Money Supply, Interest Rate, and Economic Growth in Cameroon: A Time Series Analysis

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ABSTRACT

The shortfalls of trade by barter have projected beyond imagination the role of money in any modern economic system. However, different predictions of monetary theories have assigned different degrees of the impacts of money and interest rate on economic growth and development. Thus, this paper is designed to investigate into the effects of expansionary monetary policy through interest rate on economic growth and development in Cameroon over a period of 32 years. Based on three theoretical frameworks, using ordinary least squares technique and co-integration Error Correction (EC) analysis, the finding from this study is that the effectiveness of monetary policy diminishes with expansionary monetary policy in Cameroon. This work therefore recommends guided expansionary monetary policy as an instrument for growth and development in Cameroon in particular and the CEMAC zone in general.

Key words: Dynamic, Money Supply, Interest Rates, Economic growth, Co-integration and Inflation.

RESUME

L'analyse de l'offre monétaire, du taux d'intérets et de la croissance économique au Cameroun: études statistiques.

Les inconvénients du commerce axé sur le troc ont démontré, bien au delà de nos attentes, la place centrale qu'occupe l'argent dans le système économique moderne. Selon différentes prévisions mises en avant par des théories monétaires, l'impact de la monnaie et du taux d'intérêt sur la croissance économique et le développement se fait ressentir à plusieurs niveaux. Ce travail vise à étudier les manifestations de la politique monétaire et expansionniste grâce au taux d'intérêt et son impact sur la croissance et le développement au Cameroun sur une période de 32 ans. Les conclusions de notre étude révèlent que l'efficacité de la politique monétaire constituerait un frein à la politique d'expansion monétaire au Cameroun. Ces conclusions s'appuient sur trois théories monétaires recourant au principe des moindres carrés et à une co-intégration de l'analyse de correction des erreurs. Ce travail recommande la mise en œuvre d'une politique d'expansion monétaire encadrée comme instrument de croissance et de développement dans la zone CEMAC en général et au Cameroun en particulier.

Mots clés: Dynamique, offres monétaires, taux d'intérêt, croissance économique, développement, co-intégration, inflation.

INTRODUCTION

Adam Smith and his invisible hand within the classical era rejects government interference in an economy because according to him interference will result in distortion in optimal resources allocation. This view was questioned in Europe between 1925 and 1936 when unemployment rose by 25 percent, stock market prices failed between 50 and 60 percent of their face values and inflation almost doubled for every quarter of a year.

Based on the above, other prominent scholars of the Keynesian school projected the role of government in an economy. These include, the creating of frameworks of rules and regulations governing the production and distribution of goods and services in the economy. The government is also charged with the responsibility of defending its country from foreign aggression, establishment and implementation of justice, maintenance of internal order and operating institutions through which marginal social welfare could be encouraged. According to the Keynesian scholar, the government is also expected to maintain economic stability through exchange rate control, price control, import control, income redistribution through taxation, pursuance of optimum growth and sustainable balance of payments surplus. It is therefore, expected that the government of any country could adopt constractionary or expansionary monetary, fiscal, physical or commercial policies to achieve its visionary goals.

Sine 1960, the date of independence, the Government of Cameroon had introduced a series of internal policy thrusts to achieve her expected target of double-digit growth rate, single digit inflation rate, internal and external stability. Some of the economic policies adopted so far were the Structural Adjustment Programme (SAP) of 1988/1989 and the austerity programme of 1987. The 60 percent reduction in the salaries of civil servants in 1993, the trade liberalization programmes of 1990, the suspension of the CFAF convertibility between BEAC and BCEAO in 1994 were further put in place. Next were the 50 percent devaluation of FCFA by the Central African Monetary Union (CEMAC), in 1994, the poverty alleviation strategies of 2000, the National Governance Programme (NGP) of 2000, the Good Governance Unit (GGU) of the National Assembly of 2006, the national Anti Corruption Drive (ACD) of 2006 and the operation Declaration of Assets (ODA) of 2006 were also put in place.

As a member of the Central African Monetary Union (CEMAC), Cameroon has no independent monetary policy. This automatically means that her credit expansion depends strongly on the CEMAC conditions. Thus, proper examination of the stages of Economic and Monetary integrations within the CEMAC zone explains that the link between member countries even at the level of "Free Trade" agreement is weak. The issues associated with coordinating and harmonizing of monetary, fiscal and exchange rate policies as well as industrial, agricultural and even socio-economic policies are still to be achieved. Since no common exchange rate is used by Member States, and member countries have no common interest rate, it means that monetrau policy as a determinant of economic growth in the individual states of the CEMAC Zone is questionable thereforethe present study is designed to investigate how variations in monetary policy affect productivity in Cameroon through interest rate.

Investigating into the Cameroon economy, one could observe that money supply and interest rate, which according to the Keynesian economists, induced certain changes on an economy, are observed not to have performed as expected since 1960 the year of independence. For example, in 1960, while the real economic growth stood at 8.63 percent, broad money supply stood at 30.71 billion FCFA with interest rate of 3.2 percent (World Bank, World Table, 1989-1990).The tracking performance of broad money supply, interest rate and real output in Cameroon are shown in Figure 1.1.

In 1970, the national lending rate rose to 6.8% while real GDP fell to 6.42 percent and broad money supply increased to 45.476 billion FCFA. In 1980, while the national lending rate used as proxy for interest rate increased to 19.2 percent, real GDP using 1960 as the base year dropt to negative 2.04 percent while broad money supply increased to 315.42 billion FCFA. The trends continued till 1989. In 1990, while the broad money supply increased to 763.25 billion CFAF, the national lending rate rose to 22.9 percent taking 1960 as the base year and real growth of GDP stood at negative 4.4 percent. From 1991 to 2005, while broad money supply maintained an overall average growth rate of 10.3 percent, real GDP stood at 1.8 percent on the average. From the above, it is clear that the Government of Cameroon has put in place a series of policy measures to enhance growth and development and poor growth in real national output per head has stagnated or been minimal. This equally
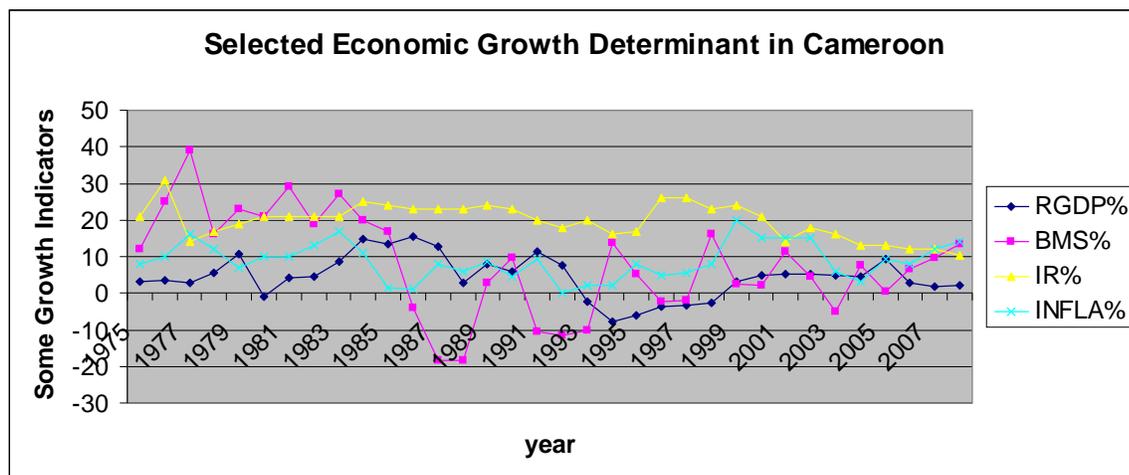
Fig. 1.1: Selected Econnomic Growth Determinant in Cameroon

Sources: World Bank, World Table, Cameroon Financial Bill 2007, and African Development Indicators. RGDP= Real Gross Domestic Income. BMS = Broad Money Supply. IR = Government Lending Rate and INFLA = Annual Inflation Growth Rate.

means that either a right policy has been introduced at a wrong time or the root causes of the problems are still to be identified and solved.

Therefore, this study intends to investigate into the impacts of monetary policy via interest rate on growth and development in Cameroon. The fundamental proposition this study is out to verify is whether the Keynesians' argument that increases in money supply actually lowers interest rate, encourages investment and creates employment opportunities is true for Cameroon. To achieve the above objectives, this study is divided into five sections. Having covered section one, section two is based on literature review and theoretical framework. Section three is on the analytical framework, section four discusses the results, while section five draws the work to a logical conclusion through the summary of major findings and policy implications.

II (a) Literature Review and Theoretical framework:

Ando and Modigliani (1965), observed that both money supply and autonomous expenditure affect output with autonomous expenditure more effective. They further argued that, the above recorded inconsistency demonstrates the superiority of Friedman's monetary model as the case with the Keynesian money demand models in an open economy.

Walters (1966), using time series data over a period of 80 years, investigated the impact of changes in money supply on the value of Gross National Product (GDP) in UK. The inspiration drawn from his finding was that with money supply treated as autonomous bank rate, as principal weapons of monetary policy, 1 percent increase in autonomous money supply could cause less than 1 percent increase in GDP, all things being equal.

Furthermore, Friedman (1969) in his study on American monetary system noted that a lag exists between changes in the money supply and consequent changes in the real income. He concluded that the lag variable changed without indicating the actual duration. The conclusion drawn from this study was that changes in money supply affect real income directly contrary to the Keynesians' view that changes in money supply affect real income indirectly; via changes in the interest rates or the availability of credits.

Aku (2002) tested the Keynesian hypothesis in Nigeria between 1970 and 2000 and his results showed that money supply does not matter in the Nigerian situation. The results showed that, increases in money supply actually led to a rise in general price level instead of falling interest rates.

(b) Theoretical Framework
The issue of money and the general economic performance has undergone a series of changes. Views ranging from the Bodin and Fisher's quantity theory of money through the Cambridge, Keynesian to the Friedman monetary hypothesis try to provide useful links between money supply and macroeconomic performance in an economy. The initial links between

money supply and the general price level formulated by Bodin in 1916 is presented as;

$$M \alpha P \text{ -- (2.1)},$$

meaning changes in money stock (M) has a direct proportional effect on the general price level(P). M = Money Stock and P = Price level. Here money is defined only as a medium of exchange, as the velocity of money is assumed constant. This is unrealistic because other theories have justified that the rate at which money changes hands varies with different countries and within the same country at different periods. As such, the later quantity theory of money drew attention to the rate at which money changes hands described as the velocity (V) of money in circulation or the money multiplier. The introduction of V into the theory served as a useful guide to the behavior of prices and outputs. This relationship also called the Fisher's quantity theory of money states that the flow of expenditure (MV) in an economy is proportionate to the values of goods and services (PT) produced.

Thus; MV=PT ------------------------------------- (2.2), where MV is the flow of expenditure and PT the value of goods and services produced. It has been argued that equation (2.2) is a tautology as such unable to tell us what happens when any or all of the variables change. Equation (2.2), also called the fisher's equation considers the demand for money only as a medium of exchange and as a store of value. In this case, the Fisher's quantity theory of money is limited since it is unable to capture the four traditional functions of money in any modern economy

The Cambridge cash balance approach has converted the quantity theory of money to the demand for cash balance presented as MV = PY ----------------- (2.3). Equation (2.3) is an identity and like equation (2.2), it does not say anything about what happens to PY, when M and V changes. To establish what happens to PY with changes in V and M, we take the partial derivative of equation (2.3) with respect to time, thus;

$$\overline{MV} = \overline{PY} \Rightarrow V = \frac{\overline{PY}}{M} - \text{ ---------------------------- (2.4)},$$

and similarly $\overline{M} = V \dfrac{\overline{PY}}{V}$ ------------------------- (2.5).

The Cambridge equations show that, given the condition of equilibrium in the money market, the supply of money (MS) is equal to its demand for money (MD). This satisfies the quantity theorists proposition.

Given that PY is the monetary value of GDP in an economy, then, it is safe to state that there is a relationship between M and GDP such that MV = PY, and V = PY/M, where I/V is known as Cambridge "K" defined simply as the ratio of money supply to GDP, such that

$$K = \frac{1}{V} = \frac{1}{PY/M} \text{ ----------------------------------- (2.6)}.$$

The Cambridge cash balance explains that a relationship exists between demand for money and the level of income in a composite form. That is MD = f (MD_t, MD_p), where MD=MS meaning demand for money is equal to supply of money. MD_t= Transactional demand for money, MD_p=Precautional demand for money.

This hypothesis was modified by the Keynesian view as MD=f (MD_t, MD_p, MD_s) where MD_s is speculative demand for money. To him, the speculative demand for money is guided by the rate of interest. As such, at less than full employment level, increase in money supply would lead to a fall in rate of interest, thereby stimulating investment via the multiplier effects to increase in demand for goods and services and eventually output.

Thus; $f(y,r) \Rightarrow md = k_1 y - k_2 r + u$ ------------------------- (2.7). Equation (2.7) is expressed in the econometric form with k1 and k2, as coefficients of Y and r respectively and U = the stochastic error term.

However, the monetarists consider rate of interest only as a partial determinant of the demand for money and that at full employment level, increases in money supply instead results in an increase in the general price level. Based on this, people will prefer to hold their money in form of assets such as houses, bonds, treasury bills, exchange bills without taking into consideration the rate of interest.

III. ANALYTICAL METHODOLOGY
(a) Scope, Sources of Data and Limitations
This study covers a period of 32 years that is, from 1975 to 2008 inclusive. That is a period of 20 years before the devaluation of the FCFA and 15 years after the devaluation. Also, the period of 15 years before the introduction of Structural Adjustment Programme (SAP) in Cameroon and 19 years after the programme. This period is very important for this study because it has recorded numerous economic reforms in terms of both fiscal and monetary adjustment in Cameroon. This study also requires some substantial amounts of

statistical information, much of which have been extracted from Cameroon Finance Bill 2007, Annual Reports of Ministry of Economy and Finance, Department of Statistics and National Accounts, Central Bank for Central African States (BEAC), African Development Indicators (ADIs) various issues, World Bank, World Table on development issues. This therefore, implies that this research is based on intensive Library Research Design (I.L.R.D) or Expost Factor Research Design (E.F.R.D).

It is important to point out that data limitations associated with the large informal sector, corruption, difficult political, social, and economic terrains might cause underestimation of the response of output induced by interest rates and quasi money supply. Apart from the above, data inconsistencies are also rampant. The same data from varying sources tend to give different information. In addition, there are long time lags between policy formulation and implementation due to institutional and structural rigidities observed in the Cameroon economy. However, given the scope and objectives of this work, the study has no option than to rely on estimation and provisional data available.

(b) Model Specification, Estimation, and Validation:
Given the nature of this study, three econometric models are specified for estimation. The first is the quantitative assessment of the relationship between the Cambridge "k", interest rate and nominal GDP following Walters (1970)'s and Aku's (2002) approaches used to evaluate the UK and the Nigerian economies, respectively. The second is the over all monetary policy effect on GDP based on the Keynesian and monetarist approaches and the third model demonstrates the dynamic of monetary policy on GDP. Thus:

$$k = aY^{a1}r^{a2}e^{u} \text{ -------------------------------- (3.1a)}$$

where; K = Cambridge "K", Y= normal GDP, r = Lending rate, U = error term with its assumed normality, a, a_1, a_2 are the coefficients of the parameters to be estimated. Transforming equation; (3.1a) to a linear form we have;

$$Ink_t = Ina + a_1 InY_t + a_2 Inr_t + U_1 \text{ -------------- (3.1b)}$$

Based on Keynes and Friedman thoughts we have

$$InY_t = Inbo + b_1 InMs + b_2 Inr_t + b_3 InInFlA_t + b_4 InFISDY_4 + U_2 \text{ -- (3.2)}$$

The dynamic model becomes;

$$InY_t = Inc_o + C_1 InMs + C_2 InMs_1 + C_3 InMs_2 + ----- Ct - nInMs_n + U_3 \text{ --------- (3.3)}$$

Where; Ms = quasi money supply, INFIA= Inflation

rate, FISDY = fiscal deficit as a ratio of GDP, b_0 to b_4 and C_o to C_{t-n} are the coefficients of the parameters in equation 3.2 and 3.3 to be estimated. Equation (3.3), allows for substantial time Lags in the economy responses to changes in the quantity of money on real output. This study has employed Cointegration Error Correction Mechanism (ECM) to estimate the specified equations 3.1 to 3.3 using ordinary Least Squares technique, used in this work based on its BLUE Property (Best Linear Unbiased Estimator). The units root test (ECM) is conducted in this work because of data instability arising from the variations in the Cameroon economic terrain within our period of study. With frequent variations in the policy and developmental environments (Political, Social, economic, high level of corruption, strikes), there is need to difference the time series data so as to separate the non-economic occurrences resulting from expansionary monetary and fiscal policies. By doing this, meaningful economic results are guaranteed since the problems of spurious correction are eliminated.

In addition to the stationary results, the validity of our regression parameters are based on economic a priori theoretical expectation, adjusted R-Squared, T-value F-Statistic and Dubin Watson (DW) econometric second order test.

IV RESULTS
(a) Presentation of Results
This section presents the stationarity test and the ordinary Least Squares results based on Cointegration Error Correction Mechanism. A cursory perusal of the static ordinary regression results not presented in the work because of space, show that inconsistencies exist in some of our Ordinary Least Squares (OLS) results. This is reported by high adjusted R_2 and low D-W statistics, which reflect the presence of high serial correlation among the random terms. This admixture of low D-W and high explanatory power means that the explanatory power of our models are misleading since the results suffered spurious regression and are nonsensical. The study proceeds to confirm the non-stationarity results by carrying out unit root tests and the results are presented in Table 3-1.

From the OLS results not presented for the reason explained above, it is observed that the time series data are nonstationary and should be corrected. Such correction is carried out by differencing both dependent and the independent variables as presented in Table 3.1.

Table 3.1: Results of First Order Differencing of the variables of the time series

.Variable	ADF Test		PP Test		Remarks
	Without Trend	With Trend	Without Trend	With Trend	
Δk	- 4.9248	-4.81404	-6.14898	-5.99159	1(0)
ΔY	-5.0029	-4.87092	-6.8828	-6.72120	1(0)
ΔR	-4.914201	-4.930813	-6.77289	-6.755189	1(0)
ΔMS	-4.46084	-4.37622	-5.97696	-5.85902	1(0)
$\Delta/nFLA$	-5.89107	-5.88004	-7.322235	-7.3546	1(0)
$\Delta FISDY$	-10.28550	-10.64146	-2.9284	-3.0776	1(0)
Critical Values			-3.6752	-4.3082	
1%	-3.6852	-4.3226	-2.9665	-3.5731	
5%	-2.9705	-3.5796			

Data.Source: Computed by Author from the (OLS) regression result.

In Table 3.1 the study tests, the hypothesis that H_0: Y_t, 1(1) against H_1: Yt 1(0). From the above results, we reject the null hypothesis when Yt, 1(0) and from Table 3.1 the results show that all the variables, which suffer from spurious regression achieved stationarity in the first difference and as such, are integrated in the order 1. With these corrections, our estimated coefficients are now reliable, and can be used for policy recommendations. Thus, the estimated parameters are presented as seen on Tables 3.2 to 3.4 below.

(b) Discussion of the Cointegration Results
In equation 3.2 with the exception of the constant term, all the coefficients of our explanatory variables are

Table 3.2: Ordinary Least Squares Result Based on Cointegration Error Correction Mechanism. Dependent variable: Log of the Cambridge "K". Number of observations, 32 years.

Variable	Coefficient	T-Value	Std-Error	P-Value
Constant	4.2064	(2.53862)*	0.6731	[0.502]
Δ/nR	-0.4450	(-3.8671)*	0.3598	[0.052]
Δ/nY	-0.6421	(-3.6615)*	0.3663	[0.001]
ECM(-1)	-0.9623	(-6.2831)*	0.0413	[0.000]
R^2 =0.6984, F-Ratio = 15.148, D.W.=2.046				

Table 3.3: Result of the Growth Equation Based on Co integration Error Correction Mechanism. Dependent variables: Log of GDP, Number of Observation: 32 years

Variable	Coefficient	T-Value	Std- Error	P-Value
Constant	3.2452	(10.463)*	0.2334	[0.000]
$\Delta Lnms$	0.6729	(2.4491)*	0.81431	[0.0501]
$\Delta \ln R$	0.3084	(0.9038)	41926	[0.194]
$\Delta \ln \ln FLA$	-0.5684	(-3.6641)*	0.0424	[0.006]
$\Delta InFISDY$	0.04735	(5308)	0.1167	[0.246]
ECM (-1)	-0.6542	(-2.1836)*	0.0468	[0.0431]
R^2 =0.864, F-Statistic (5:25)=12.6, D.W.=1.9341				

Table 3.4: The Dynamic Policy Result Based on Co integration Error Correction mechanism. Dependent variable GDP. Number of Observation: 32

Variable	Coefficient	T-Value	Std. Error	P. Value
Constant	29.143	(0.7674)	0.3376	[0.490]
Ms_1	0.6341	(2.4941)*	0.6431	[0.062]
Ms_{t-1}	-0.0642	(-2.4864)*	0.36424	[0.044]
Ms_{t-2}	0.6942	(2.6743)*	0.29481	[0.026]
Ms_{t-3}	0.7453	(2.3126)*	0.3966	[0.074]
ECM(-1)	-0.8462	(-2.446)*	0.37324	[0.062]
R^2 =0.7331, F-Statistic (5:25)=10.1162, D.W.=1.9624				

negative meaning increase in these variables would result in a fall in the Cambridge "k". The negative values of interest rate and nominal GDP represented by R and Y mean that the effectiveness of monetary policy diminishes in Cameroon with increase in money supply. In addition, from the conventional IS-LM Framework, expansionary monetary policy results in the fall in interest rate, but our findings in (3.2) reject that proposition. The role of monetary policy on output (GDP) as suggested by the Keynesians and the monetarists' paradigms are also presented in equation (3.3) and the results reveal that broad money supply, interest rate, and fiscal deficit are positively related to growth with inflation reporting a negative effect on growth. However, based on our t-value, the coefficient of interest rate is insignificant and as such, this is in agreement with the monetarist hypothesis. The negative effect of inflation on growth supports the monetarist's view that inflation enhances assets holding than cash thus retarding growth.

The investigation into the role of monetary policy in Cameroon shows that both positive and negative effects are registered on the GDP of Cameroon induced by variation in quasi-monetary supply. From this result, the null hypothesis that monetary policy matters in Cameroon is rejected with the observation that what matters in Cameroon is the misalignment of fiscal, monetary, and commercial policies, which have yielded galloping inflation, poverty and corruption. Therefore, correcting these situations require that inflation, institutional and structural rigidities must be given due consideration when projecting our policy recommendations.

The t-values of most of our results are significant. All the variables account for more than 60 percent of the total variations in the dependent variables, with high explanatory power presented by the values of adjusted R^2. The F-ratios reveal that our results are more than 99.9 percent reliable, which further justify why our findings should be used for policy recommendation, since no serial correlation exists.

V. SUMMARY OF MAJOR FINDINGS, POLICY RECOMMENDATIONS, AND CONCLUSION

Covering a of 32 years (1975 to 2008), this work has investigated into the effects of money supply via interest rate on economic growth in Cameroon. The results reveal that increases in money supply in Cameroon lead to rise in general price level instead of fall in interest rates contrary to the Keynesian's hypothesis. Also in Cameroon, economic growth and development are enhanced by increases in interest rate, broad money supply, credit expansion, and fiscal deficit GDP ratio. This same growth is retarded by increase in the general price level.

Finally, the speed of the adjustment parameter as indicated by the coefficient of the error correction variable is significant with their appropriate negative signs, meaning that economic growth in Cameroon adjusts faster to long-run equilibrium due to changes in money supply, interest rate, fiscal deficit, price adjustment (at the rate of 65.42 percent). Therefore, the policy implications from these findings are that:

- Government policy aimed at encouraging broad money supply can have significant desirable impacts on economic growth if such measures also aimed at eliminating inflation, structural rigidity, and corruption. Therefore, the combinations of guided expansionary monetary policy, price stability, and good governance and all its features are recommended.

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