The Effects of Monetary Policy on Inflation in Ghana.

Godson Ahiabor

Department of Economics, Central University College

P O Box 2305, Tema.Ghana.

Tel:+233244731219   E-mail:gkahiabor@yahoo.com

Abstract

 This study looks at the effects of monetary policy on inflation in Ghana. Annual data from 1985-2009 were used to estimate the model. The study limited itself to these variables, interest rate, exchange rate and money supply on inflation. In Ghana, the Bank of Ghana is responsible for controlling money supply. The results showed a long-run positive relationship between money supply and inflation, negative relationship between interest rate and inflation, however, a positive relationship between exchange rate and inflation. The study recommends that monetary policy alone should not be used to control inflation but fiscal and other non monetary measures must be employed.

Key words: Monetary Policy, Inflation, Money supply Interest rate, Exchange rate

1. Introduction

The economic and financial situation of a country is largely based on the monetary policy being implemented by the Central Bank of the country. It is widely agreed that monetary policy can contribute to sustainable growth by maintaining price stability. According to Christiano and Fitzgerald (2003), when the rate of inflation is sufficiently low households and businesses do not have to take into account when making everyday decisions. A government manages its economy through the combined actions of fiscal and monetary policies. The notable and visible element in fiscal policymaking which is directly influenced by government's expenditures both recurrent and investments, the government adjusts its spending levels in order to monitor and influence the nation's economy.

Monetary policy is the process by which the monetary authority of a country controls the supply of money, often targeting a rate of interest for the purpose of promoting economic growth and stability. Its official goal is to usually include relatively stable prices and low unemployment. In practice, all types of monetary policy involve modifying the amount of base currency in circulation. This process of changing the liquidity of base currency through the open sales and purchases of (government-issued) debt and credit instruments is called open market operations. The constant market transactions by the monetary authority modify the supply of currency and this impacts other market variables such as short term interest rates and the exchange rate.

Monetary theory provides insight into how to craft optimal monetary policy, this is referred to as either being expansionary or contractionary, where an expansionary policy increases the total supply of money in the economy more rapidly than usual, and contractionary policy expands the money supply more slowly than usual or even shrinks it (Lipsey et al., 2001).

Inflation as a term has been described by many economists in different ways but one thing runs through all. Economists agree that inflation is a rise in general price level. Pigou (1947) reconciles this fact by defining inflation as the continuing or persistent tendency for the price level to rise.

Inflation can also be defined as persistent and appreciable increase in the general price level. This may be one of the most familiar words in economics (Ackley, 1960)

Inflation is typically a broad measure, such as the overall increase in prices or the increase in the cost of living in a country. McMahon (2007) defined it as an increase in the price a person pays for goods, while Amadeo (2012) cited it as when the prices of most goods and services continue to creep upward. When this happens, your standard of living falls. That's because each dollar buys less, so you have to spend more to get the same goods and services. But it can also be more narrowly calculated for certain goods, such as food, or for services, such as a haircut, for example. Whatever the context, inflation represents how much more expensive the relevant set of goods and/or services has become over a certain period, most commonly a year.

1.1 Literature Review

Monetary policy is associated with interest rates and availability of credit. Instruments of monetary policy have included short-term interest rates and bank reserves through the monetary base. For many centuries, there were only two forms of monetary policy, namely, decisions about coinage and decisions to print paper money to create credit. Interest rates, while now thought of as part of monetary authority, were not generally coordinated with the other forms of monetary policy during this time. Monetary policy was seen as an executive decision, and was generally in the hands of the authority with seigniorage, or the power to coin. In recent centuries, monetary policy adheres to the process by which the central bank of a country controls the supply of money, often targeting a rate of interest for the purpose of promoting economic growth and stability. The official goals usually include relatively stable prices and low unemployment. In adherence, the monetary policy guides the central bank's supply of money in order to achieve the objectives of price stability (or low inflation rate), with full employment, and growth in aggregate income. This is necessary because money is a medium of exchange and changes in its demand relative to supply, necessitating spending adjustments. For instance in England and Ghana respectively, England, the monetary policy famously has "long and variable lags". One of the main reasons why the demand for money depends on many other factors in the economy outside of the central banks' control, there are other forms of money apart from the sterling. Economic activity is also supported by the extent of deposits created by the commercial banks. Various measures of this are available, usually labelled "broad money" and the definition most commonly used in the UK is known as M4 raised to the power 9. Ideally, that wider definition of money is what we would like to boost to ensure an increase in nominal demand for goods and services. While in Ghana, the Bank of Ghana (central bank) is using monetary policy to achieve the government's objectives by reducing discount policy as its instrument. Developing countries may have problems establishing an effective operating monetary policy. The primary difficulty is that few developing countries have deep markets in government debt. The matter is further complicated by the difficulties in forecasting money demand and fiscal pressure to levy the inflation tax by expending the monetary base rapidly. In general, the central banks in many developing countries have poor records in managing monetary policy. This is often because the monetary authority in a developing country is not independent of government, so good monetary policy may institute a currency board or adopt dollarization. Such forms of monetary institutions, thus, essentially tie the hands of the government from interference and, it is hoped that such policies will import the monetary policy of the anchor nation.

Recently, attempts at liberalizing and reforming financial markets (particularly the recapitalization of banks and other financial institutions in Nigeria and elsewhere) are gradually providing the latitude required to implement monetary policy frameworks by the relevant central banks.

According to monetary theory, monetary policy manipulates the money supply and rate of interest in such a way to achieve the set goals (Orphanides, 2001).

Monetary theory provides insight into how to craft optimal monetary policy. It is referred to as either being expansionary or contractionary, where an expansionary policy increases the total supply of money in the economy more rapidly than usual, and contractionary policy expands the money supply more slowly than usual or even shrinks it. Expansionary policy is traditionally used to try to combat unemployment in a recession by lowering interest rates in the hope that easy credit will entice businesses into expanding. Contractionary policy is intended to slow inflation in order to avoid the resulting distortions and deterioration of asset values. The instruments of monetary policy used by the Central Bank depend on the level of development of the economy, especially its financial sector. The commonly used monetary instruments are discussed below.

1.2 Expansionary Monetary policy

Expansionary monetary policy is when the Central Bank is using its tools to stimulate the economy. This usually means lowering the prime rate to increase the money supply. This will cause mortgage rates to decline, consumers to borrow and businesses to grow, thereby hiring more workers who will consume even more. (Amadeo, 2012).

In addition, an expansionary monetary policy (also known as a relaxation of monetary policy) means an attempt to use monetary policy to boost or deflate aggregate demand, output and jobs. Typically, this involves Central Bank cutting official policy interest rates. It might also involve a relaxation of credit controls in some countries. A fall (depreciation) in the exchange rate is also an expansionary monetary policy (Mishkin, 2011).

1.3 Contractionary Monetary Policy

Contractionary monetary policy is a form of monetary policy unlike the expansionary policy. The aim is to decrease the money supply. This can be done through increases in interest rates and are often used to correct the inflationary problems of a business-cycle expansion. In theory, contractionary monetary policy can include, for example, selling Ghana Treasury securities through open market operations, an increase in the discount rate,

and an increase in reserve requirements. In theory, open market operations are the primary tool of contractionary monetary policy. Contractionary monetary policy is often supported by contractionary fiscal policy.

It is a decrease in the quantity of money in circulation, with corresponding increases in interest rates, for the expressed purpose of putting the brakes on an overheated business-cycle expansion and to address the problem of inflation. In days gone by, monetary policy was undertaken by decreasing the amount of paper currency in circulation. In modern economies, monetary policy is undertaken by controlling the money creation process performed through fractional-reserve banking (Froyen, 2009).

The Bank of Ghana is Ghana's monetary authority responsible for monetary policy. In theory, it can control the fractional-banking money creation process and the money supply through open market operations (selling Ghana Treasury securities), a higher discount rate, and higher reserve requirements. In practice, the Fed primarily uses open market operations for this control.

An important side effect of contractionary monetary policy is the control of interest rates as the quantity of money decreases, and banks are willing to make loans at higher interest rates (Pigou, 1947).

1.4 Quantity theory of Money

The quantity equation of money *(MV = PY)* provides the analytical framework with which Friedman and Schwartz (1963) studied monetary history in their comprehensive study of the United States from the Civil War to 1960. According to them a higher stock of money *(M)* would lead to a higher price level *(P)* other things-namely, real output *(Y)* and velocity *(V)*-equal, as they showed by careful study of episode after episode. (Taylor, 1999)

This is also confirmed by Pigou (1947). He explains that at full employment in any economy the velocity (V) of money supply is constant and the number of transactions (T) in the economy is also constant. Also, when money supply (M) increases it has a positive effect on the price level. This is what the monetarists refer to as inflation. Monetarists stress that there is a positive correlation between money supply and price levels (inflation) Friedman and Schwartz (1963). This implies that an increase in money supply through an expansionary monetary policy will lead to an upward adjustment in prices (inflation) and vice versa.

Modifying the classical quantity theory of money the Keynesian believes that money supply through its transmission mechanism affects the real GDP indirectly. Monetarists while agreeing to Keynes that in the short run economy does not operate at full employment therefore expansionary monetary policy may work positively in the long-run they support classists that rising money supply will increase inflation only. Therefore they suggest that the policy must accommodate increase in real GDP without changing price level. (Lan, 2008). Most of the modern economists are of the view that long run growth depends upon enhancement of productivity. If an appropriate monetary policy is supplemented by the external environment of suitable liquidity, interest rate, robust demand, soft assistance from the world bank of the financial institutions and debt rescheduling would lead to sustainable economic growth in the long run. (Laurence, 2001; Bernanke, 2003).

1.5 Empirical Review

While Friedman (1963) asserts that inflation is always and everywhere a monetary phenomenon, scholars such as Barro and Gordon (1983) agree that inflation and monetary policy are interrelated. They further assert that an expectation of firms on monetary policy has impact on inflation. According to the research, the characteristics of monetary process once implemented define their expectations. Also, following the work of Kovanen (2011), increased "market orientation" of monetary policy implementation involves a short-term market interest rate as the operating target of monetary policy.

In this type of framework, for monetary policy to have a desired impact on the real economy and inflation, which is the ultimate objective of monetary policy, it is essential that changes in the short-term market interest rate eventually translate into changes in other interest rates in the economy (that is, interest rate changes are passed through to retail interest rates for loans and deposits), which then influence the overall level of economic activity and prices. Barro (1996); Fischer (1993) and Bruno and Easterly (1998) assert that inflation can induce short run growth through expansionary macroeconomic policies, but this effect is not sustainable in the long run. In the long run, the relationship between inflation and growth is undoubtedly negative. Drukker et al. (2003) asserts that there is no effect of inflation on growth (money is super-neutral) (Sidrauski, 1967); and Tobin (1965) assumes that money is a substitute for capital, causing inflation to have a positive effect on long-run growth. Stockman (1981) explains through a cash-in-advance model in which money is complementary to capital,

causing inflation to have a negative effect on long-run growth. Roberts (1995) confirms that the monetary policy changes predict large declines in the slope of the reduced-form relationship between the change in inflation and the unemployment rate, holding fixed the structural parameters underlying inflation behavior. He further states that the notion that monetary policy should affect inflation dynamics is an old one, dating at least to Friedman's dictum that inflation is always a monetary phenomenon. Changes in monetary policy can account for most or all of the reduction in the slope of the reduced-form Phillips curve. Lucas (1975) showed how changes in monetary policy could, in principle, affect inflation dynamics. However, Lucas considered only very stylized monetary policies. Clarida, Gali and Gertler (2000) show that monetary policy may have become more predictable, implying smaller shocks to a simple monetary-policy reaction function. Ball, Mankiw, and Romer (1988) have argued that changes in monetary policy may lead to changes in the frequency of price adjustment and, thus, changes in the parameters of the price-adjustment processes. However, as in other recent works (Stock & Watson 2002; Ahmed, Levin, & Wilson 2004), changes in policy accounts for a smaller proportion of changes in output growth. The ability to explain the reduction in inflation volatility is mixed: in a small-scale model, it is possible to explain all of the reduction in inflation volatility. In Ghana however, the Bank of Ghana reports in 2011 that loose monetary policy stance is likely to pose undoubtedly a risk on persistent inflation. The paper further reports that monetary policy by itself may not be successful in any case in bringing down rising inflation rates. In an economy, such as Ghana's, characterized by fiscal dominance, monetary policy is apt to be overwhelmed by expansionary fiscal policy. Thus tighter fiscal policy with complementary monetary policy to slow-down aggregate demand is the appropriate macroeconomic policy mix to curb inflation.

1.6 Methodology

Model Specification

The model adopted for this study is adopted with these variables, the dependent and independent variable:

The econometric model is below:
$$Y_t = \beta_0 + \beta_1 Ir + \beta_2 Er + \beta_3 Ms + \varepsilon_t$$

The Interest Rate (Ir), Exchange Rate (Er), and Money Supply (Ms) are the independent variables with Inflation rates (Y_t) as the dependent variable. ε_t represent all relevant variables that were omitted from the model as well as the random errors from the estimation process. The error term is assumed according to Ordinary Least Square (OLS) assumption to be distributed in zero mean and constant variance $\mu_1 \sim N(0, d^2)$ and $\beta_0, \beta_1, \beta_2, \beta_3$ are the elasticity parameters.

1.7   Research
Hypothesis
H_0: That monetary policies have no significant impact on inflation
   (We will reject H_0; if there is a significant impact or relationship)
H_1: That monetary policies have significant impact on inflation
   (We will fail to reject H_0; if there is a significant impact or relationship)

1.8   Data
Analysis
Consumer price index (CPI) is the general method used in Ghana for calculating the level of prices, though the alternative is the GDP deflator which can also be used for measuring price levels in the Ghanaian economy. For this study, the CPI approach was used in calculating the general price level as it was used in obtaining the inflationary rates. Below is the table showing the descriptive statistics.

**Trend Analysis of Ghana's Inflationary rate (1985-2009)**
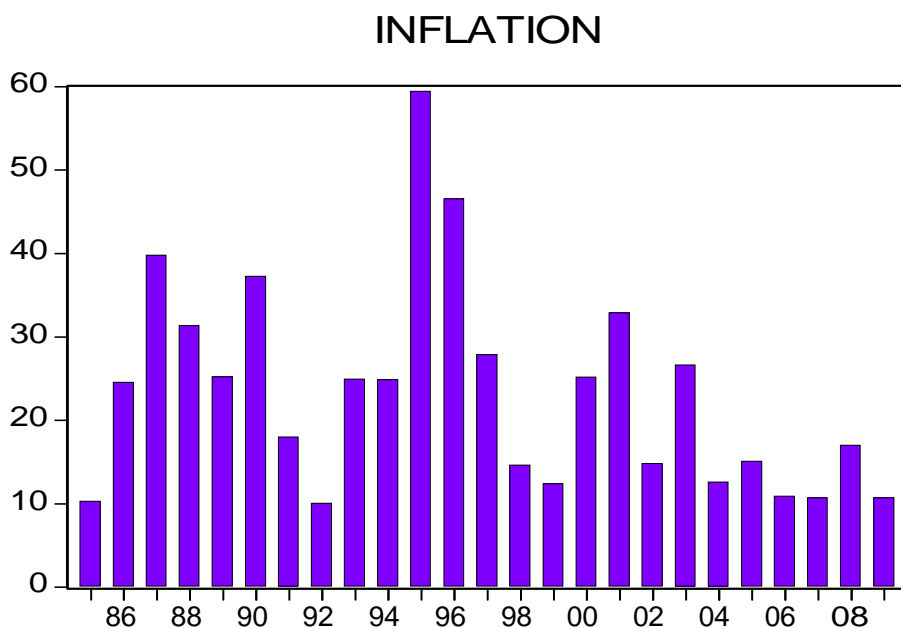
INFLATION

Source: Researchers field work, 2012

The maximum inflation rate was experienced in 1995 and the minimum in 1992.

The mean inflation for the period was 23.6 percentage points with a standard deviation of 12.61 percentage points depicting the spread of the values from the mean over the study period. The trend shows that it is skewed to the right, which is a positive skewness.

**Trend Analysis of Ghana's Money Supply (1985-2009)**
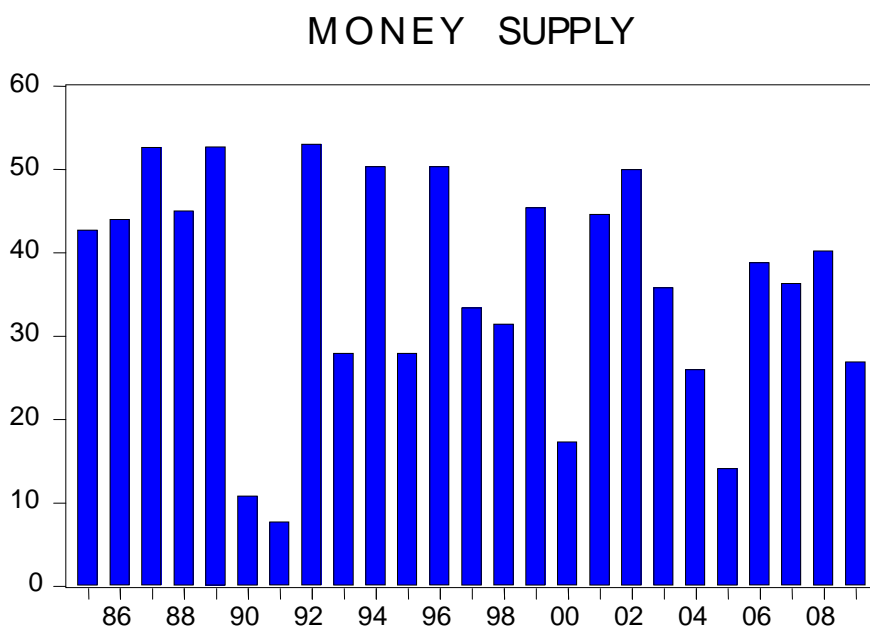
M O N E Y   S U P P L Y

Source: Researchers field work, 2012

1.9 Money Supply Growth

Money Supply is a key instrument employed by the Central Bank in their quest to control inflation rates. In Ghana, a high rate of money supply growth was envisaged in the year 1985. This gave the reason for which businesses, entrepreneurs, traders as well as the general public believe that all was not well with the monetary system at the central bank especially with money supply growth rising up to 53 percentage point and the lowest seen in the early nineteen ninety's (1991) at 7.7 percentage point. Money supply growth over the period has an average value of 36.2 with a dispersion of 13.58 over the study period. The money supply is positively skewed.

Trend Analysis of Ghana's Exchange Rate (1985-2009)
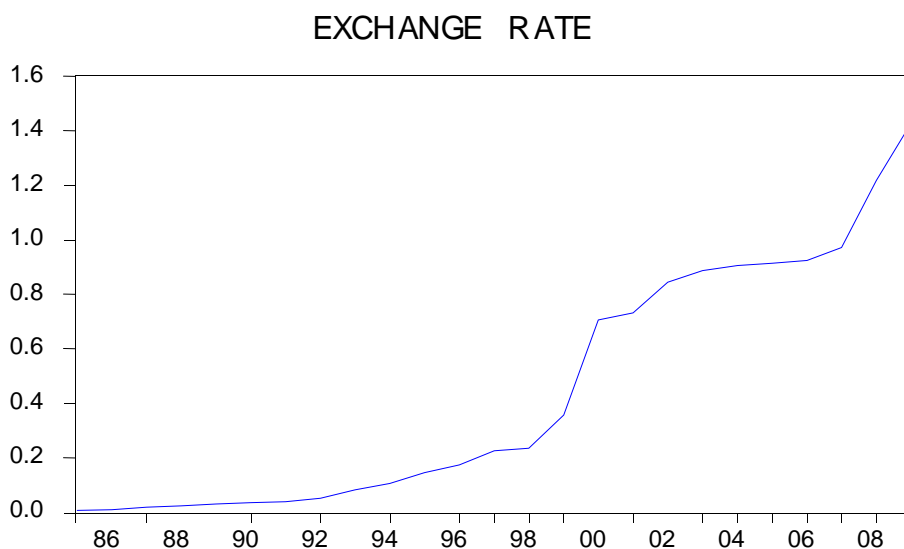
EXCHANGE RATE

Source: Researchers field work, 2012

Exchange Rate

Due to the inheritance of huge foreign exchange reserves from the colonial era, Ghana exercised practically no control over the foreign exchange markets, which were in the hands of a few commercial banks. The exchange rate saw its maximum during 2009 and minimum in 1985. It is skewed to the right.

Figure 1- Trend Analysis of Ghana's Interest Rate (1985-2009)
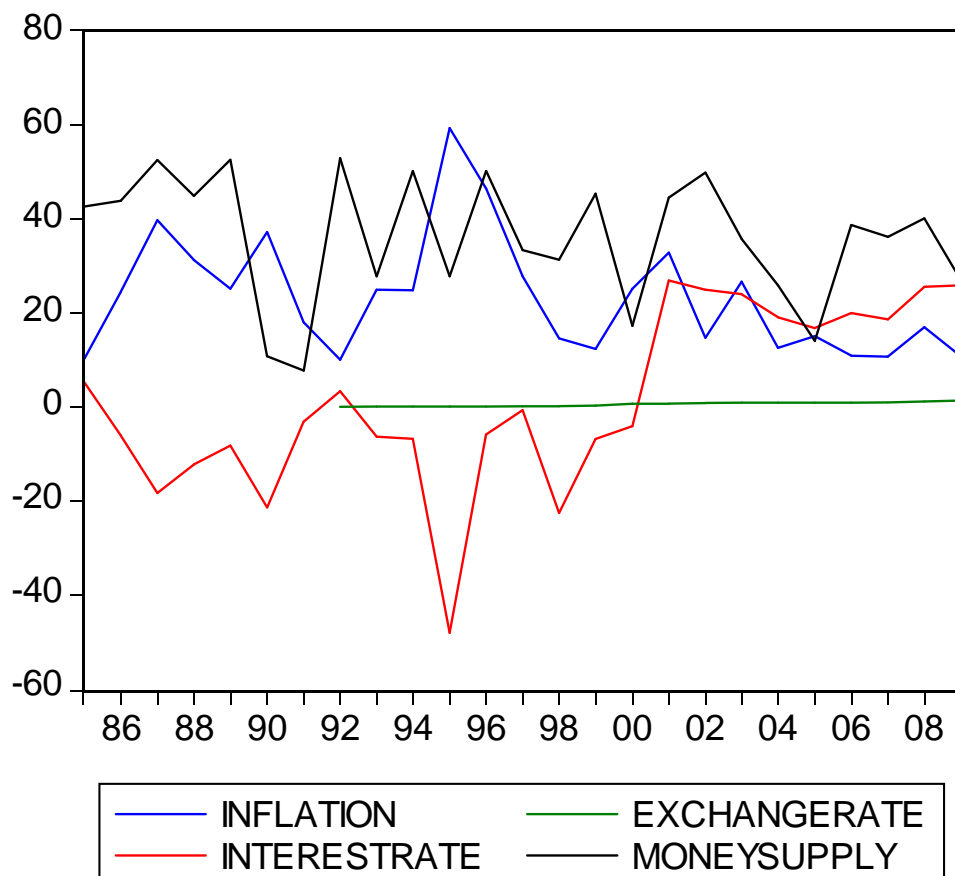

INTEREST RATE

Source: Researchers field work, 2012

Interest Rate

Ghana's financial system has experienced rapid growth during the past decade, which has transformed the financial markets. The rapid growth can be explained in part by the increase in prosperity (Ghana's per capita income rose almost ten-fold during the past decade. The fall in inflation and faster real growth, combined with improved fiscal balances and a stable currency, permitted the Bank of Ghana to ease monetary policy and improved liquidity contributed to lower lending interest rates.

A combined trend Analysis of Ir, MS, Inf, Exc. Rate (1985-2009)

Source: Researchers field work, 2012

1.10 Hypothesis Testing

At 5% level of significance with a degree of freedom of 25(n-k), the tabulated value (T-tabulated) is 2.07, while the calculated value (T-statistics) for the three variables (Interest rate, Exchange rate and Money supply) are -2.95, 0.86, 0.73 respectively. Since the calculated value is less than the tabulated value for interest rate, it can be concluded that interest rate has no significant impact on inflation but may have an indirect link; therefore we do not reject H_o.

The tabulated value is greater than the calculated value for money supply, it can be concluded that money supply has no significant impact on inflation, therefore we do not reject H_o. The exchange rate also from the data does not have any significant impact as we did no reject H_o.

The model estimates under t-statistic column (Table 2) depicts that the three independent variables are not statistically significant and that; they don't really impact on inflation rates within the Ghanaian economy.

The t-statistic and the standard error test revealed that the parameters were insignificant. For all the variables in the model, the values of standard error are more than half of the values of the coefficient of the variables. This shows that the data used for the computation are statistically insignificant.

The result also shows that the residuals from the ordinary least square regression are not auto-correlated against the alternative in the data used for the computation. This is because the Durbin Watson statistics (1.513575135) does not fall within the determinate region.

1.11 Summary of findings

The main objective for embarking on this study was to assess the impact of monetary policy on inflation and the following findings were made:

> A theoretically expected positive long-run relationship was empirically confirmed between money supply and inflation in this study.

> A theoretically expected negative long-run relationship was empirically confirmed between interest rate and inflation in this study.

> Surprisingly, there was a weak correlation between money supply and inflation and could be attributed to the fact that some important variables were omitted and catered for by the stochastic error term.

> There was also a weak correlation between inflation and interest rate.

> The null hypothesis was rejected indicating that there is no relationship between money supply and inflation, interest rate and inflation and exchange rate and inflation which should not be the case as empirical evidence does not suggest so.

> A theoretically expected positive long run relationship was empirically confirmed between inflation and exchange rate.

1.12 C o n c l u s i o n

The main purpose of the research paper was to find out the relationship existing between the four variables, Interest rate, exchange rate and Money Supply against Inflationary rates. And how the country can fully reduce its inflationary rates to the minimum bearing as the research establishes the relationship between interest rate, exchange rate and money supply on inflation rates within the Ghanaian economy.

The study also adopted the secondary data source using the E-views and SPSS package to critically analyse the variables quantitatively.

1.13 Recommendations

Money loses its value during inflation, people are discouraged from saving. They want to buy all they need before the prices get higher than they can afford. This leads to things like black market, sellers buying at cheaper price and selling to consumers at current inflated prices, etc. This will cause scarcity of funds in the money market and reduce the level of investment in the economy. The resultant fall in the level of investment would mean a lower level of employment.

Monetary policy alone is incapable of controlling inflation. It should therefore be supplemented by fiscal measures, non-monetary and non-fiscal measures. Fiscal measures are highly effective for controlling government expenditure, personal consumption expenditure, and private and public investment. From the various monetary, fiscal and other measure used in studying and controlling inflation, it becomes clear that to control inflation, the government should adopt all measures simultaneously. Inflation is like a hydra-headed monster which should be fought by using all the weapons at the command of the government.

Controlling inflation should not be influenced by politicians. This is due to the fact that economic indicators are interwoven and influencing the control of one to achieve a favourable outlook without allowing the market forces or the monetary policies to work will in the long run be revealed in exchange rate and interest rate.

References

Ackley, G. (1960). *Macroeconomic theory.* New York, NY: Macmillan.

Ahmed, S., Levin, A., & Wilson, B. A. (2004). *Recent U.S. macroeconomic stability: Good   policies, good practices, or good luck?* (Discussion Paper no. 730). Federal Reserve Board International Finance

Amadeo, K. (2012). *Obamacare bill: A summary of the Bill's 10 titles*. Retrieved from: http://useconomy.about.com/od/healthcarereform/a/Obamacare-Bill.htm.

Ball, L., Mankiw, N. G., & Romer, D. (1988).The New Keynesian economics and the output -inflation trade-off. *Brookings Papers on Economic Activity, 1*, 1-82

Barro , R. J . (1996). Inflation and growth. *Federal Reserve Bank of St. Louis Review, 78*, 153- 169.

Barro, R. J., & Gordon, D. B. (1983). Rules, discretion and reputation in a model of monetary policy. *Journal of Monetary Economics, 12*(1), 101-122.

Bernanke, B. (2003). *Constrained discretion and monetary policy*. New York, NY: Remarks before the Money Marketeers of New York University.

Bruno, M., & Easterly, W. (1998). Inflation crises and long-run growth. *Journal of Monetary Economics, 41*, 3-26.

Christiano, L. J., & Fitzgerald, T. J. (2003). The band pass filter. *International Economic Review*, 44, 435–465.

Clarida, R., Gali, J., & Gertler, M. (2000). Monetary policy rules and macroeconomic stability: Evidence and some theory. *Quarterly Journal of Economics, 115*, 147-180.

Drukker, M., Kaplan, C. D., Feron F. J.M., & Van Os, J. (2003). Children's health-related quality of life, neighbourhood socio-economic deprivation and social capital. A contextual analysis. *Social Science and*

Medicine, 57, 825-841.

Fischer, S. (1993). *The role of macroeconomic factors in growth* (Working Paper No: 4565). National Bureau of Economic Research (NBER)

Friedman, M., & Schwartz, A. J. **(**1963). *A monetary history of the United States, 1867–1960.* Princeton: Princeton University Press for NBER.

Froyen, R. T. (2009). *Macroeconomics: Theories and policies.* (9ᵗʰ ed.). Upper Saddle River, N.J.: Pearson Prentice Hall.

Kovanen, A. (2011). *Monetary policy transmission in Ghana: does the interest rate channel work?* (IMF Working Paper 11/275). London: Paper Back.

Laurence, H. M. (2001). Inflation targeting as a monetary policy rule. *Journal of Monetary Economics, 43*(7), 607-654.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage Publications

Lucas, R. E. (1975). Econometric policy evaluation: A critique. *Carnegie-Rochester Conference Series, 1*, 19-46.

McMahon, G. (2007). Measuring short-run inflation for Central Bankers. *Federal Reserve Bank of St. Louis Review, 79*, 3-8.

Mishkin, F. S. (2011). *Monetary policy strategy: Lessons from the crisis in approaches to monetary policy revisited- lessons from the crisis* (Sixth ECB Central Banking Conference) Frankfurt, Germany: European Central Bank.

Orphanides, A. (2001). Monetary policy rules based on real time data. *American Economic Review, 91,* 964 -985

Pigou, A.C. (1947). Economic progress in a stable environment. *Economica, 14*, 180-188.

Roberts, J. M. (1995). New Keynesian economics and the Phillips curve. *Journal of Money, Credit, and Banking, 27*, 975-984

Sidrauski, M. (1967). Rational choice and patterns of growth in a monetary economy. *American Economic Review, 57,* 534-544.

Stockman, A. C. (1981). Anticipated inflation and the capital stock in a cash-in-advance economy. *Journal of Monetary Economics, 8*, 387–383.

Stock, J. H., & Watson, M. W. (2002). *Has the business cycle changed and why* (Working Paper). Harvard University (August)

Taylor, J. B. (1999). A historical analysis of monetary policy rules. In J.B. Taylor, (Ed.), *Monetary policy rules*. Chicago, CA: University of Chicago Press.

Tobin, J. (1965). Money and economic growth. *Econometrica, 33*(4), 671-684.

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/journals/   The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar