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Macroeconomic Determinants of Inflation: Evidence from the Republic of Guinea

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Abstract
This paper examines the macroeconomic determinants of inflation in Guinea, for the period between 1990-2015 using co-integration analyses. The main purpose of the research is to investigate whether money supply, gross domestic per capita and exchange rate have a significant impact on inflation during the period under consideration. The stationary properties of all the variables were checked and established. All the variables were found to be integrated at first difference. Johansen co-integration approach showed that there is both long and short-term relationship between the variables. The study shows that in the long-term, when money supply increases by 1% inflation also rise by 0.18%, the exchange rate has a positive effect on inflation. 1% increase in the exchange rate will also cause inflation to increase by 0.007%. However, GDP per capita influenced inflation negatively; as a result, 1% increase in GDP per capita will cause inflation to decline by 0.08%.
Keywords: Guinea, Inflation, Economy growth, and Cointegration

1. Introduction

This paper examines the framework for analyzing the key determinants of inflation in Guinea over the period 1990-2015, the period that Guinea's economy started experiencing some level of economic decline. It must be pointed out however that, one of the most tormenting macroeconomic problems facing the world today is inflation which has been mainly characterized by several economic factors, termed as determinant of inflation, which significantly impact today's world.

Economists has debated that inflation is firmly a monetary phenomenon and it occurs when the increase of money supply is higher than the growth rate of the economy [Akcay et al (1996)], the link between money and inflation is created when government allows the Central Bank to print money for financing its expenditure while leading to depreciation of the currency. The variation of the exchange rate has a great influence on the economy as a whole; exchange rate volatility has a higher effect on price movement through aggregate demand an aggregate supply [Madesha, et al. (2013)]. On the other hand, currency devaluation can have a direct impact on price level through imported commodities (intermediate goods and finished goods) purchased by firms and final consumers, which make prices rise. As a result, the price level aggregate in the economy rises which leads to an inflationary situation.

In Guinea, inflation has been one of the major macroeconomic problems since independence to the present day. Evidently, inflation in Guinea is caused by both monetary and non-monetary factors [(IMF, 2006)]. In the past, Guinea's balance of payment position has been in severe difficulties due to inappropriate trade, fiscal and monetary policies [Touré, M. F. (2010)]. The balance of payment deficits that resulted was financed through expansionary monetary policy, which resulted in increased money supply and the subsequent effect on the economy; through high general price levels. In 2006, inflation had reached a level of 34.7 percent [(Central Bank of Guinea, 2010)].

A non-monetary source of inflation is attributable to the poor performance of the agricultural, mining and service output sectors which lasted for a long time. This resulted in high food prices in the country. It is noted that rebound in economic growth would be mainly driven by those sectors, which has limited direct impact on the population's income and poverty reduction. Food prices alone account for over half of the average household expenditure in Guinea [(IMF, 2005)].

Monetary policy is the main instrument that the central bank can use to control the inflation. The concern about inflation does not only focus on the need to maintain overall macroeconomic stability, but also the fact that inflation hits the less privileged particularly hard, as they do not have effective inflation hedges. [Blavy, M. R. (2004)] Price stability is a good thing in itself, but as inflation injects noise into the price system, making long-term financial planning becomes more complex.

Inflation disturbs economic policies in different ways. Broadly, there are two groups in every economic society: the stable revenue group and the elastic revenue group [Madesha, W., et al. (2013)]. In the inflation period in the country, those in the first group lose while those in the second gain. This is because the price measure of different commodities is not the same. In that period, most prices increase, but the increase of different prices differs. Prices of some commodity increase faster than others, while some may remain unchanged. As mentioned earlier, the less privileged and the intermediate class suffers the most because their

income is more or less fixed but the prices of commodities continue to rise [Okhiria, O. and T. Saliu (2008)]. The main objective of the macroeconomic policy is to generate a stable economy which would maintain and create employment, increase education level, a good trade balance, sustainable growth in economic and maintain price stability.

The paper is organized as follows. Section 2 inflation overview in Guinea, section 3 gives a literature review, section 4 empirical frameworks and the model using in this study, section 5 results and discussion and section 6 conclusions and recommendation.

2. Inflation overview in Guinea

Historically, Guinea has not suffered from high inflation. The annual average was only 6.7 percent between the periods of 1964-1979. Administrative controls distorted the operation of markets and the formation of price. A prolonged period of high inflation followed, lasting for about 10 years, from 1979 to 1989. The increase in the inflation rate in 1979 and the early 1980s was caused by economic liberalization in the context of significant fiscal imbalances and the poor use of instruments of monetary policy. With the general reform program that followed the 1984 coup, inflation increased dramatically, the annual average rate was 65 percent in 1986 when the domestic currency was degraded by 92 percent, trade was liberalized and price controls (except those on oil and food) were removed [Blavy, M. R. (2004)].

Consequently, after 1986 the annual average rate of inflation fell severely and remained low until the end of 1999. The decrease in the inflation rate was due to favorable climatic condition leading to a very significant rise in agricultural output. Other improvements followed, including the decrease in the prices of food products and basic commodities, particularly housing and transportation, increase in exchange rate stability and a decrease in imported prices; especially prices of imported rice. Except in 1995, when the presidential election and heavy downpour of rain pushed prices upward, the declining trend in inflation continued. Annual average inflation was under 2 percent in 1997 and remained under control until 2002, largely because of the relative stability of monetary policy. Broad money was limited, bank credit to the government was controlled [Blavy, M. R. (2004)].

From 2002 to 2009, Guinea's inflation dropped dramatically, in that period, Guinea's balance of payment position has been in severe difficulties due to inappropriate trade, fiscal and monetary policies. The Excessive exchange rate is the single most persuasive cause of inflation in Guinea. The average rate of inflation was 34.7% in 2006, reflecting fiscal mismanagement. On the other hand, this phenomenon can be explained by the growth of the average budget deficit, which rose from 3% of GDP in the second half of 2002 to 4.8% of GDP in 2008. Government revenues from the mining sector dropped, reflecting a decline in commodity export price, and in particular, bauxite, which is the main export product of Guinea, this is in addition to an increased level of political tensions. At the end of 2009, inflation had begun to decline to 4.7% through the adoption of some measure of state budget management. However, the end of 2014, Guinea witnessed the Ebola Epidemic which affected certain economic sectors such as tourism, transport, and trade. This situation led to inflationary pressure in the country and dampened the downward trend in inflation, which stood at 9.3 percent at the end of this period [(IMF, 2015)]. The incident showed that inflation in Guinea is caused by both monetary and non-monetary factors. The other aspect to inflationary trends is that inflation is international.

3. Literature review

The evidence [Friedman, M. (1968)] shows that inflation is everywhere a monetary phenomenon and it is the greatest concern of every country to control the problem and stabilize the economy for rapid growth and development.

[Qayyum, A. (2006)], investigated the link between money supply and inflation in Pakistan by applying correlation analysis in the 1960-2006 periods. His results indicated the strong relationship between the money growth and inflation rate. According to him, inflation in Pakistan was caused by an expansionary monetary policy that supports the monetarist proposition.

In Sri Lanka, for the period between 1980 and 2005, [Ratnasiri (2006)] examined the main determinant of inflation by using Vector Autoregressive technique. Results indicate that money supply growth and increase in rice price are the key determinants of inflation in the long-run. In the short-run, he found that price movement is the key variable on inflation. By applying Granger Causality test, [Biresaw, T.T. (2013)] used quarterly data for the period between 1998 and 2010 to investigate the determinant and impacts of dynamic inflation in Ethiopia, the variables used in this study was broad money supply, devaluation rate, and GDP growth. The empirical result showed that money supply and inflation caused each other, however, it exhibited a unidirectional causality running from devaluation rate to inflation, as well as from oil price to inflation. [Gyebi et. al, (2013)] indicated the macroeconomic determinants of inflation in Ghana over the period 1990-2009 using ordinary least squares (OLS) method, the result showed that output and money supply are the key determinants of inflation in their study period both in the short-run and the long-run. According to their results, they suggested that the independence of central bank is very important to maintain price stability and suitable economic growth.

[Mwas, N. (2006)] examined the impact of exchange rate on inflation in Tanzania using the quarterly data over the period 1990-2005. By applying structural Vector Auto regression model (VAR), the result showed that the exchange rate pass-through to inflation decrease in the late 1990's despite the devaluation of the currency. That was partly attributed to the macroeconomic and structural improvements that were implemented during the study period. They suggested that the recent increase of imports in the economy can cause inflation rise in the middle term, however, the state can remain attentive in evaluating the potential impact of foreign prices on the dynamics of inflation in Tanzania.

To examine the dynamics of inflation in Kenya [Durevall, D and all (2001)] used time series data for over the period 1974-1996 to investigate the dynamics of inflation in Kenya. They developed a single-equation error correction model and found that exchange rate and foreign price have a long-run effect on inflation, however, money supply and interest rate only has a short-run effect.

[Kinda, T. (2011)] examined the determinants of inflation in Chad using quarterly data from 1983: Q1 to 2009: Q3. His analysis was based on a single-equation model, completed by a structural vector auto regression (SVAR) models that are capable of identifying the shocks and capture inflation persistence. The results showed that the key determinants of inflation in Chad are rainfall, foreign prices, exchange rate fluctuation and public spending. Rainfall affected domestic prices through its effects on the agricultural sector.

4. Empirical framework

This section shows the empirical framework to estimate the determinants of inflation in Guinea. The price level is affected by monetary and non-monetary factors and on the other hand by domestic and external factors. In this study, three variables; money supply, exchange rate and gross domestic product are taken as the key determinants of inflation in Guinea, from the above analysis, the following functional form is proposed.

$$INF = f(M2, GDPC, EXR) \ldots \quad (1)$$

Where;

$INF =$ Inflation measured the average growth in Consumer Price Index (CPI).

$M2 =$ Money supply; which is defined as the sum of currency in circulation and the domestic bank's deposits.

$GDPC =$ Gross domestic product per capita measured as household income.

$EXR =$Exchange rate, defined as the annual average of official exchange rates based on monthly averages (local currency units to the US dollars), because, it is the rate determined by national authorities or the rate determined in the legally sanctioned exchange market.

The money supply is used in this model to reflect the monetary policy and to show out the effect that money in circulation and domestic banks deposit have on inflation. On the other hand, in order to measure the impact of fiscal policy on inflation through the aggregate demand, exchange rate is used to represent the external factor and the impact on the overall inflation rate and gross domestic product per capita is included to represent the household income level and the impact income has on the inflation. Those variables are not the only macroeconomic determinants of inflation, other variables will also influence inflation, but due to unavailability of data we limit our discussion to these three variables.

4.1 Long-term model specification

We used three determinants to build our model due to the insufficient time series data available on other variables. However, including both monetary and non-monetary factors would carry out the role that those variables play in inflation in the long term, if it exists.

We specify the general time series regression model in equation (2) below.

$$INF_t = a_0 + a_1 M2_t + a_2 GDPC_t + a_3 EXR_t + \varepsilon_t \ldots (2)$$

Where all variables used are already defined above, a is the constant, ε in the model is the error or the stochastic disturbance term, which will address the influence of other factors of inflation, which have not been mentioned in the model and t is the time.

4.2 Short-term model specification

Therefore, if the variables are cointegrated, then the vector error correction (VECM) model is employed to investigate the short-run relationship between the dependent variable and the independent variables. The error correction model (VECM) for the dependent variable is based on the following equation (3).

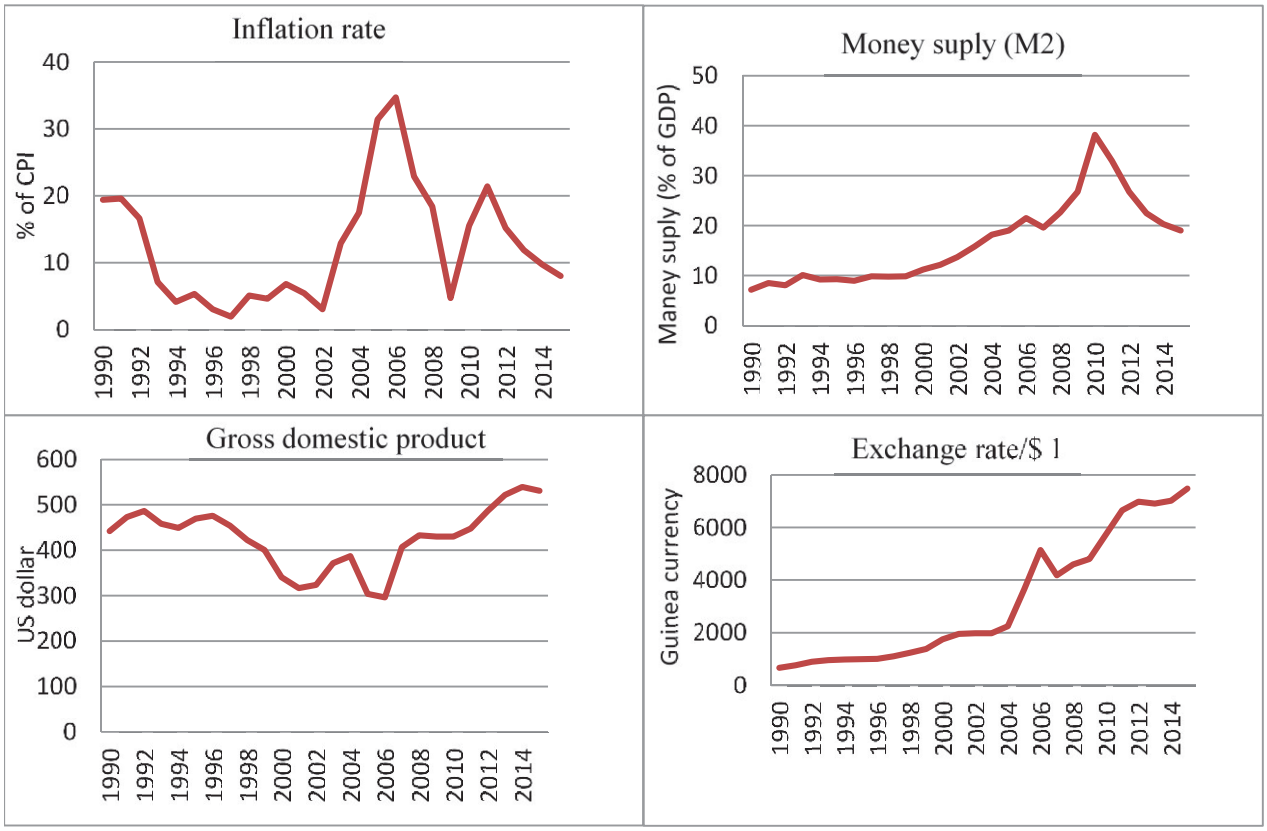
$$\Delta INF_t = b_0 + b_1 \Delta M2_t + b_2 \Delta GDPC_t + b_3 \Delta EXR_t + b_4 ECT_{t-1} + \varepsilon_t \ldots (3)$$

In this model, ECT_{t-1} is the residual obtained from the long-term model. The long-term equilibrium between the endogenous variable, INF, and the exogenous variables is supposed to be negative at the error correction term, ECT_{t-1} which also represents the speed of adjustment.

5. Empirical analysis and Discussion

5.1 Data source

Figure 1 Plot of the data, 1990-201



Source: Author's computation based on data of Central Bank of Guinea, 2017.

We are aiming to investigate the influence of GDPC, money M2, and exchange rate on inflation in Guinea over the period of 1990-2015, Guinea's economy experienced some level of economic decline within this observed period. The inflation rate for Guinea is measured as the percentage change in the consumer price index CPI. Money supply is measured by $M2$, which is the sum of currency in circulation and the deposits in the domestic banks, Gross domestic product per capita $GDPC$ is the ratio of GDP by total population, and exchange rate EXR is measured by the depreciation or appreciation of the currency in circulation and measured as the Guinea money per US dollar rate. This study uses various means to collect the study variables data such as Word Bank indicator (2016) for the exchange rate, Guinea Statistical Service (2010) for the inflation rate, and Central Bank of Guinea (2013) for money supply and GDP per capita.

We represent all our variables in figure 1. From this figure, we note the high depreciation of Guinea currency was from 2002 through 2015. Gross domestic product per capita also started declining from 1992 through 2006, but at the end of 2006, it started increasing. Money supply started increasing from 2000 until 2010, then decreases thereafter.

Table1. Descriptive statistics of the variables under consideration
Sample: 1990-2015

variables	INF	M2	GDPC	EXR
Mean	12.54231	16.59615	426.8423	3193.789
Median	10.80000	14.75000	437.4500	1980.385
Maximum	34.70000	38.20000	539.6000	7485.510
Minimum	1.900000	7.200000	296.1000	660.8000
Std. Dev.	8.859443	8.256560	68.57340	2410.881
Observations	26	26	26	26

Source: Author's computation, 2017

The table 1 below shows the descriptive statistics of the variables used in this study. The average value of GDP per capita is 426.84 US dollar, while inflation as a percentage of GDP, money supply as a percentage of GDP and exchange rate are 12.54, 16.59 and 3193.78 respectively. The high value of exchange rate denotes the high depreciation of Guinea currency over the time studied.

5.2 Unit root test

The unit root test was carried to see whether the variables are stationary or non-stationary. The Augmented Dickey-Fuller (ADF) test was used. The table below shows the unit root results of the variables inflation INF, money supply $M2$, gross domestic product per capita $GDPC$ and exchange rate EXR. The test has failed to reject the null hypothesis of the presence of the unit root. All considered variables were found to be stationary at the first difference, i.e., integrated of order (1). The lag structure in the ADF test was chosen on the basis of the Schwarz information criterion (SIC). The Augmented Dickey-Fuller test based on the following regression model:

$$\Delta k_t = b + \alpha k_{t-1} + \beta_t + \sum_{j=1}^{b} d_j \Delta k_{t-1} + \varepsilon_t \ldots \quad (4)$$

Equation (4) test for a unit root in k_t, where y consists of each of the four variables in our model, $t = 1, \ldots, T$ is the time, Δk_{t-1} is the lagged first differences to accommodate serial correlation in the errors, ε_t is the error term, testing the null of a unit root against a trend stationary alternative. The null and the alternate hypotheses for a unit root in k_t are H_0: $\alpha = 0$ and H_1: $\alpha < 0$. To select the lag length (b), we used the "t-sig" approach proposed by [Especkerman-True, K., et al. (2015)]. The result of the unit root test is presented in table (2) below.

Table2. The results of Augmented Dickey-Fuller test (ADF) for unit root

	Level		first difference	
Variables	t-stat	P-Value	t-stat	P-Value
INF	-1.9161	0.3199	-3.9964***	0.0055
M2	-1.3119	0.6077	-3.6344**	0.0126
GDPC	-0.6230	0.8469	-4.8263***	0.0009
EXR	0.5843	0.9863	-4.3095***	0.0027

& * denote 10% & 1% significance level respectively

Source: Author's computation, 2017

From the table 2, the null hypothesis of the unit root cannot be rejected for any of our variables at the level, that is, all the four variables are accepted. However, at the first difference, the null hypothesis of the unit root is rejected at 1% level for $M2$ while, $GDPC$, and EXR are rejected at 10% level. On another hand, all the variables are integrated at first order (1). Therefore, it exhibits the cointegration relationship among the variables.

5.3 Cointegration test

Table 3. Selection of Optimal Lag Length
VAR Lag Order Selection Criteria
Endogens variables: INF, M2, GDPC, EXR.

	Lag	LogL	LR	FPE	AIC	SC	HQ
0	-479.4503	NA		2.13e+13	42.03915	42.23663	42.08882
1	-391.1470	138.2138		4.07e+10	35.75191	36.73930	36.00024
2	-369.0728	26.87288		2.78e+10	35.22753	37.00102	35.67071
3	-330.5842	33.46842*		6.02e+09*	33.26819*	35.83539*	33.91383*

Source: Author's computation, 2017

*indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPR: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Vector Auto regression (VAR) was used to determine the optimal lag length for the Johansen cointegration test which is based on the AIC and SC as shown in table 3. From the result, the optimal lag length based on AIC and SC is 3 for both of them. Using the selected optimal lag length of 3, the likelihood ratio test, which depends on the maximum Eigen values of the stochastic matrix of the Johansen (1991) procedure for exploring the number of cointegration vectors, was used.

To investigate whether INF shows a long-term relationship with it denoted determinants, based on the Maximum eigenvalue and trace statistics, we achieved the aim using Johansen 1991 cointegration test.

Table 4. Unrestricted co-integration Rank test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Trace statistic	0.05% CV	Prob.
None *	107.920***	47.8561	0.0000
At most 1*	56.5696***	29.7970	0.0000
At most 2*	18.0778**	15.4947	0.0200
At most 3	0.6961	3.84146	0.4041
	Max-Eigen statistic	0.05% CV	Prob.
None *	51.3509***	27.5843	0.0000
At most 1*	38.4918***	21.1316	0.0001
At most 2*	17.3816**	14.2646	0.0156
At most 3	0.6961	3.84146	0.4041

Source: Author's computation, 2017

Max-eigenvalue test indicates 3 co-integration equations

& * denote 5% & 1% significance level respectively

Table 4, shows the results of the cointegration test. From the table, the Maximum eigenvalue and trace statistics showed that there are three (3) cointegration vectors at 1 and 5% level of significance. The result indicates that there is at least one long-term cointegration relationship among price movement, exchange rate, gross domestic per capita and money supply.

5.4 Long-term model

The Ordinary Least Squares (OLS) was used in the estimation of the coefficients of the explanatory variables in the model. The OLS enabled us to determine the individual as well as the collective statistical significance of the explanatory variables on the dependent variable. The result for long-term equation is represented in table 5

Table 5. Long-term cointegration results using Ordinary Least Squares (OLS) method
Dependent variable: INF

Variables	coefficient	Std. Error	t-statistic	Prob.
M2	0.182235	0.312864	0.582474	0.5664
GDPC	-0.086377	0.023687	-3.646581	0.0015
EXR	0.007940	0.002185	4.224483	0.0016

R-squared: 0.540923, Adjusted R-squared: 0.453480, Prob: 0.001882

Source: Author's computation, 2017

All the explanatory variables have estimated signs of the corresponding coefficients, as indicated; money supply and exchange rate have a positive relationship with price fluctuation, while gross domestic per capita has a negative relationship with inflation. From the results, money supply $M2$ has a positive impact on inflation but not statistically significant. This shows that as money supply increase by 1%, inflation rise by 0.18%. This means taxes, as the main and most convenient source of revenue, have not grown fast enough to meet the required expenditure. As a result, large budget deficits have emerged, which must be financed by bank borrowing, which in turn has accelerated the growth rate of the money stock and consequently increased inflation. Gross domestic product per capita, $GDPC$ influenced inflation negatively and it is statistically significant; as a result, 1% increase in $GDPC$ will cause inflation to decline by 0.08%. This means that the increase of wage that Guinean households receive from government or private enterprises are being put into productive sectors of the economy like the agriculture and trade which has expanded the aggregate supply of output, on the other hand, aggregate supply will be greater than aggregate demand, hence, a reduction in the inflation rate.

Finally, the exchange rate has a positive effect on inflation and statistically significant. As a result, 1% increase in the exchange rate will also cause inflation to increase by 0.007%. This might be due to the depreciation of the Guinean currency which is caused by the decline in the cost of raw materials on the international market, and the increase in the consumption of foreign products to the detriment of Guinean products. Imports will therefore be greater than exports leading to a deficit in the trade balance. However, higher inflation results in high currency depreciation, that is, when inflation increases, it would lead to an increase in importation of goods and services and lower exports, which in turn would lead to a depreciation of domestic currency.

When there is an increase in exchange rate, the price increase on the imported goods and services while the export decrease, hence, a positive relationship between inflation and exchange rate. The study concludes that in the long-term, GDP per capita has a negative impact on inflation in Guinea. Exchange rate and money supply caused inflation to increase.

In addition, the estimate of the long-term cointegration relationship of Guinean's macroeconomic variables, R-squared and Adjusted R-squared (0.540923 and 0.453480) were used to assess the performance of the estimated model. This means that our explanatory variables explain about 54% of the total variation of inflation

in Guinea. In other words, money supply, GDP per capita and exchange rate collectively explain more than 54 percent, the level of prices or inflation in Guinea for the period 1990 to 2015.

5.5 Short-term model

The vector error correction model (VECM) of Engle-Granger is used to estimate the short-term dynamic relationship between the variables. The result of the short-term model of the relationship between the variables is presented in table 6.

Table 6. The results for Error Correction Model for Short-term

Variables	Coefficient	Std.Error	T-Statistic
The speed of adjustment	-2.620938***	-0.563803	[-4.648678]
D(INF(-1))	-0.728958	-0.674043	[-1.081470]
D(INF(-2))	-6.189751****	-0.92515	[-6.690536]
D(M2(-1))	-2.141006	-1.14477	[-1.870250]
D(M2(-2))	2.51809**	1.173509	[2.145778]
D(GDPC(-1))	1.200888***	0.161112	[7.453763]
D(GDPC(-2))	0.235452***	0.222269	[1.059311]
D(EXR(-1))	0.134492***	0.015789	[8.517936]
D(EXR(-2))	0.07993***	0.019028	[4.200578]
C	-63.5248***	-9.845679	[-6.452049]

Source: Author's computation, 2017

R-squared: 0.927193; Adjusted R-squared: 0.876788; F-statistic: 13.70093

** & *** denote 10% and 1% significance level

VECM associates the changes in inflation to the change with the other lagged variables and the disturbance term of lagged periods. The coefficient of the speed of adjustment parameter is relatively large with the right negative sign and statistically significant at 1% level. By this finding, it is concluded that any increase in the inflation rate for a short-term in Guinea, reverts to a decrease in the long-term. Hence, the model combines flexibility in the dynamic specification with desirable long-term properties. In the past years, inflation had a negative impact on the current economy and turn around to be statistically significant at 1% level. More so, when the past year's inflation increases by 1%, the current inflation will decrease by 6.18%. Money supply has a positive impact on current inflation and shows a statistically significant at 10% level. The past records of GDP per capita and exchange rate have a positive effect on inflation and both of them are statistically significant at 1% level.

5.6 Granger Causality test

Granger causality test was performed in order to examine the linear causation between the concerned variables. Granger causality is useful in determining the direction of the relationships. The test is based on the model specified below.

$$Y_i = \alpha_0 + \sum_{j=1}^{m} \beta_i Y_{t-j} + \sum_{i=1}^{n} \delta X_{t-i} + \mu_t \quad \ldots (5)$$

If X_t Granger cause Y_t, then, the current values of Y_t are determined by past values of X_{t-1}. The test of H0: H_0: $\delta_i = 0$, can be carried out with the F- test. In the view of Granger, the presence of cointegration vector shows that Granger causality must exist in at least one direction. We used the optimum lag length of variables based on AIC, which is 3 in this analysis. The result for Granger Causality test is presented in table 7.

Table 7: the result of Granger Causality test

Pairwise Granger Causality tests, Sample: 1990 2015, Lags: 3

Null Hypothesis	Obs.	F-statistic	Prob.
M2 does not Granger Cause INF	23	1.80149	0.1875
INF does not Granger Cause M2		2.1251	0.1372
GDPC does not Granger Cause INF	23	0.95765	0.4366
INF does not Granger Cause GDPC		3.19388	0.052
EXR does not Granger Cause INF	23	0.19635	0.8973
INF does not Granger Cause EXR		0.75001	0.5381
GDPC does not Granger Cause M2	23	1.92168	0.1668
M2 does not Granger Cause GDPC		2.56687	0.0908
EXR does not Granger Cause M2	23	0.94338	0.4429
M2 does not Granger Cause EXR		1.68843	0.2095
EXR does not Granger Cause GDPC	23	4.2065	0.0226
GDPC does not Granger Cause EXR		2.48156	0.0982

Source: Author's computation, 2017

From table 7, the result shows that there is unidirectional Granger causality effect at the 5% level of

significance running from inflation to GDP per capita, and it also exist a unidirectional causality effect at 10% level of significance running from money supply to GDP per capita. However, exchange rate has significance bi-directional Granger causality with GDP per capita. This means both variables have some predictive component to affecting each other at 5 and 10 % respectively.

5. Conclusion and recommendation

This paper examines the key macroeconomic determinants of inflation in Guinea over the period 1990-2015 using cointegration analysis. The empirical analysis is based on time series econometrics. The variables used in this study were: inflation as the dependent variable, gross domestic product per capita, exchange rate and money supply as independent variables. The results of Johansson's cointegration test indicates that there exist a long-term and short-term relationship between inflation, money supply, gross domestic product per capita and exchange rate in Guinea.

The study found that in the long term, money supply $M2$ and exchange rate EXR affect inflation positively. However money supply is not significant, that is, as money supply and exchange rate increase, inflation rise. While gross domestic product per capita $GDPC$ impact negatively on inflation and it is statistically significant; when gross domestic product per capita increases, inflation declines. It was indicated that in the short-term, the past two years of inflation impact negatively on the recent inflation if the past year's inflation increases by 1%, the recent inflation will decrease by 6.18%. The past record of money supply has a positive impact on current inflation and shows a statistically significant at 10% level. The past records of GDP per capita and exchange rate have a positive effect on inflation and both of them are statistically significant at 1% level. The Granger Causality test shows that there is unidirectional Granger causality effect at the 5% level of significance running from inflation to GDP per capita, and it also exist a unidirectional causality effect at 10% level of significance running from money supply to GDP per capita. However, exchange rate has significance bi-directional Granger causality with GDP per capita. This means both variables have some predictive component to affecting each other at 5 and 10 % respectively.

Recommendation:

To attain high and sustained long-run economic growth, exchange rate must be used as a monetary policy instrument. Relevant measures to improve management policy among various arms of government should be put in place. Monetary policy should be made to complement fiscal policy measures. The government should improve the taxes and financial administration policies by the widening of the tax base and improved collection rates, particularly stricter control of the exemptions, which allow the state to largely finance its expenditure rather than financing the budget deficit by creating money, thus reducing inflation.

The state should make short-term and long-term investment plans for the creation of infrastructures that will lead to the encouragement of foreign investors and creation of employment. The country through the government should be able to reduce the scarcity of external currency by increasing its exports both in quantity and quality through relevant export promotion strategies.

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