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Impact of Exchange Rate Threshold Level on Stock Market Performance-Evidence from Ghana

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ABSTRACT

The exchange rate plays a significant role in an economy and also the purpose of this study is to examine the impact of exchange rate threshold level on the capital market performance. The study used a Threshold Autoregressive model introduced by ^[24] and ^[12]. The study used quarter-time series data for thirty years from 1990 to 2019. The capital market performance was measured by the value of shares traded; market turnover; market capitalization and all-shares index. However, the results unconcealed the subsequently estimated threshold level of exchange rate for every performance indicator: 7.94%; 25.33%; 25.33%, and 7.80% respectively. In all, the threshold level of the exchange rate estimated was 8 and 25 percent. The findings suggest that a low rate is performance-enhancing. Additionally, the exchange rate above the threshold level is harmful to the capital market performance. The findings of this investigation may be helpful to the government of Ghana and policymakers as they decide on an exchange rate target to implement to avoid the prejudicious effects of high exchange rates whereas getting the growth advantages of the low exchange rate. The finding of the study shows that the exchange rate impacts the economy more than inflation however, not many works in the subject area have been done in Sub-Saharan Africa. Therefore, I suggest that more threshold studies ought to be meted out on the exchange rate in the other sectors of the economy to determine its impact on the economy.

1. Introduction

Goods and services are trade among nations. Trading globally creates an opportunity for shoppers to encounter goods and services that are not available in their country or more expensive domestically. For the trading to be effective, the consuming country has to convert its currency into another nation's currency at a charge. This expense is term as an exchange rate. In finance, an exchange rate could also be a rate at that one currency is listed for oth-

ers. It is additionally viewed, as the estimation of one nation's currency concerning completely different currencies. An exchange rate can likewise mean a price of one currency expressed in terms, of another currency or against a basket of various currencies. An exchange rate can likewise mean a price of one currency expressed in terms, of another currency or against a basket of various currencies. In a very skimming exchange rate system, the unit is set by the powers of demand and provide within the unfamiliar with the trade market.

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High exchange rate affects the economy wherever import of products and services is dominated than the export of products and services, in the sense that each one producing corporations and different businesses that interact business with their foreign counterpart got to carry an outsized sum of the native currency for few foreign currencies in other to do their business. These high expenses, however, apportion to merchandise and services and creating them expensive to afford. The exchange rate is that the money value for credit and foreign currencies. It affects resource allocation, production, levels, price, and gain. Ultimately, fluctuation during this reflects in share value as an indicator of market performance^[17]. they have additionally seen real exchange rate depreciation as an element that would additionally result in capital flight thereby depriving the domestic economy of its investable money resource.

According to^[5], exchange rate instability has real monetary prices that influence price stability, firm profit, and a nation's steadiness. Exchange rate unpredictability has implications for the financial arrangement of a nation notably the stock market. Yet, an outline of the available literature uncovers disparate views on analysts on the issue of whether or not unacquainted with exchange rate fluctuation impacts stock market unpredictability^[9, 21-23] exchange rate volatility consequence is unhealthy for companies as a result of it affects the important output of a country. The share costs of corporations are eventually influenced due to the changes within the current and future money flows of the firm.

1.2 Problem Statement

The Ghanaian economy is not left out with the exchange rate development. However, the aim of this study is to establish the link between Exchange rate and stock market performance and to estimate the extent of exchange rate above it the exchange rate would hinder the performance of the stock exchange. The paper is interested in estimating the threshold level of the exchange rate in order to find out at what level of the exchange rate would be harmful to the stock exchange as a result of most of the listed corporations on the Ghana stock exchange have their business transaction hovering round the globe.

1.3 Objectives of the Study

- (1) To analyze the extent to that exchange rate fluctuations, impact the worth of shares listed.
- (2) To find out the impact of the exchange rate on the market turnover ratio.
- (3) To investigate the impact of exchange rate fluctua-

tion on the capitalization of shares listed.

- (4) To analyze the extent to that exchange rate fluctuations impact all-shares index.

1.4 Research Questions

This research work seeks to answer a wide range of questions and therefore the following research questions are going to be thought of during this work.

- (1) what is the impact of the exchange rate on the worth of shares listed under the various exchange rate regimes?
- (2) Is there a statistically vital threshold level of exchange rate above that exchange is harmful to the turnover ratio?
- (3) Is there a statistically significant threshold level of exchange rate above that rate of exchange is harmful to market capitalization?
- (4) Is there a statistically non-linear relationship between exchange rate and all-shares index; in other words, is there an intensity of exchange rate above that exchange rate affects all-shares index?

2. Literature Review

Post Keynesian approach assumes that currency prices are determined among the marketplace for money-capital that trade flows do not tend toward balance. It is additional assumed that gain effects are additional very important to decide the present account than price effects. Purchasing power parity theory on the other enunciates the determination of the rate of exchange between two inconvertible paper currencies. though this theory is also traced back to Phillis Wheatley and Ricardo, but the credit for developing it in an exceedingly very systematic means that has gone to the Swedish economic expert Gustav Cassel. This theory states that the equilibrium rate of exchange is set by the equality of the purchasing power of two inconvertible paper currencies. It implies that the rate of exchange between two inconvertible paper currencies is set by the internal price levels among the countries.

However, the balance of payments theory of the rate of exchange maintains that the rate of exchange of the currency of one country with the opposite is set by the factors that are autonomous of the interior price index and finances. It emphasizes that the rate of exchange is influenced, in a very important manner, by the balance of payments position of a country. A deficit within the balance of payments of a country signifies a state of affairs throughout that the demand for exchange (currency) exceeds the availability of it at a given rate of exchange. The demand for a foreign exchange arises from the demand for foreign merchandise and services. the availability of foreign

exchange, on the contrary, arises from the availability of product and services by the home country to the foreign country.

2.1 Empirical Review

The studies reviewed thus far have indicated that the exchange rate is a major obstacle in promoting economic process, therefore, it is a necessity of policymakers to aim at mitigating the exchange rate to a lower rate. However, the question is what ought to be the target level of exchange? Once more, how low ought to be within the capital market to have a positive impact on economic growth? In other words, if a non-linear relationship exists between exchange rate and growth, then it ought to be possible to estimate the threshold, or exchange rate purpose, at that the sign of the relationship between the two variables would switch. The study concerning the relationship between inflation and economic growth had been looked at into two ways, that is a linear and non-linear model.

However, the first few studies that investigated the possibility of non-linear relationships are ^[8, 19]. In their studies, they found structural breakpoints. ^[8], found the existence of a positive relationship between long-term growth and inflation at a low rate of inflation, however at higher rates it becomes negative. Later ^[8] research, different studies among others ^[15] found threshold inflation in a developed country is 1-2% and developing country is 11-12%. ^[16] found 2% in industrializing countries and 17% for non-industrialized countries. ^[24] found 5.43% in 32 Asian countries. ^[4] found a 12% threshold of inflation in developing countries.

Then, ^[3] found 13.48%, 14.48%, 15.37%, and 40% for total gross domestic product, industrial, services, and agriculture sectors respectively, ^[18] found an inflation threshold of 6.7% for the total sample, 9-11 of the sub-sample of low-income countries and 6.5% for middle-income countries. Moreover, few studies have examined the threshold level and also the relationship between inflation and economic growth in Ghana. These are ^[10] explored threshold regression models designed to estimate the inflation thresholds rather than imposing them, have obtained 10% for Ghana whereas, ^[1] explored the conditional least squares technique found 11% for Ghana, lastly ^[2] using secondary quarter-time series data for thirty-years from 1990 to 2019 on the capital market found inflation threshold level of 3% and 4% for the Ghana Stock Market. Again, completely different thresholds or mixed results in inflation level could have been caused by exploitation of data from the various economic jurisdictions of varying economic trends and conditions. ^[20, 16] mention that the study of inflation and economic growth ought to be

the main target in the country as a result of the economic structure of each country is completely different. Besides, some studies have examined the same country however have obtained totally different results for a different period which seemingly due to the economic structure of the country over time. It has additionally been noted that there is no specific study that has yet been undertaken on the threshold impact of exchange rate on capital market performance. Although, the capital market has been one of the sectors that form an integral part of economic growth. However, the main target of data for this study is on Ghana.

3. Research Methodology

The methodology utilized in this study relies on the threshold autoregressive (TAR) approach introduced by ^[24, 12]. In this model, the dependent variable is a function of its lag. Within the self-exciting threshold model, the lagged variable is employed as the threshold variable. This model specifies that individual observations can fall into distinct categories based on the value of a determined (threshold) variable. In growth theory, the main sources of growth power lie in the buildup of the factor of production, and therefore the promotion of marginal productivity and total factor productivity. The recent literature has instituted that the relationship between monetary development and economic growth does not follow a single pattern. As an example, ^[14, 11, 6] have found that inflation affects real variables through its impact on monetary market activities. To look at the effects of the interaction between inflation on capital market performance, the study employed the TAR model proposed by ^[24, 12]. In the TAR model, the classification of the variable across regimes relies on an estimate of the time series behavior that is consistent with reaching the threshold that separates the regimes. This study applies the Autoregressive model to estimate the threshold level of inflation higher than that inflation could have an effect on capital market performance. The threshold level of inflation relies on the subsequent equation:

$$Y_t = \beta_1' x_t h(qt \geq y) + \beta_2' x_t h(y < qt < y) + \varepsilon_t \quad (1)$$

Equation (1) can be re-written in a general form as:

$$\begin{aligned} \gamma_t &= \beta_1' x_t h + \varepsilon_t & \text{if } q_t \leq \gamma \\ \gamma_t &= \beta_2' x_t h + \varepsilon_t & \text{if } q_t > \gamma \end{aligned} \quad (2)$$

Where qt is the threshold parameter that dividing the observation into two regimes (assuming the single threshold model). The regimes are split by differing regression slopes, β_1 and β_2 . We now need to know whether or not

the threshold impact is statistically significant. The null hypothesis of the threshold impact is represented by the linear constraint $H_0: = \beta_1$ and β_2 . The threshold value is determined by the least square estimation proposed by the author and also the value of the threshold that decreased the total of squares residuals ^[13]. The likelihood ratio test is employed for the development of a confidence interval. Estimation for slope parameter β_1 and β_2 on the sample split for estimation of.

4 Presentation and Analysis of Results

4.1 Introduction

This section focuses on the empirical estimation, presentation and economic interpretation of the regression results carried out using the methodology highlighted in the previous section.

Table 1. below, shows descriptive statistics of the dependent and explanatory variables that were used in the study for the thirty years from 1990 to 2019. The exchange rate is at 1.69% as compared with other explanatory variables such as inflation rate and interest rate whose rate is at 5.34% and 3.81% respectively. The average exchange rate shows in table 1 below is -0.34%.

4.2 Correlation Matrix

The correlation analysis was performed ascertain the

strength and direction of the linear relationship between the two variables. In the results, the correlation between exchange rate and also the total value of shares, market turnover ratio, market capitalization, and all-shares index are 0.899, -0.258, 0.926, and 0.753 respectively, that indicates that there is a moderate positive relationship between inflation and market turnover ratio. The negative relationship between exchange rate and market turnover ratio suggests that as exchange rate decreases, dependent variables of market turnover ratio increase. The result additionally indicates the highest positive relationship between exchange rate and market capitalization, that shows that, because the exchange rate increase, market capitalization decreases.

4.3 Stationarity Tests

The stationarity or unit root test of the data employed in this study was conducted exploring the augmented Dickey-Fuller test and therefore the results are shown below. The study compared the test statistic value with that of test important value at 5% significance and considering p-value and it has been indicated that three variables (MCA, ASI, EXCH, and INT) had unit-roots. This can be as a result of absolutely the values of the ADF test statistic for each of these variables were less than absolutely the variables of the test essential values at 5-hitter. additionally, the p-values appreciate each of the ADF test statistics for these

Table 1. Descriptive statistics

	TVS	MTOR	MCA	ASI	INF	EXCH	INT
Mean	1.737178	-4.680262	6.417439	8.089632	3.925201	-0.340263	3.128361
Median	2.576422	-4.730551	7.878682	8.286252	3.892840	-0.099084	3.135494
Maximum	6.130813	-2.409566	9.730751	10.38559	5.348060	1.698443	3.806663
Minimum	-6.151633	-6.924473	-0.460449	4.850936	3.167161	-3.370668	2.564949
Std. Dev.	2.885501	0.969509	3.071229	1.394657	0.509607	1.395214	0.380704
Observations	117	117	117	117	117	117	117

Table 2. Correlation matrix

	TVS	MTOR	MCA	ASI	INF	EXCH	INT
TVS	1.000000	-0.029737	0.948914	0.811088	-0.370256	0.898864	-0.567774
MTOR	-0.029737	1.000000	-0.343614	-0.148584	0.352415	-0.258186	0.444230
MCA	0.948914	-0.343614	1.000000	0.808943	-0.459114	0.926010	-0.673671
ASI	0.811088	-0.148584	0.808943	1.000000	-0.320895	0.752875	-0.633971
INF	-0.370256	0.352415	-0.459114	-0.320895	1.000000	-0.462616	0.761616
EXCH	0.898864	-0.258186	0.926010	0.752875	-0.462616	1.000000	-0.616376
INT	-0.567774	0.444230	-0.673671	-0.633971	0.761616	-0.616376	1.000000

variables were bigger than 5% (0.400; 0.428; 0.193 and 0.338), respectively. in this case, the null hypothesis of no unit roots within the data series could not be rejected and therefore accepted. However, the variables with unit root are transformed into initial difference to bring stationarity in these data, thereafter, the changed data were utilized in the regression model in the study.

Table 3. Result of Augmented Dickey- Fuller (ADF) stationarity tests

	ADF Test Statistics	Test Critical Value at 5%	*P - Value
TVS	3.952786	3.449020	0.013
MTOR	7.066288	3.449020	0.000
MCA	2.355441	3.449020	0.400
ASI	2.302945	3.450436	0.428
INF	4.246044	3.449365	0.005
EXCH	2.820507	3.450436	0.193
INT	2.479754	3.449365	0.338

*MacKinnon (1996) one-sided p-values.

Table 4. Result of Augmented Dickey- Fuller (ADF) stationarity tests 1st difference

	ADF Test Statistics	Test Critical Value at 5%	*P - Value
LNMCAs	6.610267	3.450436	0.000
LNASI	3.934319	3.450436	0.014
LNEXCH	9.621885	3.450436	0.000
LNINT	6.162574	3.449365	0.000

4.4 Regression Analysis

The study used a Threshold Autoregression model proposed by [22, 12] to estimate the threshold level of inflation at which inflation will be harmful to the capital market performance. To achieve this objective, we continue to test for the threshold effects using annual growth of inflation as the threshold variable. This suggest that, testing the null hypothesis of the linear model against the alternative hypothesis of the two-regime model. Since the threshold parameter is being unidentified test (such as the t-test) have non-standard distribution. [13] proposed a bootstrap method to stimulate the asymptotic distribution of the likelihood ratio test of the null hypothesis.

This study, first of all, estimated the threshold number in the model. Null hypothesis $H_0: \beta_1 = \beta_2$ (No threshold impact) and also the different hypothesis is $H1: \beta_1 \neq \beta_2$ (threshold effect exist). The result reveals one threshold model for all the dependent variables are 7.94%, 25.33%, 25.33% and 7.80 respectively.

4.4.1 Test of Exchange Rate Threshold Impact and Threshold for Total Value of Shares

Table 5. Estimated result of threshold for total value of shares

Null of Hypothesis	F - Test	Bootstrap P - Value	Estimated Threshold
Null of no threshold	18.547	0.002	7.94%
Null of one threshold	80.523	0.000	

4.4.2 Test of Exchange Rate Threshold Impact and Threshold for Market Turnover

Table 6. Estimated result of threshold for market turnover ratio

Null of Hypothesis	F - Test	Bootstrap P - Value	Estimated Threshold
Null of no threshold	12.553	0.038	25.33%
Null of one threshold	17.848	0.000	

4.4.3 Test Result of Exchange Rate Threshold Impact and Threshold for Market Capitalization

Table 7. Estimated result of threshold for market capitalization

Null of Hypothesis	F - Test	Bootstrap P - Value	Estimated Threshold
Null of no threshold	19.303	0.000	25.33%
Null of one threshold	127.249	0.000	

4.4.4 Test Result of Exchange Rate Threshold Impact and Threshold for All-Shares Index

Table 8. Estimated result of threshold for all-shares index

Null of Hypothesis	F - Test	Bootstrap P - Value	Estimated Threshold
Null of no threshold	10.732	0.127	7.80%
Null of one threshold	45.045	0.000	

4.4.5 Estimated Results of Threshold Impact of Exchange Rate on Capital Market Performance

Table 9 below shows the estimated results of exchange rate impact on capital market performance and performance has been measured with four variables that are: the value of share traded; market turnover ratio; market capitalization and all-shares index. In table 9, the first column shows the results of the impact of the exchange rate on

the value of shares traded. The result is divided into two exchange rate regimes that are low and high denoted by β_1 and β_2 . In regime, one where the exchange rate is 7.94%, the coefficient value of (1.271) which is over the threshold value indicating a positive significant relationship between exchange rate and the total value of shares traded. That one percent increase in the exchange rate would lead to a reduction in the value of the total shares traded by 127.1 per cent. In regime 2 of the first column, where the exchange rate is > 7.94% the coefficient value (2.014) shows a positive relationship between exchange rate and the total value of shares traded which a percentage increase in the exchange rate would result in a reduction in the value of shares traded. However, the result of the exchange rate on the value of shares traded is statistically significant in each regime. This means that the exchange rate is detrimental to the value of shares traded in both regimes.

The second column of table 9 shows the result of the impact of exchange rate on market turnover ratio. In the table, where the exchange rate is 25.33% the coefficient value (-0.392) shows the negative relationship between exchange rate and market turnover ratio and that a percentage decrease would result in an increase in the market turnover ratio by 39.2 percent. The result in the regime two also indicates that, where the exchange rate is 25.33% the coefficient value (0.166) indicating a positive relationship between exchange rate and market turnover ratio, this suggests that a percentage increase in the exchange rate would lead to a decrease in the market turnover ratio. The impact of the exchange rate in one regime is negative and statistically significant, but statistically insignificant in regime two. The estimated result in the third column of table 9 indicates that where the exchange is 25.33 the coefficient value (2.236) shows a strong positive relationship between exchange rate and market capitalization and that a one per cent increase in the exchange rate would result in a reduction in market capitalization by 223.6 per cent. Where exchange rate is 25.33% the coefficient value (1.766) also shows the positive relationship between inflation and market capitalization and that a one per cent increase in the exchange rate would result in a reduction in market capitalization of 176.6 percent. The result of the impact of exchange rate on market capitalization in both regimes, one and two is positive and statistically significant in both inflation regimes.

Lastly, the fourth column of the Table 9 shows that, in regime one, where exchange rate is 7.80% the coefficient value (0.196) indicates the positive relationship between exchange rate and all-shares index and that a percentage increase in the exchange rate would result in a reduction in the all-shares index by 19.6 per cent. It has also been

revealed in the regime two that where the exchange rate is 7.80% the coefficient value of (0.719) shows the positive relationship between exchange rate and all-shares index that one per cent rises in the exchange rate would result in a reduction in the all-shares index by 71.9 percent. However, the impact of on all-shares index is statistically significant in high exchange rate regime that is (if qt 7.80). This implies that the exchange rate is harmful to all-shares index when it rises above the estimate threshold level.

Table 9. Impact of exchange rate on capital market performance

Effect of Inflation on Capital Market Performance	Value Traded	Turnover Ratio	Market Capitalization	All-Share Index
β'_1	1.271 (0.204)***	-0.392 (0.115)***	2.236 (0.120)***	0.196 (0.125)***
β'_2	2.014 (0.122)***	0.166 (0.215)	1.766 (0.226)***	0.719 (0.074)***

Notes: Estimation period is 1990Q4 to 2019Q4. Threshold variable is the growth rate of EXCH&. “***” levels of significance. Values in parentheses are t values.

4.4.6 The Result of Explanatory Variable and Capital Market Performance

In table 10 below, the estimated result revealed a positive significant effect of inflation on the market turnover ratio, all-shares index, and a negative significant effect of inflation on the market capitalization in the regime one of the models. The coefficient value (2.206; 1.096 and -1.537). In regime two, the result also indicates a statistically significant positive effect inflation on the value of shares traded, market capitalization and a negative significant effect of on all-share index with the coefficient value (1.079; 1.891; and -651). The result shows a strong positive effect of inflation rate on capital market performance measures in both regimes suggesting that the inflation rate can equally harm the capital market performance.

The result also shows that the interest rate has a negative effect on the value of market turnover ratio and all-shares index in the regime, one with the coefficient value (-1.110 and -2.594). In regime two, the result indicated the positive effect of interest rate on market turnover ratio and a negative impact on market capitalization and all-share index with the coefficient value (3.499, -1.025 and -3.759) these results are statistically significant.

Table 10. Effect of explanatory variable on capital market performance

Effect of Control Variables	Value Traded	Turnover Ratio	Market Capitalization	All-Share Index
<i>Constant</i>	20.374 (2.487)***	-8.595 (0.626)***	24.052 (1.853)***	15.017 (1.528)***
	11.459 (2.275)***	-17.467 (3.874)***	27.318 (4.071)***	9.109 (1.385)***
	-0.855 (0.518)	2.206 (0.298)***	-1.537 (0.313)***	1.096 (0.402)***
<i>lnfl</i>	1.079 (0.324)***	-0.651 (0.626)	1.891 (0.658)***	-0.651 (0.186)***
	-0.512 (0.668)	-1.110 (0.492)***	-0.201 (0.517)	-2.594 (0.448)***
<i>lnint</i>	-0.434 (0.664)	3.499 (1.181)***	-3.759 (1.241)***	-1.025 (0.398)***
	R- Square	0.839	0.536	0.892
<i>Number of Observation</i>	50	89	89	49
	66	27	27	67

Notes: Estimation period is 1990Q4 to 2019Q4. Threshold variable is the growth rate of EXCH &. “***” levels of significance. Values in parentheses are t values.

5. Conclusions

In this empirical work, the study examined the impact of exchange rate on capital market performance by considering a threshold level of the exchange rate. The study used a threshold autoregression (TAR) approach proposed by [24] and [12] to ascertain the threshold impact of exchange rate on capital market performance. The study covered the period of thirty-years from 1990-2019. so as to estimate the threshold level, the study used a growth rate of the exchange rate as a threshold variable in the model. The study estimates the threshold level of exchange rate for performance indicators from 8% to 25th that's 8% for the value of shares traded and all-shares index and 25th for turnover ratio and market capitalization. The findings of this study show that there is one exchange rate threshold value. The result indicates that the exchange rate is completely significant in both low and high exchange rate regimes for all the dependent variables, except that of the market turnover ratio that encompasses a negative significant relationship with the exchange rate in regime one and positive in regime two but not significant. The estimated results confirm the exchange rate situation in the Ghanaian economy. The empirical result further suggests that when the threshold level of the exchange rate is above 8 to 25th, the exchange rate is harmful to capital market performance. Also, capital market performance is often enhanced only when the exchange rate is below the threshold level estimated.

In conclusion, the investment into the capital market would only be improved when the exchange rate is kept at a low or moderate rate. The empirical result in this study indicates that the exchange rate threshold so exists in the

relationship between the exchange rate and capital market performance. However, the policy implication derived from this study is that governments and policy-makers ought to develop and implement microeconomic and macroeconomic policies which will enhance the performance of the capital market to stimulate economic growth in Ghana and developing countries. The findings of this investigation might be useful to the government of Ghana and policymakers as they decide on an exchange rate target to adopt to avoid the harmful effects of a high exchange rates while reaping the growth benefits of the low exchange rate.

It has indicated that the exchange rate impacts the economy more than inflation in Sub Saharan Africa however, not many works in the discipline in Sub Saharan Africa. Therefore, I like to recommend that additional threshold studies have to be meted out on the exchange rate in the other sectors of the economy to establish its impact on the economy.

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