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## Is There a Causal Relationship between Money Supply and the Inflation Rate? Thoughts from the Gambia

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### **Abstract:**

*This study examines the causal relationship between money supply (M2) and inflation rate in The Gambia, using the Standardized Vector Error Correction Model for the period 1985 and 2018. The independent variable used in this research is inflation rate and the dependent variables are money supply (M2), official exchange rate, and gross domestic product (GDP). The results indicate that inflation in the Gambia is caused by money supply – the only variable that affects the rate of inflation in our model. On the other hand, official exchange rate and gross domestic product were found to have no significant effect on the inflation rate in the Gambia. These findings are consistent with the Quantity Theory of Money, which contends that the general price level of goods and services is proportional to the money supply in an economy. The findings of the paper do however have policy implications, particularly for the Gambia and other developing countries. At the policy level, the Central Bank of the Gambia needs to see to it that the amount of money supply is proportional to the quantity of money demanded, if the persistent increase in the country's inflation rate is to be adequately addressed.*

**Keywords:** Money Supply, inflation, official exchange rate, gross domestic product and vector error correction model

### **1. Introduction**

Like most developing economies, the Gambian economy has, since the country's political independence in 1965, been grappling with the challenges posed by inflation. Critics attribute this to the profligacies and macroeconomic policy failures of the previous governments and the current administration that designed and implemented inefficient and wasteful economic policies, which in turn created the necessary conditions for the mismanagement of the Gambia's meagre resources through corruption. Studies have documented that a country with more corruption, tends to have more inflation levels as well (Al-Marhubi, 2000).

Inflation is a monetary problem in every economy, and as in most of the developing economies, the nature of inflation in the Gambia is not an exception. In most economies, especially the developing economies, if the growth rate of money supply is more than the demand for money, there is high possibility that there will be some significant increase in the prices of goods and services during that particular period.

During periods of inflation, some governments use different measures to get rid of the inflation in the economy. In the US, for instance, during the 2008 financial crisis, the prices of goods and services, including wheat increased significantly (Keatinge, 2015). The monetarists were able to assess the causes of the crisis; which were down to the supply shocks in the economy, higher demand for food items, increase in the supply of money, increase in the prices of Hard Red wheat, and a huge change in the climate and natural resources (ibid).

Economists, however distinguish between two types of inflation: Demand-Pull Inflation and Cost-Push Inflation<sup>1</sup>. Both types of inflation cause an increase in the overall prices of goods and services within an economy.

Demand-pull inflation occurs when aggregate demand for goods and services in an economy rises more rapidly than an economy's productive capacity. One potential shock to aggregate demand might come from a country's central bank that rapidly increases the supply of money.

On the other hand, cost-push inflation, occurs when prices of production inputs increase. Rapid wage increases or rising raw material prices are common causes of this type of inflation. The sharp rise in the price of imported oil following the OPEC oil embargo in the 1970s, when inflation-adjusted oil prices went up from \$25.97 per barrel in 1973 to \$46.35 per barrel in 1974, is a classic example of cost-push inflation<sup>2</sup>.

<sup>1</sup> <https://www.frbsf.org/education/publications/doctor-econ/2002/october/inflation-factors-rise/>

<sup>2</sup> [https://www.thebalance.com/opec-oil-embargo-causes-and-effects-of-the-crisis-3305806#:~:text=During%20the%20OPEC%20oil%20embargo,barrel%20\(bbl\)%20in%201974.](https://www.thebalance.com/opec-oil-embargo-causes-and-effects-of-the-crisis-3305806#:~:text=During%20the%20OPEC%20oil%20embargo,barrel%20(bbl)%20in%201974.)

Most economist around the world also believe that inflation is a monetary phenomenon. In particular, Milton Friedman who many consider to be the father of monetarism and a Nobel Laureate in Economics, said "Inflation is always and everywhere a monetary phenomenon". He argued that, the changes in the overall price level are only brought about by the changes in the monetary stock or money supply.

In the Gambia, there is anecdotal evidence that suggests that money supply is positively related to the country's inflation rate, but this assertion has not been strongly supported by empirical evidence. Therefore, despite the unprecedented increase in the size of money supply from the various budget reports in the Gambia, there is still a gap in the empirical literature about the effects of money supply on the country's inflation rate.

Consequently, the two fundamental questions that needs to be addressed are, what is the relationship between money supply and inflation rate in the Gambia, and what is the policy implication of this relationship?

The paper will attempt to provide answers to these questions by using the Vector Error Correction Model (VECM), which looks at both the long-run and the short-run causal relationships between and among the variables of interest.

Testing the co-integration and causality relationships between money supply and inflation rate in the context of The Gambia for the period 1985 and 2018 is thus the subject-matter of this paper, using various other econometric estimation procedures as stationarity tests, Johansen co-integration, Granger causality and diagnostic tests.

The rest of the paper is structured as follows. Section 2 discusses the relevant literature while Section 3 showcases the data sources and methodology. Section 4 presents the empirical findings, and Section 5 concludes the paper, highlighting key policy implications and recommendations.

## 2. Literature Review

Even though the effect of money supply on economic growth has attracted a lot of research interest in recent years (See for example Kausar, *et. al.*, 2020 and Chaker, 2012), the causal relationship between money supply and inflation, particularly in developing countries such as the Gambia, has not received adequate attention. Among the few research conducted in this respect includes Liang (2017), who in an empirical study on the factors and countermeasures of inflation in China found that China's inflation was largely caused by rapid growth in money supply plus endogenous and external shock factors.

According to Ayubu (2013), understanding the degree at which money supply affects inflation will give a valuable clue of how central banks can control the relative effectiveness of monetary policy framework. Excessive supply of money over its demand can also cause inflation to occur (Akinboade, *et. al.*, 2004).

Another study also shows that money supply has a positive effect on the CPI in Pakistan; but the amount of money supply may also lead to a lot investments, promoting greater level of employment (Nawas *et al.*, 2017). This research concluded that money supply, interest rate and GDP have positive impact on the prices of goods and services in Pakistan. This suggests that in developing countries money supply is not the only macroeconomic variable that can affect inflation; but real GDP, international oil price and excessive dependent on import can equally cause inflation.

According to a research conducted by Diermeier and Goecke (2016), the control of money supply becomes the last option for the European Central Bank after the three monetary instruments were exhausted. At the time in Europe, the interest rate was low; there was a strong relationship between the liabilities and the lending of the commercial banks and the inflation in the individual countries. Eventually, Diermeier and Goecke (2016) were able to find out two problems which stood out from the rest, which were the real economy divergence and the different ways in which the financial intermediation work in different European countries (Diermeier and Goecke, 2016).

Diermeier and Goecke (2016) made a number of policy recommendations, including for there to be flexibility in the monetary policies; thereby promoting the individual demand through lending to achieve the inflation target. On the demand side, there should be a total reduction in the overall political uncertainty; while on the supply side, the total review of the monetary policies is highly required.

A case study in China by Wank and Adjorlolo (2019) revealed that long run interest rate significantly influences economic growth both in the negative and positive direction. This implies that higher interest rate has the tendency to restrict economic growth and inflationary pressure.

In the case of Winks and Adjorlolo (2019) the exchange rate also has a long run but insignificant negative effect on economic growth. They recommended that the Bank of Ghana should be autonomous and the state should not interfere in its functions. Therefore, the macro economic variables that affects economic growth is interest rate and the exchange rate (Wank and Adjorlolo, 2019).

Research on the influence of money supply on inflation in Nigeria covering the period 1970-2016, was carried out by Ditimi *et. al.* (2017) to confirm the long-run and short-run dynamic relationships among the independent variables used, *i.e.*, money supply (MS), output (GDP), real exchange rate (RER), domestic oil price (DOP), and monetary policy rate (MPR), government expenditure (GE) against the dependent variable (CPI). In their findings, they were able to establish that money supply does not considerably influence inflation both in the long-run and the short-run. This could sometimes be because of the occurrence of recession in the Nigerian economy. The belief that money supply is not the key factor that triggers inflation in Nigeria; the volatility nature of the naira to dollar (exchange rate to dollar), the economies over dependent on oil, lack of keen economic policies, huge budget deficit as well as imported inflations are all possible causes of inflation in Nigeria (Ditimi *et al.*, 2017).

Ditimi *et. al.* (2017) went on to say that inflation in Nigeria and most developing countries is due to an increase in government and private spending, natural disasters, artificial increase in prices and wage spirals. The unnecessary spending by both the government and the private individuals can cause a demand pull-inflation while natural disasters and shortage in fuel supply in the other hand could cause cost push-inflation. However, the researchers believed the

problems can be solved by both monetary and fiscal policies (i.e., the central bank of Nigeria and the government should work together) and amend the problem of inflation in Nigeria.

A study on the impact of money supply on inflation in Ghana by Collins et al (2017), using OLS analysis shows a long-run relationship between money supply and inflation in Ghana. The researchers showed that the supply of money alone does not cause inflation in Ghana. However, if the money supply is faster than the economic growth, this will cause a long and sustained period of inflation. Therefore, the inflation in Ghana is caused by both fiscal and monetary factors (Collins et al, 2017).

Amadeo (2009) also confirmed that there is a strong link between inflation and money growth both in the high inflation and low inflation countries. The relationship between the money supply and inflation in the short-run is weak and unclear but in the long-run the relationship depends on the demand and supply of money. However, the author states that, many economists rely on the Phillips curve to determine the rate of inflation. The researcher concludes by stating that the countries with higher money growth have higher inflation and vice versa (Amadeo., 2009).

A similar research was conducted by Evans (2014), with the data set ranging from 1984-2012 on the relationship between Inflation and Money Supply in Kenya. He concludes that money supply is a significant determinant of inflation in Kenya in the long-run. The researcher compares the economies of the developed, emerging and the developing countries. There was an advent of higher inflation in different world economies; on average 3.6% for the advanced economies, 7.3% for the emerging Asian countries and 10.2% for the African countries in 2008. He recommends for the Kenyan government to employ a tight monetary policy centered on controlling the money supply (M2) to contain the inflation.

Suna (2017) states that there was a unidirectional relationship between money supply and inflation but there is no causal relationship between money supply and the economic growth (Korkmaz, 2017). However, he believed that tight monetary policy can force the prices to be relatively stable that in turn will force the demand to fall and the country will eventually be forced into recession. He also recommended the central bank to use their tools effectively.

A different research by Olorunfemi (2012) on money supply and inflation in Nigeria also found a unidirectional causality between money supply and inflation rate, and the interest rate and the inflation rate as well. There was a causal effect from money supply to inflation rate, interest rate to inflation rate and interest rate to money supply respectively (Sola and Peter, 2012). Thus, the government should use the rate of inflation as a guide in measuring the effectiveness of the monetary policy.

To the best of our knowledge, there has thus far been little if any recent research examining the causal relationship between money supply and inflation in the Gambia. This paper therefore builds on the existing literature by examining the relationship between money supply and inflation in the Gambia during the period 1985 and 2018.

### 3. Data and Methodology

A thorough review of the relevant literature reveals that the most notable variables that can affect inflation besides money supply include exchange rate (EXR), foreign direct investment (FDI), international oil prices (IOP) and gross domestic product (GDP). This paper will however focus on Money Supply, Gross Domestic Product (GDP), and the Official Exchange Rate and describe the methodology and estimation procedures that will be undertaken to ascertain the relationship that exists between inflation and these variables. The estimation procedure will include stationarity tests, co-integration, Granger causality and diagnostic tests.

#### 3.1. Model Specification and Data Description

The study will adopt a vector error correction model to ascertain the existence of co-integration and to examine the relationship between the growth in money supply and the changes in the inflation rates in the context of the Gambia.

##### 3.1.1. Model Specification

In this paper, we assume that the consumer price index (CPI), which is the proxy for inflation, is the dependent variable, while broad money ( $M_2$ ), GDP and Official Exchange rate (OER) are the explanatory variables.

The model can be expressed as:  $CPI = f(M_2, GDP, OER)$ ..... (1)

In regression form the model can be written as:

$$CPI = \beta_0 + \beta_1 M_2 + \beta_2 GDP + \beta_3 OER + \mu \dots \dots \dots (2)$$

A Log model however produces the coefficients of the elasticity for the dependent variable vis-à-vis the explanatory variables. As a result, we transformed all the variables of interest into logarithms.

Therefore, equation (2) is transformed thus:

$$\ln CPI_t = \beta_0 + \beta_1 \ln M_2 + \beta_2 \ln GDP + \beta_3 \ln OER + \mu \dots \dots \dots (3)$$

Finally, the Vector Error Correction Model (VECM) will be used to determine the strength of the adjustment in each period for CPI,  $M_2$ , GDP, and OER.

The results are analyzed using the Unit Root Test. All the four variables will be tested at level and the same time at their first difference. This will show whether the VECM Model is the most suitable model for this research work. Johansen Cointegration Test will also be used to identify the cointegrating order.

The VECM Model is used to check the significance of each lag variable on the endogenous variable,  $D\_cpi$ , which is the proxy for inflation as in (3).

$$D\_cpi_t = \alpha + \sum_{i=1}^k \beta_i cpi_{t-i} + \sum_{j=1}^k \Phi_j M_{2t-j} + \sum_{m=1}^k \varphi_m OER_{t-m} + \sum_{h=1}^k \eta_h GDP_{t-h} + \mathcal{M}_{1t} \dots (4)$$

### 3.1.2. Data Description

The data used in the estimation process were retrieved from different sources, including Gambia Bureau of Statistics (GBoS), The Central Bank of the Gambia (CBG), and World Development Indicators. The data set used in this study is secondary in nature and covers the period 1985 and 2018.

Consumer Price Index (CPI) is used as a proxy for inflation and is a measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food, and medical care, etc. Changes in the CPI are used to assess price changes associated with the cost of living. The CPI is one of the most frequently used statistics for identifying periods of inflation or deflation in many economies around the world.

The types of inflation measurement provide different outcomes with their respective purpose (Jushua, 2010). However, in this research we used consumer price index (CPI) as a measure of inflation, because inflation in The Gambia is measured by using this index, which examines the weighted average of prices of a basket of consumer goods and services such as transportation, food, and medical care, etc.

This study postulates that the key factors that contribute to inflation in the Gambia are money supply, gross domestic product, and the official exchange rate. The selection of these three variables in this study is because of their significant effects on the CPI, which is used as the proxy for inflation in this study.

In terms of money supply,  $M_1$  is defined as the money currency with the public, demand deposit with the bank and deposit by the central bank.

On the other hand,  $M_2$  consists of currency in circulation outside banks and total deposits, excluding foreign currency held by banks.

Finally,  $M_3$  consists of time deposit plus  $M_1$ .

For the purposes of this paper however,  $M_2$  will be used as a proxy for money supply because it is the most preferred variable (Aikaeli, 2007).

Each of these variables will be used against CPI (proxy for inflation) and the dependent variable to see the causal relationship between the independent and the dependent variable.

### 3.2. Methodology

In this section an attempt will be made to first carry out the unit root test for the variables of interest, then proceed to perform the Johansen test procedure for the non-stationary variables to determine the cointegrating ranks.

In testing for the Unit Root, the Akaike's Information Criteria (AIC) will be used. The section will also cover some post estimation tests to confirm the accuracy of the results provided by the said tests above. The Lagrange-Multiplier Test to reveal any serial autocorrelation among the error terms or lag orders and the Jarque Bera test to confirm if the residuals were normally distributed.

## 4. Empirical Results

This section presents the empirical evidence of the study as well as the results of the diagnostic tests that were obtained using techniques such as ADF and PP stationarity tests, co-integration test, Johansen co-integration test, Granger causality tests to determine both the long-run and short-run causality between the dependent variable (inflation) and the independent variables, using the Vector error-correction model.

The main focus of this section is to offer numerical evidence that supports the argument that can be used to offer concrete support on the relationship between inflation and money supply, gross domestic product (GDP), and the official exchange rate in the Gambia.

### 4.1. Unit Root Test to Check for Stationarity

Variable Name	At Level 5% Critical Value (p-value)	At first difference 5% Critical Value (p-value)
CPI	0.9916	0.0009
$M_2$	1.0000	0.0000
OER	0.2569	0.0000
GDP	0.9942	0.0000

Table 1: Result from the Augmented Dickey Fuller Test

Source: Authors' Computation Using Stata 13.0

- $H_0$ : the variables are stationary after the first difference.
- $H_1$ : the variables are not stationary after the first difference.

Table 1 shows the results from the Augmented Dickey Fuller Test, showing the stationarity of the data. From Table 1, it can be seen that the variables were not stationary at 5% confidence level. These results show that all the variables are integrated of order one and thus become stationary after the first difference. Therefore, this supports the model specified in equation four (4), and therefore the null hypothesis that the variables are stationary after the first difference cannot be rejected.

#### 4.2. Johansen Co-integration Test

Maximum Rank	Trace Statistics	5% Critical Value
0	56.7743	47.21
1	20.3814*	29.68
2	1.8002	15.41
3	0.0000	3.76

Table2: Johansen Co-Integration Test  
Source: Authors' Computation Using Stata 13.0

- H0: the variables are integrated of order zero.
- H1: the variables are not integrated of order zero.

Table2 shows the results from the Johansen Co-integration Test, which determines if the variables of interest are integrated. The hypothesis that there is no cointegrating equation (H0) is rejected. Thus, the result shows one significant co-integrating equation. This implies that all the variables move in the same direction in the long-run. Also, the results demonstrate the trace statistics in the null hypothesis is greater than the Critical Value (CV) of 5%. Therefore, the alternative hypothesis that the variables are integrated of order one under the 5% probability value cannot be rejected.

#### 4.3. Vector Error Correction Model

Having carried out the long-run cointegration from Johansen test, the final stage for this analysis is done using the Vector Error Correction Model (VECM), which looks at both the long-run and the short-run causal relationship between and among the variables of interest.

D_cpi		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
	_ce1						
	L1.	.1114253	.1140774	0.98	0.329	-.1121623	.3350129
	CPI						
	LD. (CPI)	.1827911	.3275634	0.56	0.577	-.4592213	.8248035
	L2D. (CPI)	.1788849	.2386238	0.75	0.453	-.2888092	.646579
	M <sub>2</sub>						
	LD. (M <sub>2</sub> )	1.94e-09	9.40e-10	2.06	0.039	9.53e-11	3.78e-09
	L2D. (M <sub>2</sub> )	1.02e-09	1.13e-09	0.90	0.369	-1.21e-09	3.24e-09
	OER						
	LD. (OER)	.2137315	.2616379	0.82	0.414	-.2990694	.7265323
	L2D. (OER)	-.1272019	.2273562	-0.56	0.576	-.5728118	.3184081
	GDP						
	LD. (GDP)	1.42e-11	2.65e-10	0.05	0.957	-5.05e-10	5.33e-10
	L2D. (GDP)	-1.11e-10	1.56e-10	-0.71	0.475	-4.16e-10	1.94e-10
	_cons	1.743852	.8676211	2.01	0.044	.0433463	3.444359

Table 3: Vector Error-Correction Model  
Source: Authors' computation using Stata 13.0

Note:

L1. = Lag of cointegration equation 1

LD. (CPI)= First lag difference of CPI

L2D (CPI) = Second lag difference of CPI

LD. (M<sub>2</sub>) = First lag difference of M<sub>2</sub>

L2D. (M<sub>2</sub>) = Second lag difference of M<sub>2</sub>

LD. (OER) = First lag difference of OER

L2D. (OER) = Second lag difference of OER

LD. (GDP) = First lag difference of GDP

L2D. (GDP) = Second lag difference of GDP

- H0: the lags of Money Supply are statistically significant to explain changes in CPI.
- H1: the lags of Money Supply are not statistically significant to explain changes in CPI.

#### 4.3.1. Long-Run Causality

The Cointegrated equation 1 ( $\text{ce1}$ ) which looks at the long-run causality between the dependent variable (CPI) and the independent variables ( $M_2$ , OER and GDP) shows no effect. The result shows no long-run causality between the independent and the dependent variables. This is because the coefficient of the  $\text{ce1}$  is 0.1114253 and the probability value is 0.329 which is not statistically significant under the 5% P-Value rule.

H0: there exists a long-run causality between the independent and the dependent variable.

H1: there exists no long-run causality between the independent and the dependent variable.

Since the coefficient is positive and the probability value is not significant under 5% P-Value rule, the null hypothesis that there is a long-run causality between the independent and the dependent variable is rejected.

#### 4.3.2. Short-Run Causality

The lag values of Consumer Price Index (CPI), lag1 and lag2, have a positive effect on CPI but this is not significant. Lag1 and lag 2 of CPI, which is 0.183 and 0.179 at 57.7% and 45.3% significance levels respectively, have positive effects on CPI. The first and second lag values are not significant enough to explain any changes in CPI because they both exceed the 5% Critical Value which is the decision criteria.

The first lag of  $M_2$  has a positive effect on CPI ( $1.94\text{e-}09$ ) at a significant level of 3.9% under the 5% Probability Value. This is the only lag variable that has a significant effect on CPI among all the other lag variables that were tested. The second lag variable of  $M_2$  also has a positive effect on CPI, but this is not significant enough to have an impact on the dependent variable, CPI. This indicates that money supply ( $M_2$ ) has effect on inflation (CPI) in the Gambia.

The first and second lag values of Official Exchange Rate (OER) has both positive and negative effect on the CPI (i.e., 0.2137315 and -0.1272019) respectively. However, the variables are not significant enough to explain any changes on the dependent variable (CPI), because both the probability values have exceeded the 5% threshold (i.e., 41.4% and 57.6%) respectively (Table 3).

Finally, the lag values of GDP have both positive and negative effects on the inflation rate (CPI) in the Gambia, but these are not significant enough to explain any changes to the dependent variable (CPI). The first lag value of GDP explains  $1.42\text{e-}11$  effect on the changes in CPI at a significant level of 95.7%, which is above our 5% Probability Value. Also, the second lag value of GDP which explains  $-1.11\text{e-}10$  effect on the changes in CPI at a significant level of 47.5% which is also above our 5% Probability Value.

Thus, lag one of Money Supply ( $M_2$ ) is the only lag value that explains the changes in Consumer Price Index (CPI), the proxy for inflation, and this was found to be statistically significant. All the other lag values are not statistically significant enough to explain any changes in inflation (CPI). Therefore, the null hypothesis that Money Supply has a positive effect on CPI cannot be rejected. However, the two lag values of Money Supply ( $M_2$ ) are jointly significant under the 5% Probability Value of 10.57%, which is more than the Critical Value of 5% and this shows the two lag variables (Money Supply and are jointly significant in explaining any changes in the dependent variable (CPI).

#### 4.3.3. The Post-Estimation Tests

Lag	chi2	Df	Prob > chi2
1	26.2181	16	0.05104
2	23.1559	16	0.10963

Table 4: *Vecmar: Lagrange-Multiplier Test*  
Source: Authors' Computation Using Stata 13.0

- H0: there is no autocorrelation at lag order.
- H1: there is autocorrelation at lag order.

It can be seen from Table 4 that both lag1 and lag2 have no serial autocorrelation among the error terms or lag orders. This is because both the Probability Values of the two lag orders (i.e., 5.1% & 11.0% respectively) are more than the 5% Probability Value. Thus, the null hypothesis that there is no autocorrelation at lag order cannot be rejected

Equation	Chi2	Df	Prob>Chi2
D_CPI	7.009	2	0.03007
D_ $M_2$	0.849	2	0.65413
D_GDP	3.191	2	0.20277
D_OER	0.587	2	0.74580
All	11.636	8	0.16822

Table 5: *Jarque Bera Test*  
Source: Authors' computation using Stata 13.0

- H0: the residuals are normally distributed.
- H1: the residuals are not normally distributed

Table 5 shows the results from the Jarque Bera Test for normality. As indicated in Table 5, the residual for CPI is not normally distributed under the 5% Probability Value, but all the other variables are normally distributed at the same 5% Probability Value. Jointly, the model is statistically significant at 16.8% and normally distributed under the 5%

Probability Value. Thus, the null hypothesis that the residuals are normally distributed cannot be rejected, which means that the independent variables ( $M_2$ , GDP and OER) can explain changes in the inflation rate (CPI) in the Gambia.

These results are in line with the theory set by the father of Monetarism, Milton Friedman that, "Inflation is always and everywhere a monetary phenomenon", which suggests that money supply influences inflation.

The results are also consistent with the findings of a number of previous studies. Nawaz et al (2017) indicated that money supply has positive effect on inflation in Pakistan. Another research on money supply and inflation in Malawi by Simwaka et al (2012) indicates that inflation is a result of both monetary and supply-side factors. Growth in money supply drives inflation with lags of about 3 to 6 months (ibid). A similar research was conducted in Nigeria by Omofa (2017) and it found that money supply, interest rate and exchange rate had positive relationship with the general price level. However, it was only exchange rate that was not statistically significant.

## 5. Conclusion and Recommendations

Studying the inflation trend and the effect of Money Supply on inflation in the Gambia is a very important adventure. The research shows that the most significant lag variable that can affect inflation in the Gambia is the first lag of Money Supply. This follows when the variables were first tested using the Dickey Fuller, which tests for the stationarity of the variables. It was shown that the variables were not stationary at level but after the first difference, the variables were all stationary which allowed for the VECM Model to be used.

In the long-run, there was no causality from the independent variables ( $M_2$ , OER and GDP) to the dependent variable (CPI). In the short-run, all the variables of interest show no statistical significant effect on inflation except the first lag value of Money Supply. The study also found that from all the variables that were tested, Money Supply was the only variable that has a significant effect on the dependent variable (CPI). Thus, we conclude that the inflation in The Gambia is caused by money supply.

As a result, the study recommends that the government through the Central Bank of the Gambia (CBG) and the Ministry of Finance and Economic Affairs should reduce the country's unnecessary expenditures and control the perennial budget deficits that have come to characterize the history of economic management in the Gambia since her political independence in 1965. More importantly, and in light of the empirical evidence in this paper, it is also recommended that the CBG needs to resist the temptation of creating cheap currency through seigniorage, if it is to curb excess supply of money in the economy, which we documented in this paper to be root cause of inflation in the Gambia.

## 6. References

- i. Diermeier, M. and Goecke, H. . (2016). Money Supply and Inflation In Europe: is there still a connection? *Institut der deutschen Wirtschaft Koln*.
- ii. Aikaeli, J. (2007). Money and inflation dynamics: A lag between change in money supply and the corresponding inflation response in Tanzania . *Working papers series, SSRN-id1021227*.
- iii. Akinboade, et al. (2004). The determination of inflation in South Africa: An econometric analysis. *AERC research paper 143. African economic research consortium*.
- iv. Akinboade, et. al. (2004). The determination of inflation in South Africa: An econometric analysis. *AERC research paper 143. African economic research consortium*.
- v. Al-Marhubi, F.A. (2000), "Corruption and inflation", *Economics Letters*, Vol. 66 No. 2, pp. 199-202.
- vi. Amedeo, S. (n.d.). Money Supply and Inflation: How and how much can the Money Supply affect the Inflation Rate.
- vii. Ayubu. (2013). Monetary Policy and Inflation Dynamics: An Empirical case study of Tanzanianian economy. *Masters program in Economics, 60/120 ECTS*.
- viii. Ayubu, V. S. (2013). Monetary Policy and Inflation Dynamics: An Empirical case study of Tanzanianian economy. *Masters program in Economics, 60/120 ECTS*.
- ix. Chaker, M., Inguya, S. and Cetin, R. (2012). The impact of money supply on economic growth: A case study of the United Arab Emirates. *Journal for Global Business Advancement* 5(1):7 – 20. DOI: 10.1504/JGBA.2012.048121
- x. Collins et al . (2017). The impact of Money Supply on Inflation, a case of Ghana. *Imperial Journal of Interdisciplinary Research (IJIR)*.
- xi. Ditimi et al. (2017). The Influence of Money Supply on Inflation in Nigeria.
- xii. Ditimi et al. (n.d.). The Influence of Money Supply on Inflation in Nigeria.
- xiii. (2009). *Economic Survey*.
- xiv. Elkamel, H. (2019), "The effect of corruption, seigniorage and borrowing on inflation", *PSU Research Review*, Vol. 3 No. 1, pp. 1-15. <https://doi.org/10.1108/PRR-08-2017-0036>
- xv. Jushua, K. (2010). An Estimation of Inflation Threshold for Nigeria 1970-2008. *International Review of Business Research Paper*, 375-385.
- xvi. Kausar, R., Kamran, M., and Gull, S. (2020). An Effect of Money Supply on Economic Growth: Evidence from Pakistan. *Journal of Contemporary Macroeconomic Issues* June 2020, Vol. 1, No.1 [34-43].
- xvii. Keatinge, F. J. (2015). Influential Factors in the Econometric Modelling of the Price of Wheat in the United States of America. *Scientific Research Publishing inc*.
- xviii. Kiganda, E. (2014). Relationship between Inflation and Money Supply in Kenya. *Journal of social Economics Vol.2, No.2*, 63-83.
- xix. Liang, S. (2017). An Empirical Study on the Influencing Factors and Countermeasures of Inflation in China. *American Journal of Industrial and Business Management*, 7, 513 to 521.

- xx. Narayan, P.K., Narayan, S. and Prasad, A.D. (2006). Modelling the Relationship between Budget Deficits, Money Supply and Inflation in Fiji . *Pacific Economic Bulletin*.
- xxi. Nawas et al. (2017). Correlationand Causality between Inflation and Selected Macroeconomic Variable: Empirical Evidence from Pakistan (1990-2012). *iBusiness*, 9, 149-166.
- xxii. Nawaz, M., Naeem, M., Ullah, S. and Khan, S.U. . (2017). Correlation and Causality between Inflation and Selected Macroeconomic Variables: Emirical Evidence from Pakistan (1990-2012). *Scientific Research Publicing Inc., IBusiness*,9, 149-166.
- xxiii. Oluwadayisi, A.O., & Mimiko, M.O. (2016). Effect of Money Laundering on the Economy of Nigeria. *Scientific Reseach Inc*.
- xxiv. Omofa, M. N. (2017). An Empirical Investigation into the Effect of Financial Sector Development on Consumption and Inflation in Nigeria: 1986-2012. *Open Journal of Business and Management*, 5, 11-21.
- xxv. S. Korkmaz. (2017). The Relationship between Money, Inflation, and Economic Growth in Mediterranean Countries. *conference paper*.
- xxvi. S. Ozmucur. (n.d.). Budget Deficit, Money Supply, and Inflation: Evidence from low and high frequency data for Turkey.
- xxvii. Simwaka et al. (2012). Money Supply and Inflation in Malawi: An Econometric Investigation. *Journal of Economics and International Finance Vol. 4 (2)*, pp. 36–48.
- xxviii. Sola O., and Peter A.,. (2012). Money Supply and Inflation in Nigeria: Implications for National Development. *Science Research*.
- xxix. Urich T. and Wachtel P. (1984). The Effect of Inflation and Money Supply: Announcements on Interest Rates. *National Bureau of Economic Research 1050 Massachusetts Avenue Cambridge*, 1313.
- xxx. Wank, G. and Adjorlolo, G. (2019). The Game of Monetary Policy, Inflation and Economic Growth. *Open Journal of Social Science*, 7, 255-271.