DEMAND FOR MONEY AND LONG RUN STABILITY IN GHANA: COINTEGRATION APPROACH

Emmanuel Dodzi K. Havi, MPhil
Patrick Enu, MA
C.D.K Opoku, MSc
Department of Economics, Methodist University College Ghana,
Dansoman, Ghana

Abstract

This paper examined the demand for broad money and its long run stability in Ghana. Multivariate time series approach was used. Since all the variables are integrated of order one, Johansen's cointegration approach is used to establish that the variables are cointegrated. Hence, vector error correction model was used to find the determinants of broad money. Also, CUMSUM and CUMSUMSQ plots are used to check the long run stability of the demand function. It was established that nominal foreign interest rate and expected inflation were long run determinants of demand for money while real income and nominal exchange rate were short run determinants. Also, it was found that the long run broad money demand function was stable over the period under consideration. It was recommended that monetary policy authorities should continue to implement policies that will enhance macroeconomic stability (price stability) and facilitate economic growth.

Keywords: Demand for money, Long run stability, Cointegration, Stationarity

Introduction

This study aims at investigating the determinants of demand for money and examines its long run stability in Ghana. Since the inception of the Economic Recovery Programme (ERP) in April 1983, several major reforms have been introduced into the economy of Ghana with the objective of restoring macroeconomic stability and moving onto a rapid and sustained growth path. The reforms included the liberalisation of the foreign exchange market, financial sector reforms, and tax and expenditure reforms. The

exchange rate reforms helped to correct the overvaluation of the cedi, the domestic currency, which exceeded 1000% in 1982 (Leecher, 1991), led to a market determined exchange rate and substantially reduced the parallel exchange rate premium. Interest rates have been liberalised and the security market has expanded with the opening up of the stock exchange market and the weekly auctions of government securities of various maturities. Substantial fiscal adjustments led to the lowering of the overall budget deficit, thus allowing, together with the increased inflows of net foreign financing, a sharp reduction in the government's recourse to domestic bank financing. The government no longer borrows freely from the Bank of Ghana and monetary policies increasingly emphasis the use of indirect instruments of monetary control.

As a result of these and other reforms, inflation steadily declined from over 270% in 1978 to less than 10.5% in the early 1990s, real economic growth became positive, averaging 5% for the past decade from -0.8 % between 1970 and 1983, real interest rates turned positive, and a flexible exchange rate established. In the light of the wide ranging economic changes that have taken place, especially in the exchange rate market and the financial sector, there is the need to examine the demand for money function in Ghana so as to determine what the implications of these reforms have been for the private sector's demand for money. A stable money demand function will be of crucial importance for the conduct of monetary policies in Ghana. A central objective of the Central Bank of Ghana is to maintain low and stable money demand; the monetary authorities may not be able to effectively control inflation by means of regulating the growth of monetary stock.

Therefore, the main objective of the study is to estimate money demand function and determine its stability in Ghana for the period 1970–2011. A stable money demand function is necessary for the effectiveness of stabilisation policies, where stabilisation depends on the ability to adjust money supply to its demand in order to prevent undesirable effects of monetary disturbances on real output. The relationship between money supply, prices, income, and balance of payments is determined by the demand for money, and such a relationship plays an important role in macroeconomic policy.

Theoretical Framework

In the classical theory of demand for money, money was held for transactionary purposes or as a medium of exchange. Money supply is defined as the sum of notes and coins, and demand deposits. The quantity theory of money assumes that money supply is exogenous and the income velocity of money is stable. If the velocity is stable, then the demand for

money is stable, hence, there is a tight link between the amount of money and the level of nominal income. In addition, this theory postulates that the economy moves to a long run full-employment equilibrium. In the long run, the price level depends upon the quantity of money in an economy.

The Monetarist approach to the quantity theory also assumes that money supply is exogenous and income velocity of money is stable. However, this approach differs from the conventional quantity theory in explaining the link between the money supply and the level of income. Monetarists postulate a direct transmission mechanism from monetary to real sector through the real balance effect.

Keynes (1930 & 1936) analysis of the demand for money focused on the motives that prompted people to hold cash balances. He identified three motives for holding money: transactionary, precautionary and speculative motives. Keynes argued that cash balances are held in order to bridge the gap between receipts and payments as well as for precautionary purposes, and he specified the precautionary and transactionary demand for cash balances as function of the level of income. He further stressed that the demand for money could be influenced by the interest rate. He reasoned that the speculative demand for holding cash balances was influenced by the expected interest rate on (and thus the price of) bonds. The higher the interest rate, the lower the cash balances held by individuals. Keynes, therefore, included the interest rate as an explanatory variable in his demand for money function. According to Keynes, individuals compare their normal or expected interest rate with the market interest rate and whenever the market interest rate is greater than the normal interest rate, the expectation is that market interest rate will fall leading to an increase in the price of bonds. With the price of bonds expected to rise, people will move away from cash into bonds in order to make capital gains. Conversely, if the market interest rate is lower than the normal interest rate, the expectation is a rise in the market interest rate leading to a fall in the price of bonds. With the price of bonds expected to fall, people will move away from bonds into cash in order to avoid capital losses. The basic conclusion of Keynes asset demand for money is that individuals hold either cash or bonds but not both at the same time. Tobin (1956) differed on the precept of Keynes asset demand for money. According to Tobin, generally, people are uncertain about the future rate of interest. Due to the uncertainty about the future rate of returns on bonds and the accompanying risks, people will hold both cash and bonds. In addition to the level of income, Baumol (1952) and Tobin (1956) explicitly introduced the interest rate as one of the explanatory variables in the transactions demand for money. The underlying assumption of their analysis is that money is a form of inventory. Hence, maximising behaviour with respect to inventories of goods could also apply to inventories of money. The

analysis of the demand for money couched in these terms obeyed the same kind of principle as the optimum inventory approach. The money required for transactionary purposes is inversely related to the interest rate and would not change proportionately with the volume of transactions, but rather with the square root of the volume of transactions. Whereas the Keynesian analysis of the demand for money was based on the motives that prompt people to hold money, the modern quantity theory, which is fully elaborated in the works of Friedman (1956), considers money as an asset which provides a flow of services to the holder. Thus, the modern quantity theory of money is viewed as one of many alternative forms of asset. According to Friedman, there are 5 forms of assets including money, bonds, equities, physical non-human assets and human capital. The most important implication of this approach is that money is regarded as a substitute, not only for bonds but also for equities, physical capital, durable consumer goods and human capital.

Empirical Review
        Regarding the determinants of money, empirical studies show that real income is the most important determinant of the demand for real cash balances (Adekunle, 1968; Sowa, 1993), although available evidence is rather conflicting on the magnitude of the real income elasticity of the demand for money. The interest rate has served as a measure of the opportunity cost of holding money in many studies. However, there is no conclusive evidence as to whether long or short term interest rate influences the demand for money. Studies by Gujarati (1968), Singh and Adenkule (1968) show that the demand for money is insensitive to both long and short term interest rates. Sastry, Imam and Gupta (1970), on the other hand, find that the interest elasticity of the demand for money is statistically significant. It has been advocated by some that in an open economy, foreign interest rate is an important determinant of demand for money. Finally, in most studies, the expected rate of inflation is included as an explanatory variable to measure the opportunity cost of holding cash balances in terms of real assets. The expected rate of inflation should be taken into account especially during periods of rapid inflation. This has been shown in studies conducted on Argentina, Brazil, Chile and Korea.
        Domowitz and Elbadawi (1987) used a dynamic error correction model (ECM) in their study of demand for money in Sudan in the period between 1956 and 1982. Using annual data, an ECM was estimated around the long run proportionality between money and income. The short run domestic inflation and the U.S. dollar exchange rate variable were significant at the 5 percent level.

Darrat (1984), on the other hand, used quarterly data to estimate the demand for money in Kenya for the period 1969 – 1978. His dependent variables were both M1 and M2 and he used GNP as his income variable. He also argued for a foreign interest rate variable since domestic financial markets were weak. He admitted the absence of a short-term dynamic effect of money itself. His income elasticities seemed high and heterogeneous.

Kogar (1995) tried to test whether there exist a stable long run money demand function for Turkey and Israel, which experience high inflation during the period under investigation. For the Turkish case, using quarterly data in the period 1978:Q1- 1990:Q4, it is found that there exists a long run relationship between real money (M1 and M2) demand, real income, inflation and exchange rate with an elasticity of income slightly lower than unity and also an elasticity of exchange rate significantly low. Similarly, Mutluer and Barlas (2002) analyse broad money demand in Turkey between 1987 and 2001, a period characterized by a process of financial sector liberalisation, implemented using various structural reforms and deregulations. Their results indicate the existence of long run relationship for real broad money in Turkey, with a unitary income elasticity estimated. Also, the results show that, both exchange rate and inflation rate have substantial impact on the Turkish broad money demand.

Amoako (1991) used broad money (M2) as his dependent variable. His work focused on three time periods: 1956 to 1971, 1972 to1986 and 1956 to 1986. For the income variable, he used the GDP, in all his estimations; he found that income and inflation were very important determinants of the money demand function in Ghana. The long run income elasticities were all greater than one. The 1956-71 period showed that 59 percent of the adjustment took place within a year while the 1956-86 period indicated that 226 percent of the adjustment took place within a year. Amoako's model excluded the exchange rate variable because it was not significant. The results in terms of periods of adjustment have an important implication for monetary policy. The adjustment period is a signal to policy makers that monetary policies take some time before its impact is felt in the economy. In Kallon's (1992) empirical work, he used quarterly data from 1966;1 to 1986:4 to empirically study the demand for money function in Ghana using both M1 and M2 as his regressands. He concluded that income, proxied by gross national product (GNP) and adjusted inflation (i.e, interest rate plus inflation plus the middleman's mark up), were statistically significant. He also found out that the income elasticity of money was greater than two and that the money demand function in Ghana was stable.

Finally, Halicioglu and Ugur (2005) analyse the stability of the narrow money demand function (M1) in Turkey for the period 1950 - 2002. They estimated and tested for the stability of Turkish M1 by cointegration

procedure proposed by Pesaran et al, (2001) alongside CUSUM and CUSUMSQ stability tests. They demonstrate that there is a stable money demand function and it could be used as an intermediate target of monetary policy in Turkey.

Thus much works have not been done on Ghana concerning the demand for money. The little that has been done does not involve anything on the long and short run determinants of demand for money and how stable is the demand function in the long run. Hence, the call for this investigation in this currently paper.

Methodology

To empirically investigate the determinants of demand for money in Ghana, we postulate that real money aggregate is a function of real income, nominal foreign interest rate, nominal domestic interest rate, nominal exchange rate and expected inflation. In order to avoid the problem of heteroscedasticity, the variables are expressed in logarithm except expected inflation. This helps in arriving at the elasticities of the variables (Maddala, 1992). Let Z_t denotes the vector of these variables. Therefore, the dynamics of Z_t can be represented in a vector error correction model, VECM, of the form as

$$\Delta Z_t = \nu + \Pi Z_{t-1} + \sum_{i=1}^{p-1} \Phi_i \Delta Z_{t-i} + \varepsilon_t$$

where

Δ is the difference operator,

Π is $\alpha\beta$ is a 5x5 matrix,

α is the speed of the adjustment parameter and indicates how much of the disequilibrium is being corrected. Its value ranges between -1 and 0.

β is a matrix of cointegration vectors among the variables under consideration,

Φ_i are the short-run coefficients,

ε_t is a 5x1 vector of structural disturbances assumed to be a white noise process

p is the lag length,

and Z_t is a vector of the variables defined as below:

LRM2 = log of real money aggregate = M2/CPI(consumer price index)

LRGDP = log of real gross domestic product as a proxy for real income

LFI = log of nominal foreign interest rate represented by the U.S. Treasury bill rate (90 days)

LDI = log of nominal domestic interest rate represented by Treasury bill rate (90 days)

ER = nominal exchange rate

PE = expected inflation.

Economic theory requires that the partial derivatives of the explanatory variables of money demand satisfy certain conditions; income, interest rate, exchange rate and expected inflation, a priori, are expected to be positive, negative, negative and negative, respectively.

The stationarity of the endogenous and exogenous variables were checked using Augmented-Dickey-Fuller (ADF) and Philp-Perron tests. After establishing that the variables were integrated of the same order, then, the Johansen Cointegration Test were carried out to find out if there exist a long run relationship among the variables or not. The idea of the cointegration test is to determine whether these non-stationary variables are cointegrated or not. This study applied the Johansen Cointegration Maximum Likelihood Method of Cointegration developed by Johansen (1988) to determine the number of cointegrating vectors. In this study, the maximum Eigen value test was applied. If this test shows that the variables are not cointegrated, then, the VAR model will be estimated; otherwise, the vector error correction model (VECM) will be estimated. The data from World Economic Indicators was used for the study.

Model's Variables

The real income is one of the most important determinants of the demand for real cash balances. This has been well documented in the literature. In a seminal study conducted in the United States in 1960, Chow proved that the most significant determinant of the demand for real cash balance is income. As income grows, more money is required to make transactions, hence, the positive relationship between income and money demand.

The interest rate variables are included to account for the opportunity cost of holding money. Friedman (1959) suggested that the rates of interest on all alternative assets are important. However, since interest rates tend to move together, researchers have often tried one rate (either long or short-term interest rate) (DI), proxied by the 90-day Treasury bill rate, was chosen to represent the opportunity cost of holding money. Foreign interest rate (FI), proxied by the 90-Day US Treasury bill rate, was included in the demand for money function in Ghana to capture the fact that since the United States is one of the main trading partners of Ghana, its interest rate serves as a measuring rod for money holding in Ghana. If it increases, it is expected to have a negative impact on the demand for money in Ghana since Ghanaians will rather invest their moneys in US treasury bills and vice versa. Using

short term interest rate as a measure of opportunity cost is also recommended by Heller (1965). According to Heller (1956) the short term interest rate is of greater importance (than the long term interest rate) in the money function. The closest substitute for money available, a 60 to 90 day commercial paper, is most influential in deciding whether to hold assets in the form of money or not. Long term interest rates do not influence the quantity of money demanded.

"Money as a store of wealth competes with other assets such as real estates, cattle and so on. It is assumed that the rate of inflation is the opportunity cost of these durable items" (Sowa, 1993). Economic theory suggests that an increase in the expected rate of inflation would reduce the attractiveness of money balances. This effect should be more pronounced for narrow money, which conventionally has a zero nominal yield, than for broad money, which includes time and savings deposits, whose yield can be adjusted to offset inflationary expectations" (Jamil, 1994). The inflation rate in Ghana was high, especially in the 1970s when it entered three digits. It is expected that inflation will have a negative and significant impact on the demand for money in Ghana. It should be noted that a simplified version of the adaptive expectation hypothesis is used to generate the inflation rate. This is stated mathematically as: $PE = \dfrac{P_t^2}{P_{t-1}}$, where PE is expected inflation, P_t is inflation at time, t and P_{t-1} is first lag of the inflation.

Results and Discussion

The result of the Augmented Dickey-Fuller (ADF) and Philp-Perron tests for the variables in this study is shown in table 1 below. From the table, all the variables are stationary at 5 percent level of significance with constant and trend. Therefore, all the variables, real money aggregate (LRM2), real gross domestic product as a proxy for real income (LRGDP), nominal foreign interest rate represented by the U.S. treasury bill rate (90 day) (LFI), nominal domestic treasury bill rate (90 days) (LDI), nominal exchange rate (LER) and expected inflation (PE) are integrated of order one, I(1). Since the variables are integrated of the same order, the Johanson's cointegration approach was used to determine whether the variables are cointegrated or not, if cointegrated, then, the number of cointegrating equation must be determined.

Table 1: The results of Augmented Dickey-Fuller test (ADF) and Philp-Perron for unit root.

	Variable	None			Constant			Constant and Trend		
		Level	1st diff	Conc	Level	1st diff	Concl	Level	1st diff	Concl
		t-obs	t-obs		t-obs	t-obs		t-obs	t-obs	
ADF Test	LRM1	1.3570	-5.2501**	I(1)	0.4039	-5.3607**	I(1)	-1.151	-5.8510**	I(1)
PP Test	LRM1	1.0360	-5.3538**		0.0787	-5.4614**		1.28238	-5.8544**	
ADF Test	LRM2	1.8883	-2.4551**	I(1)	1.2956	-2.5865	I(1)	-0.5619	-5.3599**	I(1)
PP Test	LRM2	1.2965	-4.5169**		0.5165	-4.7821**		-0.78858	-5.3855**	
ADF Test	LRGDP	2.3503	1.6081	I(1)	1.7906	-1.2661	I(1)	0.65546	-2.0921	I(1)
PP Test	LRGDP	4.3996	-3.4851**		3.8837	-4.9602**		-0.45683	7.0987**	
ADF Test	LFI	-0.5415	1.2160	I(1)	2.2462	0.6301		0.6319	-4.4623**	I(1)
PP Test	LFI	-0.6128	-3.6565**		2.5449	-3.7871**		0.312564	4.1129**	
ADF Test	LDI	0.0085	-6.3851**	I(1)	-2.0895	6.3186**	I(1)	6.3851**	6.7463**	I(1)
PP Test	LDI	-0.6128	-3.6565**		2.5449	-3.7871**		0.312564	-4.1129**	
ADF Test	LER	-2.1491*	-2.7400**	I(1)	-0.7531	-3.7672**	I(1)	-1.3095	-3.7547*	I(1)
PP Test	LER	-2.6835**	-2.6003**		-0.6671	-3.5647**		-1.34968	-3.5298**	
ADF Test	PE	-1.8264	-0.5752		-1.3071	-7.5751**	I(1)	-0.6325	-7.7078**	I(1)
PP Test	PE	15.6544	-1.6642		15.256	-2.4995		20.23819	-4.6928**	

*** and * indicate that the variables are stationary at 1% and 5% level of significance*

Vector Autoregressive, VAR, is used to determine the optimal lag length for the Johansen cointegration test which is based on the Schwarz information criterion (SC) as shown in table 2 below. From the result, the optimal lag length is one. Using the selected optimal lag length of one, the likelihood ratio test which depends on the maximum Eigen values of the stochastic matrix of the Johansen (1991) procedure for exploring the number of cointegrating vectors is used.

Table 2: The VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-82.91996	NA	2.37e-07	4.611280	4.909868	4.718411
1	214.8858	473.4348	7.11e-13	-8.147991	-5.759287*	-7.290944
2	289.2767	91.55804*	2.49e-13	-9.450088	-4.971269	-7.843126
3	354.9165	57.22439	2.25e-13*	-10.30341*	-3.734473	-7.946531*

Table 3 below shows the results for the cointegrating test. From the result, the Maximum Eigen value statistics show that there is one cointegrating vector at 5 percent level of significance. The null hypothesis of zero cointegrating vector is rejected against the alternative of one cointegrating vector. Therefore, it is concluded that there is only one cointegrating vector specified in the model.

Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.78116	60.7764	40.0776	0.0001
At most 1	0.53684	30.7873	33.8769	0.1119
At most 2	0.46191	24.7889	27.5843	0.1094
At most 3	0.36187	17.9684	21.1316	0.131
At most 4	0.21158	9.50915	14.2646	0.2462
At most 5	0.01038	0.41732	3.84147	0.5183
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 4 below shows the results of the coefficient of the long run relationship among the variables. From the result, real income and foreign interest rate have the expected signs and also foreign interest rate and expected inflation are significant. The results indicated that, real income, domestic interest rate, exchange rate and expected inflation have positive

impact on real money aggregate, in the long-run. This shows that as real income, domestic interest rate, exchange rate and expected inflation increase, the demand for real money aggregate increases and the real income elasticity is more than one. Also, nominal foreign interest rate has negative impact on real money aggregate in the long run, this shows that as foreign interest rate increases demand for real money aggregate reduces.

From the table, the long run elasticity of real income is elastic; therefore, a percentage point increase in real income causes real money aggregate to increase by 2.13 percentage point. Also, from the table, the impact of nominal foreign interest rate is elastic and significant; as a result, a percentage point increase in nominal foreign interest rate causes real money aggregate to decrease by 4.18 percentage point. The impact of nominal domestic interest rate is inelastic; hence, a percentage point increase in domestic interest rate causes real money aggregate to increase about 0.96 percentage point. From the table, the impact of exchange rate is inelastic; therefore, a percentage point increase in exchange rate causes real money aggregate to increase about 0.41 percentage point. Finally, the impact of expected inflation is inelastic and significant; as a result, an increase in expected inflation causes real money aggregate to increase about 0.13. Therefore, in the long run foreign interest rate and expected inflation are significant factors that influence demand for real money aggregate in Ghana.

Table 4: Normalised Cointegrating Coefficients: 1 Cointegrating Equation(s)

Variables	Coefficients	Standard Errors	T - Statistic
LGDP	2.1281	(12.8673)	0.1654
LFI	- 4.184911	(1.39176)	-3.0069
LDI	0.9633	(3.19491)	0.3015
LER	0.4073	(1.10839)	0.3675
PE	0.1289	(0.04357)	2.9585

Table 5 presents the short run dynamic relationship among the variables and the set of short run coefficients in the vector error correction model, VECM. It associates the changes in real money aggregate to the changes with the other lagged variables and the disturbance term of lagged periods. The coefficient of the speed of adjustment is negative but not significant at 5 percent. This shows that there is 0.44 percentage point adjustment taking place each year towards the long run period. However, the adjustment towards the long run period is not very stable over the period. The variables, real income, domestic interest rate and expected inflation have the expected signs.

From the table 5, the lag of real money aggregate, lag of real income, foreign interest rate and lag of nominal exchange rate have positive impact

on current real money aggregate. This shows that in the short-run, as previous real money aggregate, previous real income, previous foreign interest rate and previous nominal exchange rate increase, demand for current real money aggregate also increases. Also, the lag terms of nominal domestic interest rate and expected inflation have negative impact on current real money aggregate. This shows that in the short-run, as previous years' nominal domestic interest rate and expected inflation increase, demand for real money aggregate decreases.

From the table 5, the impact of the lag of real money aggregate is inelastic; showing that a percentage point increase in previous real money aggregate will cause the current real money aggregate to increase by 0.11 percentage point. From the table, the elasticity of previous real income is elastic and significant; therefore, percentage point increase in previous real income will cause the current real money aggregate to increase by 1.476 percentage points. Therefore, as real income increases demand for real money aggregate also increases. In addition, the impact of previous year foreign interest rate is inelastic; as a result, a percentage point rise in previous year foreign interest rate will cause the current real money aggregate to increase by 0.0056 percentage point. From the table, the impact of the lag of domestic interest rate is inelastic; as a result, a percentage point increase in previous domestic interest rate will cause the current real money aggregate to decrease by 0.0013 percentage point. From the table, the impact of the lag of exchange rate is inelastic; hence, a percentage point increase in previous exchange rate will cause the current real money aggregate to increase by 0.15 percentage point. Finally, the impact of lag of expected inflation is inelastic; as a result, an increase in the previous expected inflation caused the current real money aggregate to decrease about 0.0019. Therefore, in the short run real income and exchange rate are significant factors that influence demand for real money aggregate in Ghana.

Table 5: The Result of Error Correction Model for Short Run Dynamics

Variables	coefficients	Stad. Error	t-stats
CointEq1	-0.004432	(0.00412)	[-1.07468]
D(LRM2(-1))	0.109507	(0.15549)	[0.70428]
D(LGDP(-1))	1.475602	(0.66634)	[2.21450]
D(LFI(-1))	0.005619	(0.06162)	[0.09119]
D(LDI(-1))	-0.001308	(0.16300)	[-0.00803]
D(LER(-1))	0.150285	(0.08644)	[1.73853]
D(PE(-1))	-0.00186	(0.00463)	[-0.40137]
C	-0.010054	(0.02619)	[-0.38384]
R-squared	0.360299	Log likelihood	54.45142
Adj. R-squared	0.220364	Akaike AIC	-2.32257

Sum sq. resids	0.153882	Schwarz SC	-1.9848
S.E. equation	0.069346	Mean dependent	0.022513
F-statistic	2.574762	S.D. dependent	0.078537

The stability of the demand for money function was also checked by performing the CUSUM and CUSUM of Squares tests on the function to test the long run stability of money demand function as shown in figure 1. The plots of CUSUM and CUSUM of Squares tests in figure 1 stay within the 5 percent critical bounds. This implies that the estimated coefficients for demand for money aggregate are stable over the period under consideration. Therefore, demand for broad money in Ghana is stable; hence, monetary policy will be effective in managing the economy.

Figure 1: The Plots of CUSUM and CUSUM of Squares Tests
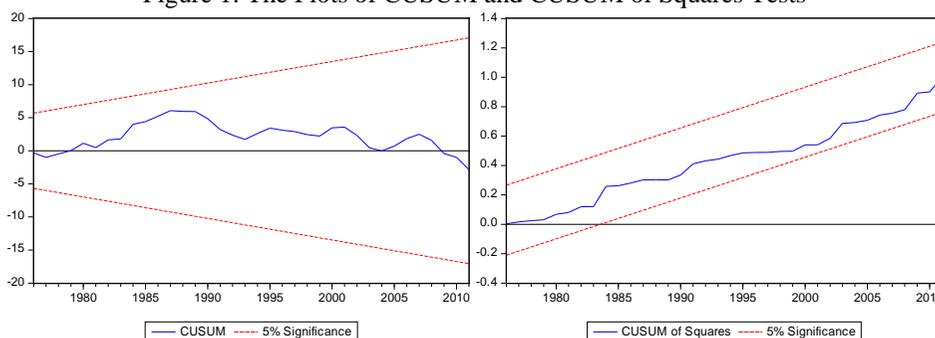
Conclusion

The study examined the demand for broad money and its long run stability in Ghana. The stationarity test shows that all the variables are integrated of order one. Johansen's cointegration approach reveals that the variables are stationary and cointegrated, therefore, vector error correction model, VECM is used to determine the factors that influence real money aggregate in Ghana from 1970 to 2011. It is concluded that nominal foreign interest rate and expected inflation are significant determinants of real money aggregate in the long run while real income and nominal exchange rate are significant determinant of real money aggregate in the short run. The plots of CUSUM and CUSUM of Squares tests show that money demand function is stable over the period. It is recommended that monetary policy authorities should continue to implement policies that will enhance macroeconomic stability (price stability) and facilitate economic growth.

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