



THE IMPACT OF INTEREST RATE AND INFLATION ON THE EXCHANGE RATE OF THE GAMBIA

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Abstract

This article investigates the consequences of interest rate and inflation on exchange rate in The Gambia, employing the dynamic model of Fully Modified Ordinary Least Square (FMOLS), Dynamic Ordinary Least Square (DOLS) and Canonical Cointegrating Regression (CCR) from 2007M1-2018M12. The long-run results reported a positive association between inflation and exchange rate, indicating that an upward movement in inflation rate will cause the dalasi to appreciate against the US dollar. Thus 1% increment in inflation will raise the exchange rate by 0.39%. However, interest rate is negatively associated with exchange rate; this implies that an increase in interest rate will cause Gambian Dalasi (GMD) to depreciate by 0.07%. The EG-Causality analysis postulated a unidirectional causal association moving from inflation to exchange rate and a feedback liaison between interest rate and exchange rate.

Keywords: Exchange rate, Interest rate, inflation, The Gambia, FMOL

INTRODUCTION

Exchange rates fluctuations is one of the main obstacles that developing economies confront in the macroeconomic management in which The Gambia is not an exception. The Gambian dalasi, was pegged to the British pound sterling since introduction in 1971 (Touray, K. Dibba, & O. Jallow, 2017). However, the peg collapsed after balance of payment and external debt crises

hit the economy in 1980s, for the past years, one of the most critical topics for Gambian economy is the fluctuating foreign exchange rate. The Gambian currency (Dalasi GMD) is fast depreciating against foreign currencies viz. Pounds, US Dollar and Euro. According to the Central Bank of The Gambia (CBG), it is assumed that interest rates in Gambia will rise when interest rates in the US are relatively unchanged, then investors from Gambia will reduce the demand for US dollars as interest rates in Gambia offer more attractive return. Interest rate fluctuation can be both the positive and negative in terms of profit depending increase or decrease in the rates (Tafa, 2015).

In 2018, inflation rate for Gambia was 6.3% though Gambia inflation rate fluctuated sustainably in recent years. The reflection of inflation as it is measured by the consumer price index shows the annual percentage change in the cost to the average consumer of acquiring goods and services that may be fixed or changed at specified intervals, such as yearly (IMF, 2018). However, the domestic foreign exchange market in The Gambia continues to operate smoothly despite the fluctuation of inflation and interest rates. Transaction volumes increased to US\$2.1 billion in the year to March 2019 compared to 1.7 billion US dollars in the previous year. From January to March of 2019, volume of transactions amounted to 638.5 million US dollars compared to US\$507.9 million in the last quarter of 2018, this indicate an increase of 25.7% (CBG, 2019). In the first quarter of 2019, buying of foreign currency increased by 18.1 % from a year ago. Furthermore, sales of foreign currency rose significantly by 20 % in the same period, thus showing a positive indication of Gambia economic outlook. Central banks need to understand the magnitude through which inflation and exchange rate can affect exchange rate fluctuations and further monitor the impacts it has on the economy as a whole. Many reasons have been discussed in the literature for the fluctuation of exchange caused by inflation and interest rate.



Figure 1. Gambia - Average Consumer Price Inflation Rate

Source: IMF: World Economic Outlook (WEO) Database, April 2019

There is no known publicized article focusing on the effects of interest rate and inflation on the exchange rate of The Gambia, it is against this gap that we find it fitting to do a research that strictly focuses on The Gambia. This study aims to study the effects interest rate and inflation rate has on exchange rate using three methods of analysis; Fully Modified Ordinary Square (FMOLS), Dynamic Ordinary Least Square (DOLS) Model and Canonical Cointegration regression (CCR) comprising of data from 2007M1-2018M12.

Results from this study is expected to be useful the government and policy makers in formulating realistic and concrete policy, the findings will also interest investors and professionals in the finance sector with an updated economic outlook of The Gambia. Being the first ever study conducted in The Gambia, the study can also be used by students, academicians and researchers as a benchmark in little empirical research in the area of Finance and Economics. The findings of this paper are can further fill the knowledge gap in terms of the relationship between inflation, exchange rate and exchange rate in The Gambia. The rest of the paper is organized as follows; in the next section, consist of the literature review in an empirical aspect of the relationship between inflation, interest rates and exchange rate. In the third section, details of the methodological procedure are explained. Result and the analysis are given in the fourth section. The paper concludes in the fifth section.

LITERATURE REVIEW

The relation of inflation, interest rate and exchange rate has become a topic of long debate among academics and there still exist a gap in the inconsistency of the findings both theoretical and empirical findings. According to Erbaş, Sökmen, & Yilmaz (2019), events where exchange rates are highly volatile, they tend to increase or decrease the interest rates in general and thus prefer the way to keep the exchange rates in balance. The authors' main focus was on whether the change in the interest rates has any effect on the exchange rate by assessing nine countries both developed and developing using panel data spanning from 1993-2015 to analyze the data. The findings showed that increase in the prices of goods and services increases the inflation rate, which eventually result in a decrease in the value of local currency against other currencies resulting exchange rate to rise (Erbaş et al., 2019).Theories shows that, governments interference can affect the exchange rates fluctuation by setting exchange barriers, trade barriers and Intervening in inflation and interest rates (Madura, 2008). Despite the effects of exchange rate fluctuation caused by inflation and interest, Carlson & Osler (1998) observed that speculation of the capital market can be a factor of exchange rate fluctuation depending on the types of shock present in the market.

On a similar study, Furman & Stiglitz (2006) from their study in nine developing nations from 1992-1998, shows that an increase in interest rates can result in a depreciation of exchange rates. However, the finding of this study is more suitable in countries with low inflation than in countries with high inflation. In another viewpoint, Purnomo (2017) took a different dimension on the effect of inflation on the currency exchange rate in an Islamic finance point of view using an interactive analysis techniques. The Author argued that, the decline of inflation in Islamic economy was due to slow economy growth influenced by the weakening of world economy and thus affected the unpredictable exchange rate of the Islamic world. exchange rate can also be affected by other factors such as income level, government control and speculations on future exchange rates (Tafa, 2015).

Nyumuah (2018) studied the volatilities between interest rate, inflation and exchange rate of developing countries. The analytical tools employed comprises of unit root test, vector error correction test and ordinary least squares regression. The findings showed that the interest rate inflation and exchange rate volatilities do not have significant effects on money demand in developing countries. However, this is not a justification that interest rate and inflation does not have any impact on exchange rate fluctuation because the demand for money of many developing economies proves to be very unstable. This argument is supported by the study of (Izadi & Dehmarde, 2012). Abdurehman & Hacilar (2016), in the other hand used the ordinary least square (OLS) model to analyze the historical exchange rates and inflation differentials of the relationship between exchange rate and inflation. Their findings reveals how the deviation of purchasing power parity might be attributed to certain factors such as transaction cost, government restriction, product specialization or other related factors. Thus exist, positive relationship between interest rate and exchange rate.

Saraç & Karagöz (2016) investigated the Impact of Short-term Interest Rate on Exchange Rate on a special concentration in Turkey using frequency domain causality test. The Authors noticed that there is no evidence that higher interest rates cause a weakening of exchange rate, thus, deviating from the previous articles. According to the findings of Basurto & Ghosh (2001), this result is not a very strong definitive evidence of the effect of high interest rates on the ability to influence exchange rate. Stability in exchange rate emerges as one of the most important objectives of the monetary policy (Cioran, 2014). Isiksal, Samour, & Resatoglu (2019) investigated "Monetary Policy and Exchange Rates" in Turkey before and after the financial crises (2001-2007 and 2010-2016) using ARDL. They suggested that an increase or decrease in the interest rates leads to the appreciation or depreciation of the domestic currency.

METHODOLOGY

Data

This article investigates the consequences of interest rate and inflation on exchange rate in The Gambia, employing the dynamic model of FMOLS, DOLS and CCR, using a monthly data from 2007M1-2018M12. The data for exchange was obtained from OECD, inflation rate from The Gambia Bureau of Statistics (GBOS) and short-term interest rates from Federal Reserve Bank of FRED St. Louis and Exchange rate and Central Bank of The Gambia (CBG). Short-term interest was also used by (Isiksal et al., 2019). The selected this time series is due to the availability of the inflation data. Secondly, according to a report by the IMF (2007), during this period the Central Bank of The Gambia has performed various interventions strategies to stabilize the volatility of the exchange rate. Therefore, the time frame studied represented a vital period in the Central Bank's intervention policies. The dependent variable is exchange rate while the explanatory variables are inflation rate and interest rate.

$$\ln EXC = f(\ln INFL, \ln INT) \quad (1)$$

Where, $\ln EX$ is log of exchange rate, $\ln INFL$ is log of $\ln INFL$ and $\ln INT$ is log interest rate.

Long-run estimation

After confirming stationarity between the variables using the Augmented Dickey Fuller unit root, the cointegration test of Johansen (1988, 1991) and Phillips and Ouliaris (1990) is also applied to avoid spurious analysis. Thereafter the long-run association amid exchange rate, inflation and interest rate is determined by the use of a single vector cointegration procedure. Although various methods can be utilized are applicable for testing cointegration. The "Fully Modified OLS" of Phillips and Hansen (1990) is utilized in this paper. This method has the merit of attaining asymptotic effectiveness by putting into consideration the existence of autocorrelation and to impede the endogeneity issues between regressors. The Dynamic OLS and Canonical Cointegration Regression of Stock and Watson (1993) are used for robustness to confirm the consistency of the FMOLS result. The DOLS approach further has a merit of preventing probable effects of endogeneity in the regressors that might occur. If cointegration is confirmed amid the variables, the individual cointegration regressions can be applied to the individual order of series. Therefore to estimate the long-run regression the FMOLS, DOLS and CCR are employed. Model expression:

$$\ln_t EXC = \beta_{0i} + \beta_{1i} \ln CPI + \beta_{2i} \ln INT + e_{it}; \quad (2)$$

Where, $\ln EXC$ is the natural log of exchange rate, $\ln CPI$ is the natural log of inflation, $\ln INT$ is the natural log of interest rate, and ε is the error term.

ANALYSIS AND RESULTS

Unit Root Analysis

The ADF results evidenced the presence of stationarity in the variables at first difference since the p values < 5% significance and thus the null assumption is rejected.

Table 1 ADF Unit Root Test

Variables	Level				First difference			
	Intercept		Intercept & trend		Intercept		Intercept & trend	
	T-stats.	Prob.	T-stats.	Prob.	T. stats	Prob.	T-stats.	Prob.
InEXC	-1.67629	0.4479	-3.27221	0.0755	-8.48024	0.0000	-8.45480	0.0000
InCPI	-1.83860	0.3603	-1.66682	0.7599	-5.39453	0.0000	-6.00759	0.0000
InINT	-1.29085	0.6325	-3.16759	0.0957	-6	0.0000	-10	0.0000
					.41659		.7271	

Note: "InCPI= Consumer Price Index, and InINT=Interest rate".

Cointegration

Johansen (1988) offered the "maximum Eigen-value test" that is proficient of discover multiple cointegrating association amid the variables. Moreover, Phillips and Ouliaris (1990), highlighted a novel technique for analyzing cointegration among variables. Both techniques applied below suggested cointegration exist among the series. The null hypothesis of non-cointegrating series is discarded at 5%.

Table 2 Johansen Cointegration Test

No. of EC(s)	Eigenvalue	Trace Statistics	Critical Value (0.05)	Prob**
None*	0.167717	36.81535	27.79707	0.0066***
At most 1	0.059589	13.50027	15.49471	0.0977
At most 2*	0.043872	5.697625	3.841466	0.0170***

Phillips –Ouliaris Cointegration Test

Series	Tau-statistics	Prob*	Z-statistics	Prob*
InEXC	-3.907279	0.03900**	-27.47853	0.0305**
InCPI	-4.191382	0.0184***	-31.31612	0.0232**
InINT	-3.000075	0.2519	-12.53989	0.0455**

***' ** "represent 1% and 5% significance respectively".

Long-Run Dynamic Model

Table 3 Long-run Coefficients of Models - FMOLS

Variables	Coefficients	t-statistics	P value
InCPI	0.391567	170.8529	0.0000***
InINT	-0.071876	-7.737085	0.000***
R ²	0.655926		
Adj. R2	0.653259		
S.E	0.060521		
Long-run	0.012617		

Note: InCPI= Consumer Price Index, and InINT=Interest rate. The bracket symbolize the P values while, *****,***,* represent 1%, 5% and 10% significance level respectively.

Table 4 Long-run Coefficients of Models-DOLS

Variables	Coefficients	t-statistics	P value
InCPI	0.391103	154.9948	0.0000***
InINT	-0.072042	-7.171640	0.0000***
R ²	0.713870		
Adj. R2	0.697317		
S.E	0.056834		
Long-run	0.012292		

Table 5 Long-run Coefficients of Models-CCR

Variables	Coefficients	t-statistics	P value
InCPI	0.391456	169.9688	0.0000***
InINT	-0.062221	-6.759270	0.0000***
R ²	0.656982		
Adj. R2	0.654323		
S.E	0.060428		
Long-run	0.012617		

The long-run results from the FMOLS, DOLS and CCR reported a positive association between inflation and exchange rate, indicating that an upward movement in inflation rate will cause and in the dalasi to appreciate against the US dollar. Thus 1% increment in inflation will raise the GMD against the USD by 0.39%. However, interest rate is negatively associated with exchange rate; this implies that an increase in interest rate will cause GMD to depreciate by 0.07%.

Granger Causality

Table 6 Granger Causality

Ho: no causality	F-statistics	P Value
lnCPI→lnEXC	3.71430	0.0271
	0.07099	0.9315
lnInt↔lnEXC	4.20096	0.0171
	3.42572	0.0356

The EG-Causality analysis postulated a unidirectional causal association moving from inflation to exchange rate. This signifies that inflation an increase or decline in inflation has consequences on exchange rate but appreciation or depreciation of the Gambian dalasi has no impact on inflation rate. Contrarily, interest rate and exchange rate has a feedback liaison.

CONCLUSION AND IMPLICATIONS

The long-run results from the FMOLS, DOLS and CCR reported a positive association between inflation and exchange rate, indicating that an upward movement in inflation rate will cause and in the dalasi to appreciate against the US dollar. Thus 1% increment in inflation will raise the GMD against the USD by 0.39%. However, interest rate is negatively associated with exchange rate; this implies that an increase in interest rate will cause GMD to depreciate by 0.07%. The EG-Causality analysis postulated a unidirectional causal association moving from inflation to exchange rate. This signifies that inflation an increase or decline in inflation has consequences on exchange rate but appreciation or depreciation of the Gambian dalasi has no impact on inflation rate. Contrarily, interest rate and exchange rate has a feedback liaison, this relationship suggest that both interest rate and exchange rate has consequences on each other.

The implication of our findings on monetary policy is that exchange rate remains important for price stability given the large proportion of imports in the country's consumption basket. If changes in exchange rate have no effect on inflation due to the unidirectional causation reported in the analysis, then monetary policies does not need to take the exchange rate into consideration when setting its inflation policy instruments. Therefore, occasional interventions in foreign exchange market by the central bank that aim at smoothing out short-term large fluctuations in the exchange rate should be encourage since they would as well enhance domestic price stability to some extent. Furthermore, hence the analysis indicated a feedback association between interest rate and exchange rate, and that an increase in interest rate results to depreciation of the Gambian Dalasi (GMD). Then, if the Central Bank wishes to

see an appreciation in the Gambian Dalasi, it should introduce quantitative easing “which is a monetary policy used by Central Banks to purchase government securities and other financial assets with newly created reserve to increase the money supply and lower interest rates”. This concept provides commercial banks with more liquidity to lend and invested those reserves in order to stimulate economic growth. It is important to note that quantitative easing do come with inflationary pressure if not properly managed, however in the case of The Gambia increasing the money supply to attained currency appreciation does not have an impact on inflation due to the unidirectional causation that runs from inflation to exchange rate. Therefore we recommend the Central Bank of The Gambia to consider quantitative easing in its monetary policies.

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