



Monetary Policy and Inflation: Empirical Evidence from Cameroon

Tékam Oumbé Honoré

Department of Economics, Faculty of Economics and Management, University of Dschang, Dschang, Cameroon

Email address:

h_tekam@yahoo.fr

To cite this article:

Tékam Oumbé Honoré. Monetary Policy and Inflation: Empirical Evidence from Cameroon. *International Journal of Economics, Finance and Management Sciences*. Vol. 6, No. 5, 2018, pp. 200-207. doi: 10.11648/j.ijefm.20180605.11

Received: September 20, 2018; **Accepted:** October 16, 2018; **Published:** October 29, 2018

Abstract: One of the most important goals for all countries is to maintain sustainable growth with low inflation. As a result, each government is fighting high inflation. To stabilize the rate of inflation, it is interesting to study its different sources and monetary policy has one. This study has two objectives: the first objective is to analyze the effect of monetary policy on inflation and the second objective is to examine the nature of the relationship between money supply and inflation in Cameroon. This study uses annual time series data from 1980 to 2016. Johansen's cointegration test was used to find the relationship between the money supply and inflation. The ARDL estimation method was used to analyze the effect of the money supply on inflation in Cameroon and the Toda and Yamamoto's causality test was used to test the causality between money supply and inflation. The results show that, there is a long-run equilibrium relationship between the money supply and inflation; the money supply has a positive and significant effect on inflation in Cameroon and there is one-way causality from money supply to inflation. This study shows that inflation has a monetary source in Cameroon. Thus, monetary policy should be planned to maintain price stability by controlling the growth of the money supply in the Cameroonian economy.

Keywords: Monetary Policy, Inflation, ARDL, Toda and Yamamoto Causality Test, Cameroon

1. Introduction

The monetary policy which had for long been given a minor consideration because of Keynesian ideas which gave it the simple role of complement to fiscal policy regained interest after the inability of Keynesian theory to explain the parallel rise of inflation at the end of 1960s. Monetary policy being one of the main instruments of economic policy, it contributes to the attainment of the objectives of economic policy.

Monetary policy refers to a set of measures aimed at affecting the financial conditions of the economy. These measures are generally taken by the monetary authorities, notably the Central Bank, in view of changing the quantity of currency in the economy and thus affect a set of macroeconomic aggregates such as output, investment, consumption, inflation, and even the value of the national currency. In fact, until the end of the 1970s, monetary policy was generally used as an instrument of short-term regulation and was therefore used for economic «expansion» when necessary and «contraction» otherwise. Since the beginning

of the 1980s, many central banks became independent and pursue liberal monetary policies aimed basically at maintaining price stability.

Within the Central African Economic and Monetary Community (CEMAC), monetary policy is managed by a monetary emission body known as the Bank of Central African States (BEAC) and according to its status, the prior objective of monetary policy is to ensure monetary stability which implicitly includes: maintaining an external coverage rate of the currency on the one hand and ensure a low increase in the general level of prices (Community norms are 3% on average per year within the framework of the multilateral surveillance mechanism) on the other.

In the CEMAC zone, monetary policy is restrictive in order to avoid inflation exceeding the 3% level which seems to be dangerous for economic activity in the zone. The recent statistics of the World Bank on the evolution of monetary policy and inflation in Cameroon shows that from 2012 to 2016, the supply of money went from 20.30% of the GDP in 2012 to 20.93% in 2013, then from 21.51% in 2014 to 22.10% in 2015 and became stable around 22.68% in 2016

while the rate of inflation went from 2.94% to 1.95%, then from 1.95% to 2.69% and was stabilised around 2.60% during the same period.

There is no consensus in literature on the relationship between money supply and inflation. Looking at the effect of monetary policy on inflation in Pakistan, the result shows that inflation is a monetary phenomenon [1]. On the other hand, the analysis between the two variables shows the coexistence between a high level of money supply and a low level of inflation in both developed and developing countries [2-3].

In the light of the above, the main question addresses in this study is as follows: Does monetary policy has an effect on the price level in Cameroon? From this main question, the following two specific questions are deduced:

- (1) What is the effect of the monetary policy on inflation in Cameroon?
- (2) What is the nature of the relationship between monetary policy and inflation in Cameroon?

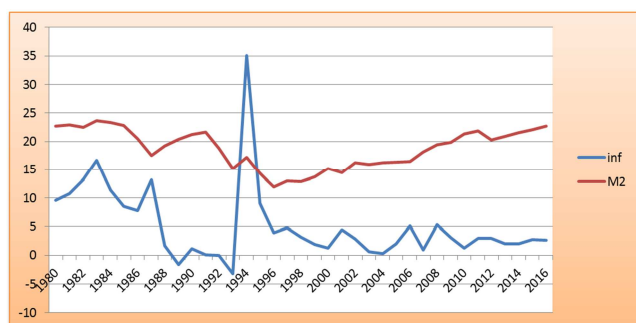
Given the questions above, this study seeks to assess the effect of the monetary policy on the price level in Cameroon. More specifically, it:

- (1) Assesses the effect of the monetary policy on inflation in Cameroon
- (2) Examines the nature of the relationship between monetary policy and inflation in Cameroon.

The rest of the study is organised as follows: after presenting the evolution of the supply of money and inflation in Cameroon from 1980 to 2016, a literature review, the methodology used, the results, and finally, the conclusion and recommendations will follow in the order.

2. Evolution of the Supply of Money and Inflation in Cameroon from 1980 to 2016

From a general point of view, four main periods can be identified in the evolution of inflation and the supply of money in Cameroon from 1980 to 2016: the first going from 1980 to 1988, the second from period 1989 to 1993, the third going from 1994 to 1997 and the last going from 1998 to 2016.



Source: Author using WDI, 2016 data.

Figure 1. Evolution of money supply and inflation in Cameroon for the 1980-2016 period.

The period from 1980 to 1988 is marked by a considerable fall of the growth rate of the monetary supply. This fall can be attributed to the crisis of the eighties witnessed in Cameroon since the quantity of money in circulation in an economy reflects the level of activity of this economy. However, a relatively high rate of inflation (on average 10.29% per year) is recorded during this same period. The inflation during this period results from the evolution of the international environment, notably the effects of the second oil crisis of February 1979, as well as the domestic one, in this case the drought of 1984 which led to a reduction in the supply of food and an increase in prices in Cameroon. However, it is necessary to specify that the growth rate of money supply and the rate of inflation in 1988 respectively witnessed a fall of 15.38% and of 82.40% relative to the rates recorded in 1980.

During the second period, the growth rate of the monetary supply witnessed a slight increase between 1989 and 1991, then a considerable fall between 1991 and 1993. This marks the beginning of the implementation of structural adjustment programs. However, the 1989-1993 is also characterised by relatively low and negative rates of inflation. This reduction in inflation arrives in an economic context marked by the reinforcement of adjustment measures applied by countries of Sub-Saharan Africa in general, and Cameroon in particular under pressure from donors like the International Monetary Fund and World Bank, reflected by an increased liberalisation of economies and the implementation of structural reforms. During this period, the average fall in prices is around 74.8% per annum in Cameroon. However, it is necessary to specify that the period from 1989 to 1993 is the only period where Cameroon witnesses a deflation.

The period from 1994 to 1997 is mainly marked by the change of parity of the CFA franc on January 12, 1994 (devaluation of CFA franc relative to the French franc) and its effects, notably the impact on prices of final consumption goods. Thus, inflation reaches the peak of 35.09% in Cameroon for the first time. This is followed by a slight fall of inflation during the 1995-1997 period. In 1997, the rate of inflation is around 4.79%. However, the 1994-1996 period is also characterized by the uninterrupted fall of the growth rate of the monetary supply. It is not until 1997 that the growth rate of money supply starts increasing.

The 1998-2016 period is marked not only by an average growth of monetary supply, but also by a relatively stable evolution of the rate of inflation. During this period, inflation does not exceed the 5.34% threshold. It is important to notice that from 2009, the annual rates of inflation recorded in Cameroon are less than the requirements of the CEMAC zone which is 3%.

3. Review of the Literature on Monetary Policy and Inflation

3.1. Review of Theoretical Literature

Theoretically, the sources of the inflation are diverse.

However, four main sources can be identified: the role of money supply, demand, the Cost mechanism and the nature of economic and social structures.

(1) Neoclassical analysis: the role of money supply and the monetarist explanation

According to the neoclassical and monetarist authors¹, inflation results from an excess printing of money. The justification of this idea is based on the existence of an economic relationship known as the «Quantity Theory of money» or Irving Fisher equation. This equation is expressed as follows: $Mv = PY$ or $Mv = PT$ where M represents the amount of money in circulation (supply of money), v , the velocity of circulation of money, P , the general level of prices and Y the volume of production or of transactions (T). This equation shows that an increase of the quantity of money causes in a mechanical manner, an increase in the general level of prices. The equation justifies the idea of a dichotomy (real sphere - monetary sphere) in neoclassical theory. In other words, the evolution of the money supply must be related to the evolution of the volume of production (and not the opposite).

(2) The Keynesian analysis: Demand pull inflation

In the theory of markets, price is determined by the equality between demand and supply. However, in some situations, demand can exceed supply: price then tends to rise automatically. When such a disequilibrium appears on a large number of markets, an "inflationary gap" is born leading to an increase in the general level of prices. In Keynesian theory, inflation is due to a disequilibrium between aggregate demand and aggregate supply. More precisely, excess demand is the carrier of inflation only when it is based on an additional monetary creation.

Besides monetary factors and disequilibrium between demand and supply, inflation can also be generated by the mechanism of costs and by the nature of economic and social infrastructures.

(3) Cost push inflation

The process of upstream production can also play an essential role in the increase in prices. Thus, high levels of prices of different factors contribute to an increase in production costs and thus increase the value of goods. The increase in production cost can have several origins:

- (a) The cost of labour: Because of union pressure, an increase in wages is reflected on the prices of goods;
 - (b) The cost of capital: This cost is determined by the rhythm of depreciation of investments. It therefore depends on the waves of technical progress and state intervention;
 - (c) The costs of raw materials: The prices of raw materials affect the level of production costs according to the degree of dependence of the economy on petroleum. In this case, we talk of imported inflation;
 - (d) The cost of state interventions: The State affects costs by means of taxation or tariff policies.
- (4) Inflation as a structural phenomenon

Inflationary disequilibrium also originates from the economic structures of capitalist countries. The increase in the general level of prices finds its source in the structural market failures as well as in the behaviors of the different stakeholders in economic activity.

3.2. Review of Empirical Literature

In the empirical literature, many authors study the determinants of inflation. Among these determinants is the supply of money. By examine the effects of the increases in the money supply and production on inflation, the result shows that there is a positive and significant relationship between the growth of money supply and the rate of inflation, and a negative relationship between inflation and the increase in total output [4]. Empirical evidence is strongly in support of the point of view that inflation is always and everywhere a monetary phenomenon [5]. The analysis of the relationship between the supply of currency and the rate of inflation through two aggregates of the money supply, $M1$ and $M2$ (two ratios of the quantity theory of money) shows that there exist a positive and significant association between the growth rate of the money supply and the long-run rate of inflation [6]. The analysis of the relationship between the excessive growth of the money supply and the rate of inflation for the Pakistan economy during the period 1960 to 2005 shows that there is a stable correlation between the growth of the money supply and the rate of inflation [7]. The study of the main determinants of inflation in Sri Lanka between 1980 and 2005 using vector autoregressive analysis shows that growth in the supply of money and the increase in prices of rice are the main determinants of long-run inflation in Sri Lanka [8]. Using a VAR model and data over the 1960-2007 period to analyse the effects of the supply of money on inflation in Cameroon, the result reveals that the increase in the money supply leads to an increase in economic growth, which in turn causes inflation [9]. The analysis of the determinants of inflation in Nigeria using an error correction model to capture the convergence of the main determinants of inflation towards the long-run equilibrium and annual data from 1970 to 2010 shows that, the lagged inflation and the monetary mass determine inflation significantly while commercial openness which reflects the trend of imported inflation, the level of income, the exchange rate and the rate of interest have no significant effect with all the variables having the expected signs in the short run and none of variables is significant in the long run [10]. Examining the determinants of inflation using data from 1990 to 2010 in Bangladesh and the method of ordinary least squares shows that, the money supply and the lagged rate of interest affect inflation positively and significantly; the lagged money supply and lagged budget deficit have a negative and significant effect on the rate of inflation [11]. The analysis of the determinants of inflation in Nigeria between 1980 and 2012 using the method of ordinary least squares shows that the supply of money and the rate of interest affect inflation positively while government spending and the exchange rate affect inflation negatively [12]. The use of the ordinary least

¹ Led by Milton Friedman, Nobel prize in Economics in 1976

squares method to analyze the effect of monetary policy on inflation in Sudan reveals that, the money supply has a positive and significant effect on inflation during the period 1970-2014 [13].

The results of the studies above show that inflation is always and everywhere a monetary phenomenon. However, the results of some studies contrast the theory according to which inflation is a monetary phenomenon [2-3]. In fact, the analysis of the effect of money supply on inflation shows that a high money supply growth rate and a low inflation co-exist in developed and developing countries [2]. In this same line, the study of the effect of the money supply (M1) on inflation in Malaysia demonstrates that money supply is negative and

statistically significant at a 1% level [3].

The authors who study the effects of monetary policy on inflation do not include an element of fiscal policy in their analysis while fiscal policy is a determinant of cost-push inflation (The State affects costs by means of taxation or tariff policies).

Some authors study the effect of monetary policy on inflation and they found that money supply affects inflation positively [6-8, 10] and negatively [2-3]. While other authors rather examine the nature of the relationship between both macroeconomic variables. The results of this second set of studies are summarised in table 1 below:

Table 1. Synthesis of empirical studies on the nature of the relationship between monetary policy and inflation.

Author	Country	Study period	Results
[14]	North Africa (Morocco, Tunisia and Libya)	1960:Q1-1980:Q2	One way causality (M2→INF)
[15]	Pakistan	1973-1985	One way causality (INF→M1 /M2)
[16]	Malaysia	1970:Q1-1998:Q4	One way causality (M2→INF)
[17]	Turkey	1990:Q1-2002: Q4	No causality
[18]	Indonesia	1954-2002	Two way causality
[19]	Bangladesh	1980-2011	One way causality (M2→INF)
[20]	Ethiopia	1970-2010	Two way causality

Source: Author going from selected empirical studies.

The authors who examine the nature of the relationship between monetary policy and inflation used the test of causality of Granger. However, in the presence of cointegration, the analysis of causality according to the popular approach of Granger is not valid any more [21-22]. In this case, the analysis of causality often takes place according to the alternative procedure given by [23].

4. Methodology

This study uses mainly secondary data. The data comes from the world perspective journal of the University of Sherbrook in Canada and the annual publication of the World Bank, in the book «world development indicators» contained in the CD-ROM (WDI) of year 2016. This study covers the period going from 1980 to 2016. The stationarity of variables is obtained using the tests of [24-25]. The number of optimum lags of the model is obtained using the Schwarz (SC) and Akaike (AIC) information criteria. In the remaining part of this methodology, the econometric model is first specify and later introduce the procedure of the test of causality according to [23].

4.1. Model Specification and Estimation Technique

The model specification is inspired by [1]. There are one dependent variable and four independent variables.

4.1.1. Dependent Variable

Inflation (Inf): This refers to the change witnessed in the level of prices paid by the average consumer during a given period in the course of his purchase of goods and services. To measure inflation, the consumer price index is used.

4.1.2. Independent Variables

Monetary policy (M2): This is the channel by which the monetary authority, generally the central bank, acts on the supply of money in order to stabilise prices. The ratio M2 / GDP is used to capture monetary policy in this study. Monetary policy has a positive and significant effect on inflation [1, 5, 19]. Exchange rate (Tch): The exchange rate shows the relationship of a currency with others. It determines the competitiveness of a country's exports. A favourable exchange rate enables better negotiations worldwide. In this study, the rate of exchange of the local currency (CFA franc) with respect to the American dollar (USD) is used. The exchange rate plays an important role in the determination of inflation in developing countries [26]. Fiscal policy: This refers to measures and decisions taken by a government and authorities in terms of taxation. Having identified the objectives to be attained, the authorities change, cancel or create tax measures in view of attaining these targets. In this study, the degree of tax freedom is used to measure the fiscal policy of Cameroon. A degree close to 100 means that the tax burden is weak: individuals and firms do not have enough taxes pay. This indicator was developed by the Heritage Foundation in partnership with the Wall Street Journal. The real interest rate (Int): This is the real return to the lender of capital and real cost for the borrower. It is the difference between the nominal rate of interest and the rate of inflation. The real interest rate affects inflation according to [1].

The equation of the inflation retained in this study is inspired by [1]. The specification of the model of inflation is given by following equation:

$$\text{Inf}_t = \alpha_0 + \alpha_1 \text{M2}_t + \alpha_2 \text{Tch}_t + \alpha_3 \text{Dlf}_t + \alpha_4 \text{Int}_t + \varepsilon_t$$

$$\forall t = 1, \dots, 37 \quad (1)$$

With α_1 being the constant, α_1 , α_2 , α_3 and α_4 , represent the coefficients of the explanatory variables and ε_t is the error term.

From equation (1), the short-run equation can be written as:

$$\Delta(\text{Inf})_t = \gamma_0 + \sum_{i=1}^a \gamma_{1i} \Delta(\text{Inf})_{t-i} + \sum_{i=0}^b \gamma_{2i} \Delta(\text{M2})_{t-i} + \sum_{i=0}^c \gamma_{3i} \Delta(\text{Tch})_{t-i} + \sum_{i=0}^d \gamma_{4i} \Delta(\text{Dlf})_{t-i} + \sum_{i=0}^e \gamma_{5i} \Delta(\text{Int})_{t-i} + \lambda(\text{ECM})_{t-1} + \varepsilon_t \quad (2)$$

In the short-run equation, the lagged error correction term $(\text{ECM})_{t-1}$ is added to adjust the results. The error correction term (ECM_{t-1}) shows the speed of adjustment of the short-run equilibrium to the long run one. In this equation, λ shows the speed of adjustment. The error correction shows the disequilibrium value.

From equation 2, the long run equation can be written as:

$$(\text{Inf})_t = \gamma_0 + \sum_{i=1}^m \beta_{1i} (\text{Inf})_{t-i} + \sum_{i=1}^n \beta_{2i} (\text{M2})_{t-i} + \sum_{i=1}^o \beta_{3i} (\text{Tch})_{t-i} + \sum_{i=1}^p \beta_{4i} (\text{Dlf})_{t-i} + \sum_{i=1}^q \beta_{5i} (\text{Int})_{t-i} + \varepsilon_t \quad (3)$$

The ARDL approach is used to estimate the coefficients of models 2 and 3 because it has several advantages: It is more appropriate to test the existence of long run relationships in small samples. It allows the testing of long run relationships between variables whose orders of integration differ. Also, it enables to obtain at the same time the short and long-run equations.

4.2. Toda and Yamamoto Causality Test

The procedure of Toda and Yamamoto comes true in two stages as follows. The first stage consists to determine the maximum order of integration (dmax) of the series and number of optimum lags (k) of the VAR in levels. This stage is accomplished by using cointegration tests. The second stage consists to estimate the augmented VAR in levels of order $p = k + \text{dmax}$. If the series are stationary, a single additional lag is introduced into the VAR and the test procedure follows the standard approach. On the other hand, if the series are intergrated of order one, then a single

additional lag is introduced into the model. If M2_t and INF_t denote the variables supply of money and inflation, the model that serves as a basis to test causality is specified as follows:

$$\text{M2}_t = \beta_0 + \sum_{i=1}^{k+\text{dmax}} \beta_{1i} \text{M2}_{t-i} + \sum_{i=1}^{k+\text{dmax}} \beta_{2i} \text{INF}_{t-i} + \sum_{i=1}^k \beta_{3i} \text{TCH}_{t-i} + \sum_{i=1}^k \beta_{4i} \text{DLF}_{t-i} + \sum_{i=1}^k \beta_{5i} \text{INT}_{t-i} + \mu_{1t} \quad (4)$$

$$\text{INF}_t = \alpha_0 + \sum_{i=1}^{k+\text{dmax}} \alpha_{1i} \text{INF}_{t-i} + \sum_{i=1}^{k+\text{dmax}} \alpha_{2i} \text{M2}_{t-i} + \sum_{i=1}^k \alpha_{3i} \text{TCH}_{t-i} + \sum_{i=1}^k \alpha_{4i} \text{DLF}_{t-i} + \sum_{i=1}^k \alpha_{5i} \text{INT}_{t-i} + \mu_{2t} \quad (5)$$

$$\text{TCH}_t = \zeta_0 + \sum_{i=1}^{k+\text{dmax}} \zeta_{1i} \text{TCH}_{t-i} + \sum_{i=1}^{k+\text{dmax}} \zeta_{2i} \text{INF}_{t-i} + \sum_{i=1}^k \zeta_{3i} \text{M2}_{t-i} + \sum_{i=1}^k \zeta_{4i} \text{DLF}_{t-i} + \sum_{i=1}^k \zeta_{5i} \text{INT}_{t-i} + \mu_{3t} \quad (6)$$

$$\text{DLF}_t = \phi_0 + \sum_{i=1}^{k+\text{dmax}} \phi_{1i} \text{DLF}_{t-i} + \sum_{i=1}^{k+\text{dmax}} \phi_{2i} \text{INF}_{t-i} + \sum_{i=1}^k \phi_{3i} \text{M2}_{t-i} + \sum_{i=1}^k \phi_{4i} \text{TCH}_{t-i} + \sum_{i=1}^k \phi_{5i} \text{INT}_{t-i} + \mu_{4t} \quad (7)$$

$$\text{INT}_t = \gamma_0 + \sum_{i=1}^{k+\text{dmax}} \gamma_{1i} \text{INT}_{t-i} + \sum_{i=1}^{k+\text{dmax}} \gamma_{2i} \text{INF}_{t-i} + \sum_{i=1}^k \gamma_{3i} \text{M2}_{t-i} + \sum_{i=1}^k \gamma_{4i} \text{TCH}_{t-i} + \sum_{i=1}^k \gamma_{5i} \text{DLF}_{t-i} + \mu_{5t} \quad (8)$$

Where β_0 , α_0 , ζ_0 , ϕ_0 and γ_0 are constants and M2_t , INF_t , TCH_t , DLF_t and INT_t respectively represent the money supply, inflation, the exchange rate, the degree of tax freedom and the real rate of interest in period t , k is the number of optimum lags of the model, dmax is the maximum order of integration of variables. μ_{1t} , μ_{2t} , μ_{3t} , μ_{4t} and μ_{5t} represent the random errors of equations (4), (5), (6), (7) and (8).

In equation (4), the hypothesis that inflation does not cause the supply of money boils down to testing if the coefficients β_{2i} is all equal to zero. In the same manner, in equation (5), the hypothesis that the supply of money does not cause inflation boils down to testing if the coefficients α_{2i} are all equal to zero. The analyses are identical for the other autoregressive equations.

5. Results

5.1. Stationarity Test Results

Table 4 shows the results of the stationarity tests. A look at this table shows that only the variable inflation is stationary at levels, the other variables being stationary in first.

Table 2. Results of the stationarity tests.

Variables	ADF test without constant		PP test without constant		Order of integration	Decision on stationarity.
	At levels (p-value)	First difference(p-value)	At levels (p-value)	First difference(p-value)		
INF	0.0014	-	0.0014	-	I(0)	YES
M2	0.8162	0.0000	0.8162	0.0000	I(1)	NO
TCH	0.6932	0.0000	0.6932	0.0000	I(1)	NO
DLF	0.2541	0.0000	0.2541	0.0000	I(1)	NO
INT	0.2260	0.0000	0.2260	0.0000	I(1)	NO

Source: Author using Eviews 9

5.2. Test of Cointegration of Johansen

The long run relationship between the variables INF, M2, TCH, DLF and INT is obtained using the test of [26].

Table 3. Trace test results.

Hypothesized	Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.765679	85.64554	69.81889
Atmost 1	0.440778	34.85827	47.85613
Atmost 2	0.228277	14.51599	29.79707
Atmost 3	0.139275	5.446430	15.49471
Atmost 4	0.005617	0.197135	3.841466
			Prob.**

Source: Author using Eviews 9

Table 4. Maximum eigen value test.

Hypothesized	Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value
None *	0.765679	50.78727	33.87687
Atmost 1	0.440778	20.34228	27.58434
Atmost 2	0.228277	9.069557	21.13162
Atmost 3	0.139275	5.249295	14.26460
Atmost 4	0.005617	0.197135	3.841466
			Prob.**

Source: Author using Eviews 9

The trace test (table 3) and that of maximum eigenvalue (table 4) show that there is an equation of cointegration at the level of 5%.

5.3. Choice of Information Criteria (Number of Optimum Lags of the Model)

Table 5. Number of optimum lags of the model.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-609.1757	NA	1.01e+10	37.22277	37.44952	37.29906
1	-495.3722	186.2240*	47289383*	31.84074*	33.20120*	32.29849*
2	-474.9439	27.23773	69778031	32.11781	34.61199	32.95703
3	-451.3293	24.33020	1.04e+08	32.20178	35.82967	33.42245
4	-420.6627	22.30297	1.50e+08	31.85835	36.61996	33.46049

Source: Author using Eviews 9

The number of optimum lags k is estimated from the results given by the LR, FPE, AIC, SC, and HQ criteria. The number of lags which minimises the criteria of information of LR, FPE AIC, SC, and of HQ is k = 1, because for k = 1, it is notice the value which minimises the five criteria of information.

5.4. Result of the Estimation of the Inflation Model

Table 6. Results of the estimation of models 2 and 3.

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M2)	0.677646	0.315150	2.150229	0.0394
D(TCH)	0.017701	0.009111	1.942829	0.0612
D(DLF)	-0.232192	0.134695	-1.723834	0.0947
D(INT)	-0.289285	0.186753	-1.549024	0.1315
CointEq(-1)	-0.892125	0.164884	-5.410630	0.0000
Cointeq = INF - (0.7596*M2 + 0.0198*TCH -0.2603*DLF -0.3243*INT)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2	0.759586	0.337491	2.250686	0.0316
TCH	0.019841	0.010051	1.974112	0.0573
DLF	-0.260268	0.149297	-1.743293	0.0912
INT	-0.324265	0.205091	-1.581082	0.1240

Source: Author using Eviews 9

The analysis of table 7 shows that only the coefficient of the variable real rate of interest is not significant in the short and long run. On the other hand, the coefficients of the variables M2, TCH and DLF are respectively significant at the 5%, 10% and 10% both in the short and long run. The

error correction term (CointEq (-1)) shows the time necessary for inflation converges to converge to its long-run equilibrium.

The supply of money has a positive and significant effect on inflation both in the short and long run. Thus, a unit increase in

the supply of money leads to an increase in inflation of 0.677 and of 0.759 respectively in the short and long run. This result is in line with theoretical and empirical evidence which stipulates that the supply of money is always a monetary phenomenon [4-6, 10]. The exchange rate has a positive and significant effect on inflation both in the short and long run. Thus, an appreciation of the exchange rate of the CFA Franc relative to the American dollar by one unit leads to an increase

in inflation of 0.017 and 0.019 respectively in the short and long run. This result is not in line with that of [27]. The degree of tax freedom has a negative and significant effect on inflation both in the long and short run. Thus, a unit increase in the degree of tax freedom leads to a reduction of inflation of 0.23 and of 0.26 respectively in the short and long run. Thus, the less expansionary the fiscal policy is, the more inflation diminishes.

5.5. Diagnosis Tests

Table 7. Results of the diagnosis tests.

Tests	F-stat	p-value
Breusch-Godfrey autocorrelation test	F(2,29) = 0.245241	Prob. F(2,29) = 0.7841
Breusch-Pagan-Godfrey heteroskedasticity test	F(5,30) = 1.549721	Prob. F(5,30) = 0.2045

Source: Author using Eviews 9

It emerges from a look at table 7 that the estimated model does not suffer from autocorrelation and heteroskedasticity problems because the respective likelihood (0.7841 and 0.2045) are greater than 5%.

5.6. Result of the Toda and Yamamoto (1995) Causality Test

The procedure of this test consists in studying causality from a VAR in levels of order (k+dmax) where k is the optimum number of lags and dmax the maximum order of integration by applying the restrictions only on the k first coefficients. In this case, k = 1 and dmax = 1, which leads us to adopt a VAR of order 2. The results obtained on the basis of the test of Wald are summarised in the table below:

Table 8. Result of the test of causality of Toda and Yamamoto.

Null hypotheses	Observations	Wald tests χ^2 statistic	p-value	DECISION ON CAUSALITY
INF does not cause M2		0.149827	0.9278	YES
M2 does not cause INF	35	20.14521	0.0000	NO
INF does not cause TCH		3.731490	0.1548	YES
TCH does not cause INF	35	2.362018	0.3070	YES
INF does not cause DLF		0.889950	0.6408	YES
DLF does not cause INF	35	7.142807	0.0281	NO
INF does not cause INT		2.046727	0.3594	OUI
INT does not cause INF	35	72.70948	0.0000	NO

Source: Author using Eviews 9

A look at table 8 shows that the supply of money causes inflation in Cameroon because the p - value is less than 1%. On the other hand, inflation does not cause the supply of money. There is thus a unidirectional causality going from the supply of money towards inflation (M2 → INF) in Cameroon. Moreover, the degree of tax freedom and the rate of interest cause inflation at the 5% and 1% levels respectively. But the reverse causality is not verified. Thus, the money supply, the degree of tax freedom and the rate of interest are the important levers for the prediction of inflation in Cameroon.

6. Conclusion and Recommendations

6.1. Conclusion

This study first assesses the effect of monetary policy on inflation in Cameroon. Secondly, it examines the nature of the relationship between the supply of money and inflation in Cameroon. The use of the ARDL method of estimation

reveals that monetary policy has a positive and significant effect on inflation in Cameroon. This result is compatible with the monetarist approach according to which the supply of money is the main cause of inflation. Moreover, the exchange rate of the CFA franc relative to the American dollar is also a cause of inflation in Cameroon. It is also retain that, fiscal policy is an instrument which the State can use to reduce the price level. Concerning the nature of relationship between the supply of money and inflation, the use of the causality test reveals that there is a unidirectional causality between the supply of money and inflation (M2→INF). Thus, the unidirectional causality obtained means that the supply of money is an important determinant of inflation in Cameroon. Thus, some recommendations can be made to various economic agents.

6.2. Recommendations

The recommendations are targeted to the following economic agents: The Bank of Central African States (BEAC) who is the guarantor of the monetary policy in the

CEMAC zone and the Cameroonian government that is responsible for regulating national economic activity.

6.2.1. Recommendation to BEAC

On the basis of the results of study, monetary policy should be planned to ensure the stability of prices by controlling the growth of the money supply in the Cameroonian economy.

6.2.2. Recommendation to the Different Governments

- (1) The Cameroonian government should use fiscal policy as an instrument enabling it to fight against inflation by reducing the tax burden of firms.
- (2) The political decision-makers should also make efforts to increase production and reduce the prices of goods and services and stimulate the growth of the economy.

References

- [1] Chaudhry, I. S., Farooq, R. I. F., & Murtaza, G. (2015). Monetary policy and its inflationary pressure in Pakistan. *Pakistan Economic and Social Review*, 53(2), p.251-268.
- [2] Haldane, A G (1997), Designing Inflation Targets in P Lowe (ed.), *Monetary Policy and Inflation Targeting*. Reserve Bank of Australia, 60(1), P.22-26.
- [3] Tang, C. F. and Lean, H. H. (2007). Is the Phillips curve stable for Malaysia? New empirical evidence. *Malaysian Journal of Economic Studies*, 44(2), p. 95-105.
- [4] Brumm, H. J. (2005). Money growth, output growth, and inflation: A reexamination of the modern quantity theory's Linchpin Prediction. *Southern Economic Journal*, 71(3), p. 661-667.
- [5] Friedman, M. (1963). *Inflation: Causes and Consequences*. Asia Publishing House, New York.
- [6] Grauwe, P. And Magdalena, P. (2005). Is Inflation Always and Everywhere a Monetary Phenomenon?. *The Scandinavian Journal of Economics*, 107(2), p. 239-259.
- [7] Qayyum, A. (2006). Money, inflation, and growth in Pakistan. *The Pakistan Development Review*, 45(2), p. 203-212.
- [8] Ratnasiri, H. (2009). The Main Determinants of Inflation in Sri Lanka: A VAR Based Analysis. *Central Bank of Sri Lanka-Staff Studies*, 39 (1&2) p. 1-14.
- [9] Tabi, N., and Ondo, A. (2011). Inflation, Money and Economic Growth in Cameroon. *International Journal of Financial Research*, 2, p. 45 -56.
- [10] Dania, N. (2013). Determinants of Inflation in Nigeria (1970 – 2010). *The Business & Management Review*, 3(2), p. 106-114.
- [11] Hossain, T., and Islam, N. (2013) Economic Analysis of the Determinants of Inflation in Bangladesh. *The International Journal of Social Sciences*, 11(1), p. 29-36.
- [12] Iya, I. B., and Aminu, U. (2014). An Empirical Analysis of Determinants of Inflation in Nigeria. *Journal of Economics and Sustainable Development*, 5(1), p. 140-150.
- [13] Mohamed, I. (2016): The Impacts of Monetary Policies on Inflation Rates in Sudan (1970–2014). *International Journal of Advance Research in Management, Engineering and Technology* 1(1), P. 75-81.
- [14] Darrat, F. (1986). Money, inflation and causality in North Africa countries: An empirical investigation. *Journal of macroeconomics*, 8(1), p. 87- 103.
- [15] Jones, J., and Khilji, N. (1988). Money Growth, Inflation, and Causality: Empirical Evidence for Pakistan 1973-85. *The Pakistan Development Review*, 28(1), p. 45-58.
- [16] Tang, T-C. (2004). Causality between Money and Price in Malaysia: A Revisit. *Labuan Bulletin of International Business & Finance*, 2 (1), p.71-81.
- [17] Us, V. (2004). Inflation dynamics and monetary policy strategy: Some aspects for the Turkish economy. *Journal of Policy Modeling*, 26, p.1003–1013.
- [18] Hossain, A. (2005): The Granger-causality between money growth, inflation, currency devaluation and economic growth in Indonesia: 1954-2002. *International Journal of Applied Econometrics and Quantitative Studies*, 2(3), p.69-92.
- [19] Salma, A. (2016). “Temporal causality between inflation and money supply: a case study of Bangladesh”. *International Research Journal of Management & Social Sciences*, 1(5), p. 2455-4553.
- [20] Fitsum, S., Yilkal, W., and Teshome, A. (2016). The Relationship between Inflation, Money Supply and Economic Growth in Ethiopia: Co integration and Causality Analysis. *International Journal of Scientific and Research Publications*, 6(1), P. 2250-3153.
- [21] Brida, J. G., Sanchez Carrera, E. J., and Risso, W. A. (2008). Tourism's impact on long-run Mexican Economic Growth. *Economics Bulletin*, 3(21), p.1-8.
- [22] Zortuk, M. (2009). Economic impact of tourism on Turkey's economy: evidence from cointegration tests. *International Research Journal of Finance and Economics*, 25, p. 231-239.
- [23] Toda, H. Y. and Yamamoto, T. (1995). Statistical Inference in Vector Autoregression with Possibly Integrated Processes. *Journal of Econometrics*, 66 (1/2), p. 225-250.
- [24] Dickey, D. A. and Fuller, W. A. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root., *Econometrica*, 49, p. 1057-1072.
- [25] Phillips, P. C. B. and P. Perron, (1988). Testing for a unit root in time series regression. *Biometrika*, vol.75 (2), p. 335-346.
- [26] Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 12(2–3), p. 231–254.
- [26] Diop, A., Dufrénot, G., & Sanon, G. (2008). Long Run Determinants of Inflation in WAEMU. In A-M. Gulde and C. Tsangarides (Eds.), *the CFA Franc Zone Common Currency, Uncommon Challenges*. Washington DC, International Monetary Fund.