Original Research Article

An empirical analysis of the effects of monetary policy on economic growth in Cameroon

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Abstract

This study is designed to empirically examined the cause and effect relationship between monetary policy channels and economic growth in Cameroon using time series data from 1980-2014, sourced from the United Nations Commodity Trade data base, Cameroon Finance Bill and World Development Indicators. Estimation technique necessitated by the study was the Vector Autoregressive (VAR) estimation technique which was able to capture the cause and effect relationship of both the independent and dependent variables and between the dependent variables too. Results from the study showed that interest rate and consumer price index negatively and significantly affect economic growth in both the first and second lag years while broad money, in a two year lagged period negatively affect economic growth but positively related in the first lagged. Both results were significant. From the study thus, we were able to recommend policies to reduce interest rates and thus make loans cheap, measures to reduce prices of goods and services available to average consumers and also ways to control the quantity of liquid cash available in the economy; which is dependent on the economic situation of the country. These will thus stimulate economic activities and subsequently growth for Cameroon.

Keywords: Broad Money, Consumer Price Index, Interest Rate, Liquid Cash, Monetary Policy Channels, Monetary Policy

INTRODUCTION

The need for sustainable development is one of the biggest quests for all Sub-Saharan nations and Cameroon in particular. Interestingly, the quest to achieve sustainable growth is not only tied to the coordination and control of the different sectors of the economy but also entails the use of policy tools. This is particularly an imperative because besides the fact that sustainable growth is argued to depend on a number of factors including structural transformation, industrialization, trade openness, entrepreneurship, enhancing business competitiveness, good governance, political stability (Aboagye et al., 2013), fiscal and monetary policies among others; its promotion will have several implications on many variables with monetary policy of great importance to this work.

Many countries in Sub-Saharan Africa have attempted several policies; many of which are not only intended to inject growth into their economies, but also to ensure sustainable growth (Aboagye et al., 2013) without sacrificing other policies needed for that same growth. Cameroon has recorded dismal growth rate for more than a decade now (4.1 in 2011, 4.7 in 2012, 5.1 in 2013 and 5.4 in 2014, (CIA, 2015)) with sustainable development remaining a challenge. Prolonged high oil and some agricultural goods prices encouraged the government to launch ambitious public investment programs to fill the infrastructural gaps existing in the country. Oil sector contribution to Cameroon GDP remained high of about 9.9% in 2006, 9.3% in 2007, 10.7% in 2008 and 7.8% in 2011 (Cameroon Economic,
Social and Financial Report, 2013). Despite large incomes from oil, poverty, income inequality and unemployment remains very high with most employed underemployed (underemployment is about 75%). One of the most pressing challenges is the implementation of structural reforms to promote sustainable and inclusive growth while adopting macroeconomic policies to preserve financial stability, ensure efficient use of export revenues and increase resilience against shocks.

Large unsterilized surpluses resulting from surge in oil export revenue over the last decade continue to impair monetary policy transmission mechanisms and make monetary policy largely ineffective. Growth of bank deposits dropped in 2013 but remain strong while the growth of credit accelerated due to the dynamism of the non-oil sector and domestic consumption. Liquidity in the banking system decreased following a decline in foreign assets. Nonetheless, excess liquidity in the system remains high in part due to some liquidity injection by the Bank of Central African States (BEAC) to support some financial institutions which again mar monetary transmissions growth (IMF Country Report, 2014).

By 2014, GDP growth was about 5.4; this was as a result of continued implementation of public investment plans. Inflation rate remain moderate (below 3%) exactly 1.8% reflecting favorable trend in food prices. The continuation of expansion of the fiscal policy will maintain fiscal deficit to about 3% of GDP. Current account deficit remained around 3% of GDP as high oil export revenue will be offset by large imports needed for infrastructural growth. Medium-term growth looks positive, if significant reforms are implemented; reforms to promote private investment, improve business climate and deepening of the financial sector (Cameroon Economic, Social and Financial Report, 2014).

Some scholars argue that, promoting growth and development requires the forgoing of other resources and policies needed for sustainability. In a clearer sense, the forgoing of other policies to achieve growth does not mean inefficient utilization or abandonment of such policies but rather better implementation of both mixes to ensure quality and sustained growth with efficiency (Itoe and Atangana, 2015). Monetarists strongly believe that monetary policy exact greater impact on economic activities and growth as unanticipated change in the stock of money affects output; that is the stock of money must increase unexpectedly for the central bank to promote growth. In fact, they are of the opinion that an increase in government spending would crowd out private sector and such can out-weigh any short-term benefits of an expansionary fiscal policy (Adefeso et al., 2011 in Abata et al., 2012 and Forgha et al. 2013). On the other hand, the concept of liquidity trap is a situation in which real interest cannot be reduced by any action of monetary authorities was introduced by the Keynesian economists. Hence, at liquidity trap an increase in the money supply would not stimulate economic growth because of the downward pressure of investment owing to insensitivity of interest rate of money supply. John Maynard Keynes recommends fiscal policy by stimulating aggregate demand in order to curtail unemployment and reducing it in order to control inflation (Abata et al., 2013).

Monetary policy can be implemented by any central bank using the following measures; reserves requirement, open market operations and discount rate among others. The open market operation channel is best applied using money supply. In the scope of this work, money supply will be limited to liquid currency and bank credits which we commonly call broad money ($M_2$). The ability to hold money in any form is limited to portfolio decision. Discount rate on its part is interest rate charged by central banks for lending out excess reserves. Therefore, interest rate is the measure or variable used for discounting. Reserve requirement is the minimum amount of reserves a bank is required to hold by government regulation but for lack of data, it cannot be incorporated here.

The benchmark interest rate in Cameroon last recorded at 2.45%. Interest rate in Cameroon averaged 3.75% from July 2009 to 2015, reaching an all time height of 4.25% in July 2009 and a recorded dept of 2.45% in July 2015 (BEAC, 2015). In theory, positive real interest rates approach anchors on the Financial Repression Hypothesis (FRH) associated with the McKinnon (1973) and Shaw (1973). The main argument underlying the FRH is that regulated nominal interest rates result in very low and even negative interest rates, which among other things, undermined efficiency in financial intermediation and as a result cause fragmented financial markets, dependence on foreign aid and poor economic growth in LDCs (Bwire et al., 2008). According to FRH, interest rate elasticity of savings is positive, elastic and significant. From this notion, financial reforms have been practiced in a number of SSA countries since 1980s. These reforms have been characterized by deregulation of interest rates from government controls with a view to availing positive real interest rates. The belief is that higher real interest rates would elicit a higher volume of domestic savings and, given the supply-side effect, private investment would increase and set in a virtuous circle of higher growth and more savings for investment.

Conventionally, it is agreed that a good understanding of the stability and determinants of the demand for real money balances forms the core in the conduct of monetary policy as it enables a policy-driven change in monetary policy aggregates to have predictable influences on output, interest and ultimately price (Sriram, 1999; Halicioglu and Ugur, 2005; Nachega, 2011 in Nduka, 2014). Thus, stable demand function serves as a stabilization policy which depends on the ability of central bank to adjust money supply to its demand in order to prevent monetary disturbances from inhibiting growth. Worthy to note again is the fact that the relationship between money supply and price, income and balance of
payment is determined by money demand and this relationship is important in macroeconomic policies (Nduka, 2014). Central banks strive to promote and maintain monetary stability and growth through debt and foreign exchange management. Therefore, appropriate demand and supply management of monetary policy by the central banks is necessary for economic development requires money to be stable and functional (Nwafor et al., 2007).

Cameroon is a member of CAEMC (Central African Economic and Monetary Commission) and its monetary policy is conducted by the MPC (Monetary Policy Committee) of the Bank of Central African States (BEAC). The MPC’s national responsibilities are exercised by Monetary and Financial Committee. BEAC’s monetary policy has sought to stabilize prices and real effective exchange rate and to prevent public spending from crowding out private investment (Njimanted et al., 2013).

After three years of a rather restrictive monetary policy, that is between 2010 and 2012, even though inflation complied with the CAEMC convergence criteria, BEAC moved to an expansionary monetary policy implemented through two instruments; refinancing and reserves aimed at achieving robust growth. The MPC reduced the advance rate (intervention rate) for banks from 3.5% to 3.25%. The required reserve ratio for banks in Cameroon is 11.75% for sight deposits and 9.25% for deposits. As a result, money supply grew by 7.7% in 2013 from 3.07 trillion to 3.31 trillion francs CFA; in 2012 it grew only by 1.4%. Credit to the economy (domestic credit) also increased by 30.3% between 2011 and 2013, benefiting the private sector (+14.6%) in conjunction with the financing of major infrastructure projects (Cameroon, 2014).

The government of Cameroon implemented the structural adjustment and stabilization programs in the late 1980s to stimulate all major (private and real sector) sectors of the economy, together with the other CEMAC member states and also the drafting of the Growth and Employment Strategy paper (GESP, 2010 to 2020). Fall outs of the SAP included privatization and devaluation with devaluation being a direct monetary policy implication. The GESP emphasizes in summary sustainable growth encompassing all sectors of the macro-economy (Itoe and Atangana, 2015). This paper therefore seeks to draw attention to the effects of this robust growth policy designed by the policy makers of Cameroon on monetary policy. Monetary policy is expected to play a passive role in the economy and its poor manipulations might lead to undesirable consequences. According to Friedman (1982) "one of the five major points of monetary policy is that monetary authorities should avoid trying to manipulate either interest rates or exchange rates". This basic idea often stressed in many criticisms of this type is that an interest rate instrument is inconsistent with the objectives of long-term monetary control and price stability (Dotsey, 1987).

Given the fact that a lot have recently been put into place with the expectation of increasing the rate economic growth in Cameroon, even though still dismal and also still in one digit, this study is thus designed to put forth answers to the following questions; how are these monetary policy decisions growth policies influencing economic growth? What are the policy variables and their level of influences on monetary policy in Cameroon? This study is conducted under the null hypothesis of monetary policies in Cameroon have no statistically significant effect on economic growth. This study therefore is conducted under five sections. While the introduction draws on the background information, section two provides the recent literature on the topic, sections three and four anchor on analytical methodology, presentation and discussion of results respectively. The last section draws the work to logical conclusion through summary of major findings and recommendations.

**Literature Review**

The concept of the quantity theory of money (QTM) began in the 16th century. As gold and silver inflows from the Americas into Europe were being minted into coins, there was a resulting rise in inflation. This led economist Henry Thornton in 1802 to assume that more money equals more inflation and that an increase in money supply does not necessarily mean an increase in economic output. The assumptions and calculations underlying the QTM, as well as its relationship to monetarism and ways the theory have been challenged. The quantity theory of money states that there is a direct relationship between the quantity of money in an economy and the level of prices of goods and services sold. According to QTM, if the amount of money in an economy doubles, price levels also double, causing inflation (the percentage rate at which the level of prices is rising in an economy). The consumer therefore pays twice as much for the same amount of the good or service.

Another way to understand this theory is to recognize that money is like any other commodity: increases in its supply decrease marginal value (the buying capacity of one unit of currency). So an increase in money supply causes prices to rise (inflation) as they compensate for the decrease in money's marginal value. In its simplest form, the theory is expressed as:

\[ MV = PT \]  

Where:

- \( M \) = Money Supply
- \( V \) = Velocity of Circulation (the number of times money changes hands)
- \( P \) = Average Price Level
- \( T \) = Output (quantity of goods and services sold)
T = Volume of Transactions of Goods and Services
The original theory was considered orthodox among 17th century classical economists and was overhauled by 20th-century economists Irving Fisher, who formulated the above equation, and Milton Friedman. It is built on the principle of "equation of exchange":
Amount of Money x Velocity of Circulation = Total Spending
Thus if an economy has 5 francs CFA, and those 5 francs CFA were spent five times in a month, total spending for the month would be 25 francs CFA.

QTM adds assumptions to the logic of the equation of exchange. In its most basic form, the theory assumes that V (velocity of circulation) and T (volume of transactions) are constant in the short term. These assumptions, however, have been criticized, particularly the assumption that V is constant. The arguments point out that the velocity of circulation depends on consumer and business spending impulses, which cannot be constant.

The theory also assumes that the quantity of money, which is determined by outside forces, is the main influence of economic activity in a society. A change in money supply results in changes in price levels and/or a change in supply of goods and services. It is primarily these changes in money stock that cause a change in spending. The velocity of circulation depends not on the amount of money available or on the current price level but on changes in price levels.

Finally, the number of transactions (T) is determined by labor, capital, natural resources (i.e. the factors of production), knowledge and organization. The theory assumes an economy in equilibrium and at full employment. Essentially, the theory's assumptions imply that the value of money is determined by the amount of money available in an economy. An increase in money supply results in a decrease in the value of money because an increase in money supply causes a rise in inflation. As inflation rises, the purchasing power, or the value of money, decreases. It therefore will cost more to buy the same quantity of goods or services.

Empirically, Bassey et al. (2012) studied the effect of monetary policy on the demand for money in Nigeria. These authors used data from 1970 to 2007 and employed the Ordinary Least Multiple regression statistic technique as the estimating technique of analysis. They were able to find out that there exists an inverse relationship between interest rate and money demand, there also exists an inverse relationship between expected inflation rate and money demand and again there exists an inverse relationship between exchange rate and money demand in Nigeria. These authors were able to recommend that the Nigerian government through the central bank should formulate good policies that will ensure demand for money function thereby encouraging economic growth in Nigeria.

These authors did not use an estimation technique which is able to take care of endogeneity which is a characteristic of this study. The authors again did not conduct all the pre-tests needed for the application of any good econometric method of estimation; that is no unit root test, no stationarity test, no multi-collinearity test and no test of autocorrelation. Again the authors were not specific or precise in their recommendations. They generalized it and as such left a void which casted doubts on their work.

Okwo et al. (2012) conducted a study on the topic “An Evaluation of Monetary Policy Outcomes and its Effects on Price Stability in Nigeria”. They used data from 1985 to 2010 and employed a simplified Ordinary Least Squares technique of estimation in a multiple form. They were able to find a statistically insignificant result between monetary policy, gross domestic product, credit to the private sector, credit to the government sector and inflation in Nigeria. This suggests that monetary policy as a policy as instrument may have been inactive in influencing price stability in Nigeria. They thus recommend that sound fiscal policies will be an important component of the policy mix if price stability is to be sustained and credible. These authors used a limited time scope from which good policy decisions cannot be drawn. Even though some of the pre-tests needed for the application of the Simple Ordinary Least Squares technique of estimation were conducted, other tests such as multi-collinearity, autocorrelation and error correction tests were not mentioned. Also the authors were not very specific in their recommendations. Therefore, there is the need to upgrade the work.

Besnik (2013) studied the effectiveness of fiscal and monetary policy during financial crisis in developing and emerging countries. He used data provided by Leaven and Valencia (2008 and 2010) for 83 financial crises episodes and for 66 developing and emerging countries. He employed the Ordinary Least Squares with robust standard errors and the Generalized Method of Moments estimator. He was able to find out that monetary and fiscal policy contractions are associated with increase in output cost during the financial crises. In addition, fiscal policy expansion is accompanied with smaller output cost over the financial crises, whereas monetary expansion has not showed a clear effect. Therefore, he was able to recommend that, discretionary fiscal expansion and neutral monetary policies are likely to mitigate output cost during the financial crises in developing and emerging countries.

Here the researcher used two composite macroeconomic variables as the dependent variables. In their application, the variables that make up both monetary and fiscal components may have influences on each other, so to for the independent variables and as such will produce faulty results. Also the researcher did not show how and where the unit root tests, stationarity tests, multi-collinearity test and co-integration with
autocorrelation tests were conducted. Thus this results even though paved the way for further research on this and related topics casts a lot of doubts.

Samba (2013) in his work Monetary Policy Effectiveness under the CEMAC Region: An Empirical Evaluation; used quarterly data from 1990 to 2007 and employed a gradual methodology based on Vector Auto Regressive (VAR) approach. He began by estimating usual three variable model including real GDP, consumer price index and interest rate. This author was able to find out that, there are too many differences among the CEMAC countries on effecting a common monetary policy. This outcome reflects the difficulties encountered by the central bank to implement a common monetary policy in the region. His results also show that traditional interest rate channel is not effective enough in the CEMAC area. Moreover, if there is some evidence of bank lending channel in this region, we are inconclusive on this issue due to well known identification problem that arises with the use of aggregate data. The author recommends further studies on the topic to shed more light on the bank lending channel issue.

As a shortfall, the author after using a simplified and appropriate econometric model failed to show the results of the pre and post tests needed for the application of the econometric technique of application used in the work. He also failed to draw appropriate and applicable recommendations necessitated by his findings. But all the same, he opened the way for further research and improved on the literature on this and related topics.

Ekobena (2013) studied monetary policy and economic growth in the CEMAC zone. He used data from 1986 to 2006 and employed the Generalized Method of Moment (GMM) as the method of estimation. His result generally showed that monetary policy centered on the role played by the nominal aggregates of money and credits positively influence economic growth in the CEMAC area. He also found out that inflation played a negative role on economic growth. He recommended the need for maintaining a macroeconomic framework, stable to profit from the positive externalities inherent in the impacts of the monetary policy as well as the concomitant installation of mechanisms of correction of the harmful effects coming from the policies.

Again, this author fails to specify the pre and post tests used in his work. He again failed to be specific in drawing necessary recommendations necessitated by the work. All the same the work is an advancement of research on the topic and related topics.

Nduka (2014), in his study titled, Structural Breaks and the Long-run Stability of Demand for Real Broad Money Function in Nigeria: A Gregory-Hanson Approach; examined the long-run demand for real broad money function and its stability in Nigeria from 1970 to 2012. He used the Gregory and Hanson (1996a and 1996b) co-integration test to capture endogenous structural breaks in the co-integrating vectors of Nigerian long-run money demand function, cumulative sum of recursive residuals and cumulative sum of recursive residual squares tests for structural stability proposed by Brown et al. (1975). They were able to find out that demand for real broad money went through a regime shifts in 2005. The result also confirms the existence of a long-run relationship between real broad money demand, real income, real domestic interest rate, real exchange rate, rate of inflation and foreign interest rate. But the result of cumulative sum of recursive residuals squares shows that the demand for money function is stable, but has undergone some temporary periods of instability.

The work of Nduka (2014) failed to establish the means through which broad money aggregate (M2) can be used to achieve macroeconomic objectives. The author should have reconciled the short and the long-run equilibrium through the use of the vector error correction model in this work.

**METHODOLOGY**

The time scope of this research work extends from 1980 to 2014 that is a 35 year span. Reasons advanced for this include the availability of consistent data within the period of study, eventful nature of the period and the initiation and implementation of policy reforms that affects monetary and fiscal policies such as the structural adjustment and stabilization policies with major fallouts like privatization (fiscal policy) and devaluation (monetary policy) all to stimulate economic growth and sustainable development. To ascertain the cause and effect relationships between the dependent and independent variables in the model, we employ the ex-post and causal research design which also permits the use of the data without any manipulations since they are time series and secondary in nature.

The growth model of Solow-Swan with monetary policy variable will be the basis upon which the relationship between economic growth and monetary policy will be built. The framework of Solow-Swan is built upon the premise that aggregate output (Y) is a function of capital (K), labor (L), monetary policy (Mo) and other factors that affect output which might not be necessary in our case. The Cobb-Douglas production function is the easiest way of capturing the link between input and output in the above mentioned framework. Using the endogenous growth model, the independent variables which make up the model will affect growth; that is output. Thus in its simplest form, we use the ‘AK’ model which work on the property of diminishing returns to capital to develop an appropriate model for this work.

\[ Y = AK \]

A is a positive constant and K is capital. ‘\( A \)' affects level of technology and is positive while K can also include human capital. The 3.3.1 is output per capita and marginal average product are constant at level \( A > 0 \). The
transitional dynamic equation of Solow-Swan model \( f(k)/K = A \). This shows how a country’s per capita output can converge to its own steady state. The transitional dynamic equation is then given as
\[
DK = k/K = s.f(k)/K - (n - d)
\]
replacing \( A \) implies \( DK = s.A - (n - d) \).

If technology is zero, that is \( X = 0 \), we can prove that per capita growth can occur in the long-run even without exogenous factors.

Therefore from equation 3.3.1 our modeled equation can be written as function form:
\[
\text{GDP} = f(M_2, \text{IR}, \text{CPI}) \quad \text{……3.3.2}
\]

The functional linkage specified above indicates that a deterministic relationship exist between the set of dependent and independent variables. Therefore to account for random variables, the relationship will be transformed into econometric models by introducing the stochastic error terms. The variables in the model are logged to reduce their multiplicative effect into additive effects. Logging also permits the interpretation of the estimated coefficients of the variables as elasticity (Inoni, 2009). Basically, all the variables in the model have been carefully selected on the basis of theoretical and or empirical analyses (Itoe and Atangana, 2015). Thus we rewrite the model as below after expanding, taking natural log and first difference of equation 3.3.2, we have;
\[
\text{DlnGDP} = \beta_0 + \beta_1 \text{DlnM}_{2t} + \beta_2 \text{DlnIR}_t + \beta_3 \text{DlnCPI}_t + U_t \quad \text{……3.3.3}
\]

It is expected a priori that \( \beta_1, \beta_2, \beta_3 < 0 \). Here \( \beta_i \) are constants, \( M_2 \) is broad money, \( \text{IR} \) is interest rate and \( \text{CPI} \) is the consumer price index for Cameroon.

To investigate on the relationship between monetary policy and economic growth for Cameroon, we employ the Vector Autoregressive (VAR) Model which has always serve as an extension of the Granger Causality test and permits the extension away from the bivariate framework of the dependent and independent variable only. From equation 3.3.3, we can represent our VAR modeled equations as below:
\[
\text{DlnGDP}_t = \beta_0 + \Sigma_{j=1} \beta_j \text{DlnM}_{2t} + \Sigma_{j=1} \beta_j \text{DlnIR}_t + \Sigma_{j=1} \beta_j \text{DlnCPI}_t + U_t \quad \text{……3.3.4}
\]
\[
\text{DlnM}_{2t} = \beta_0 + \Sigma_{j=1} \beta_j \text{DlnGDP}_t + \Sigma_{j=1} \beta_j \text{DlnIR}_t + \Sigma_{j=1} \beta_j \text{DlnCPI}_t + U_t \quad \text{……3.3.5}
\]
\[
\text{DlnIR}_t = \beta_0 + \Sigma_{j=1} \beta_j \text{DlnGDP}_t + \Sigma_{j=1} \beta_j \text{DlnM}_{2t} + \Sigma_{j=1} \beta_j \text{DlnCPI}_t + U_t \quad \text{……3.3.6}
\]
\[
\text{DlnCPI}_t = \beta_0 + \Sigma_{j=1} \beta_j \text{DlnGDP}_t + \Sigma_{j=1} \beta_j \text{DlnM}_{2t} + \Sigma_{j=1} \beta_j \text{DlnIR}_t + U_t \quad \text{……3.3.7}
\]

It is expected a priori that \( \beta_1, \beta_2, \beta_3 < 0 \). From the data GDP and IR have negative values, in application of the formula, they will not be log.

In this study broad money is the sum of currency outside banks; demand deposits other than those of the central government, the time, savings and foreign currency deposits. Real interest rate is considered as the lending interest rate adjusted for inflation as measured by the GDP deflator. The consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specific intervals, such as yearly.

Before actual estimation, trend analyses are conducted using graphs. Descriptive statistics and normality tests such as the mean, median, maximum and minimum values, standard deviations, kurtosis, skewness and Jacque-Bera tests are all conducted. They were conducted to justify whether or not the variables in the model are normally distributed within our study area and period of study (Tests are not presented here because of space). Stationary tests particularly the augmented Dickey- Fuller unit root tests were conducted since no structural breaks were exhibited by any of the variables as the trend analyses reports. The level of integration of the variables in the series was also conducted. The pairwise correlation test was conducted to tests the degree of multi-colinearity among the variables, that is how much does the presence of one independent variable influence the other in the model. The Langragian multiplier (LM) test was used to test for whether or not serial correlation existed in the model. The level of integration of the variables in the model was tested using the Johanson-Juselius (JJ) cointegration test and also the normalize cointegration test was conducted to ascertain whether or not the model meets up with the a-priori expectations. Lastly the error correction test was conducted to reconcile the short and the long-run equilibrium position in the model. The Granger causality test and the vector auto regressive estimate tests are the actual estimation techniques conducted to show the actual level of causality between the variables in the model (most of the results are presented in the appendix).

**RESULTS**

The trend analyses conducted for the period of study (graphs not shown because of space) revealed that the variables were stochastic with drifts even though they drifted at different magnitudes. IR, CPI and \( M_2 \) showed an upward trend in the overall while GDP exhibited no particular trend. Descriptive statistics which are also normality tests were conducted as shown on appendix F.

Unit root tests conducted to test for stationarity and level or other of integration (shown on appendix B) reveals that all the variables attained stationarity at level and at 1% level of significance except for CPI which was stationary at 5% significance level.

The pairwise correlation matrix (shown on appendix C) showed that all the variables are weakly correlated with themselves; IR and CPI had a coefficient value of 0.21 and IR and \( M_2 \) had a value of -.14. This means that the presence of any of the variables in the model does not affect the other.

The unrestricted cointegration results (presented on appendix D) reveal the presence of 4 cointegrating equa-
tions at 5% level of significance. This means that a long-
run equilibrium relationship exists between the variables
in the system. We thus reject the hypothesis of no
cointegration in favor of the hypothesis of cointegration.
The normalized cointegration test (presented on
appendix E) conducted in pursuit, reveals that in the long-
run, IR and M₂ will have negative effect on GDP growth
while CPI will have a positive effect. Re-writing in
equation form;
\[ D(GDP) = -2.92D(IR) + 37.92Dlog(CPI) – 9.67D(M₂) \]
Therefore except for IR, the other variables do not tie to
the a-priori expectations.

The VAR equations derived from the VAR estimation
table are presented in appendix F, the equation of greater
concern is the equation for gross domestic product.
Inferring from this VAR equation thus, we can see that a
0.001 percent change of GDP the current year is caused
by a percent change of GDP itself the previous year and
.108 percent the second lagged year. Both results are
insignificant. This implies that everything being equal, in
the economy of Cameroon, growth is a continuous
process. A good start the current year sets the pace for
better growth the coming year. This is evident today in
the increasing percentage growth of GDP which is even
though still very dismal and still in one digit for
Cameroon.

Again still, from the GDP equation, a 0.213 percent
decrease in GDP the current year is accounted for by a
percent increase in IR the previous year. This implies that
as IR increases the previous year, GDP falls the current
year in Cameroon. This result is significant at 1% level of
significance. Again a 0.332 percent decrease in GDP the
current year is accounted for by 1 percent rise in IR two
years ago. This result is also significant at 1 percent. In
Cameroon, increasing IR cause money holders to run for
this attractive rate rather than doing other investment.
This will thus cause GDP to fall correspondingly. This
result ties to that of Bernanke and Blinder (1992) who
found out that monetary policy impulses lead to a decline
in both aggregate loans and economic activities.

Again on the GDP equation, 14.084% decrease in
GDP the present year is caused by 1% change in CPI the
previous year. This means that, for one year lagged
period, increases in CPI of 1% will cause GDP to fall at
the rate of 14.084% the current year. This result is
significant at 10% level of significance. This result shows
that as the prices of goods and services to average
Cameroonian consumer increases by 1% in the last year,
the GDP decreases the present year by 14.084%. This
study did not tie to that of Owolabi et al. (2011) who
found a positive relationship between the respective
indicators of monetary policy innovation including CPI.
On the other side, 17.666% increase in GDP this year is
caused by 1% increase in CPI two years ago. This
means that as the prices of goods and services to an
average Cameroonian increased two year ago, will cause
GDP to increase this year by 17.666%. This means that if
average Cameroonian are able to purchase increasing
price of goods and services, implies increased standard
of living which correspondingly means economic growth.
This result is significant at 5% level of significance. This
second result thus, ties to that of Owolabi et al. (2011)
mentioned earlier.

Lastly, on the same GDP equation, 9.234% increase
in GDP the current year is as a result of 1% change in M₂
last year. This means that as liquid cash and bank credit
increases in the economy by 1% today, this will cause
GDP in a one year period to increase by 9.234% in the
Cameroon economy. This result is significant at 5% level
of significance. On the other hand, 12.481% decrease in
GDP this year is accounted for by 1% increase in liquid
cash availability in the Cameroonian economy two years
ago. This result is significant at 5% level of significance.
Increases of liquid cash in an economy can lead possibly
to inflation which is dangerous to any economy.

These results on GDP equation as reveal by the
constant term is that, there are many other variables
which are not included in the model which exerts a
negative influence on GDP even though insignificantly.
The coefficient of determination that is adjusted R-
squared reveals that, the lagged independent variables
are jointly able to explain the totality of the outcomes of
GDP growth in Cameroon. The modeled equation here
has an F-statistic value of 2.656 which is above the
critical value of 2.14 at 10%. This implies that the model
is statistically reliable and predictions can be drawn from
it. We therefore reject the null hypothesis.

SUMMARY, RECOMMENDATION AND CONCLUSION

Summary of Major Findings

The study was designed mainly to examine the nature of
the relationship between monetary policy and economic
growth in Cameroon within the period from 1980 to 2014.
In a more specific form, it was out to determine the
monetary policy channels and their effects on economic
growth in Cameroon. The work was able to find out that,
IR, CPI and M₂ are among the monetary policy channels
implemented by the policy designers in Cameroon. The
presence of a negative constant term and an insignificant
result, implied that other variables negatively and
insignificant affect GDP growth in Cameroon. These
policy channels showed almost the same results on their
effects on economic growth except for M₂. The VAR
result was able to show that as IR increase the previous
years, GDP falls the current year. For CPI, as the price
for goods and services put to average consumers in
Cameroon increases the previous years, GDP falls the
current year. For the case of M₂, that is money supply, if
too much of liquid cash is available in the economy two
years ago, it will cause GDP to fall the current year, but in
a one year period, increasing liquid cash in the economy
will cause GDP to rise the current year. These results were all statistically significant.

Recommendations

To improve on economic growth, the government should design measures to reduce IR and the constant rise in price of goods and services available to average consumer. Also measures should be taken to control the quantity of money available in the economy. Increasing IR led to fallen GDP. This was due to the fact that rising IR will make investments loans to become expensive and since investments (both private and public) are the engine of growth, high IR leads to fallen investments and subsequently fallen GDP.

Again measures should be taken to reduce the constant rise of prices of goods and services available to average consumers in Cameroon. This will thus reduce inflation and so increase the value of our local currency and make it competitive. This can be done by monitoring the supply of money in the economy by policy makers and applying necessary measures to reduce or increase money supply in the economy (this can be done using the open market operation that is either buying or selling bonds to the general public).

The government should also try as much as possible to allow monetary policy to play a passive role in the economy that is the forces of the market should be allowed to determine money supply in the economy and policy designers should only arbitrate. Too much infringing into monetary policy activities will distort this passive role and so disfavors economic growth.

CONCLUSION

As necessitated by this research work, we applied the VAR estimation technique after conducting the pre-tests and using data from 1980 to 2014. Based on the aims and objectives of this study, we were able to find out that, as IR and CPI increases, GDP falls and for M₂, we saw that in a two year lagged period, increasing M₂ caused GDP to fall while in a one year lagged period, increasing M₂ will cause GDP to rise. Thus from the findings, we were able to recommend measures to make IR cheaper so that investment loans can become cheaper and so foster economic growth. Measures to reduce CPI and so put goods and services at the reach of average consumers in Cameroon are also recommended. Again measures to reduce constant rise in prices of goods and services will makes both our goods and services and our local currency to be competitive in the foreign markets. Lastly, monetary policy instruments to either reduce or increase the quantity of money circulating in the economy of Cameroon is recommended (open market operations).

REFERENCES

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Leaven and Valencia (2010). Resolution of Banking Crisis: the good, the bad and the ugly, IMF Working Paper, 10/146
Nachega J (2011). “A cointegration Analysis of Broad Money Demand in Cameroon, International Monetary Fund, WP/01/26
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Appendix A

<table>
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<th>Year</th>
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<th>M₂</th>
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Source: United Nations Commodity Trade Data Base

Appendix B

Table 4.1.3.1: Summary of Dickey- Fuller

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<th>Critical value 5%</th>
<th>Critical value 10%</th>
<th>Level of Integration</th>
<th>Remarks (stationary)</th>
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<td>Dlog(CPI)</td>
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Source: computed and summarized by author using E-view
### Appendix C

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Source: Computed by author using E-view

### Appendix D

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Source: computed by author using E-view

### Appendix E

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Source: computed by author using E-view

### Appendix F

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| Adj. R-squared | 0.299428 | 0.317315 | 0.437199 | 0.094637 |
| F-statistic    | 2.656192 | 2.801117 | 4.010202 | 1.405051 |

*1% significance level, ** 5% significance level, *** 10% significance level

Source: computed by author using E-view
### Appendix G

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**Source:** Author's computation using E-view