

“THE BALANCE OF PAYMENTS AS A MONETARY PHENOMENON” AN ECONOMETRIC STUDY OF GHANA’S EXPERIENCE

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Abstract

This paper examines the monetary approach to balance of payments (BoP) in Ghana using monthly data set that spans from January 2006 to February 2018 from Bank of Ghana. The Augmented Dickey Fuller test as well as the Phillips-Perron test was employed to assess the presence of unit root or otherwise. The empirical results from ARDL cointegration and error correction modeling revealed that the BoP in Ghana is a purely monetary phenomenon: both short-run and long-run relationships exist between selected variables and Net Foreign Assets. Exchange Rate, Net Domestic Credit, Inflation Rate and Interest Rate are found to have a significant influence on the BoP position in the long run. Also, Net Domestic Credit and Broad Money Supply have a highly significant effect on the BoP position in the short run. The policy conclusion is that authorities in charge of monetary policy formulation for the Ghanaian economy can consider prudent monetary policies aimed at correcting BoP disequilibrium in the economy as a short-run and long run mechanism.

Keywords: Net Foreign Asset, BoP, Econometric, Monetary Phenomenon, Cointegration

INTRODUCTION

Long term disequilibrium in BoP is a crucial economic problem in a great number of low and middle income countries including Ghana. Factors that cause the persisting problems of disequilibrium in the BoP include abysmal export performances, very large service account deficits, external debt repayments, large fiscal deficits, and distortions of price and misappropriation of foreign aid (Ayentimi, 2013). In the attempt to come out with financial and fiscal policy, BoP is essential in providing the threshold warning signals to ensure that the underdeveloped countries practice fiscal discipline. BoP data are also of great significance in understanding changes in money stock, money-market liquidity and the exchange rate of a currency, all are salient drivers in enacting monetary regime (Merwe, 2002). Ghana's growth record has been sporadic; as it recorded increased GDP growth between mid-fifties and early-sixties, but stalled in growth by 1964. After this period, the growth of Ghana became jerky until the year 1981 which marked the threshold of a steady path. Ghana recorded negative growth in the ending parts of the sixties and seventies including the period 1980-1983. By 1986, Ghana's trade position had improved significantly, resulting in a trade surplus of 0.25% of GDP. Balance of trade turned into deficit recording 5.0% of GDP in 1995, 10.27% in 1997 and 22.03% in 1999. However, 2004-2005 witnessed a worsening trade position as the trade deficit edged up from 23.96% of GDP in 2005 to 27.94% of GDP in 2007 (Amoah and White 2009). Within the period 2009 and 2011, annual real GDP growth saw an increase from 4.8% to 14.0%. It thereafter witnessed a continuous decline to 4.0% GDP in 2014. From this point, a marginal decline in real GDP of 3.8% and 3.7% respectively during 2015 and 2016 was observed. It then shot up to 7.9% in 2017 (2017 Budget statement of Ghana). A lot of current studies professed that a country needs to efficiently tackle its deficit in order to forestall dangerous path of economic failure as experienced by Greece.

Having perused literature, it is undeniable to establish that the Monetary Approach to the Balance of Payments (MABP) is still an unsolved phenomenon. Lachman and Dhlwayo (1975) concluded their studies with concrete evidences in favour of MABP. However, Watson (1990) concluded otherwise. It is for this reason that informs the need to carry out a study in Ghana to find out if the role of excess money supply is significant in BoP disequilibrium in Ghana. The study will also identify the drivers of BoP adjustment in Ghana.

REVIEW OF RELEVANT LITERATURE

When a country experiences disequilibrium in its BoP, different mechanisms are often implemented to restore the BoP to its equilibrium position. Three of such mechanisms employed include the monetary, the elasticities and the absorption approaches.

The Monetary Approach to the Balance of Payments (MABP)

The MABP refers to BoP as a monetary incident. It connects a country's BoP and the money supply of that country (Chacholiades, 1990). MABP is a measure of the grand BoP determined by a country's international reserves and is affected by lack of balances which is prevalent in the money market. In a study by Dhlwayo (1996), it was established that in a system of fixed exchange rates, excess money supply engender increasing expenditure, which in turn put domestic demand for foreign goods and services in an upward trend. This necessitates the reduction of towering domestic demand to be financed by reducing foreign exchange reserves, which tends to worsen the BoP. He intimated again that the outflow of reserve assets lowers money supply until it equals money demand. This restores monetary equilibrium by stalling an outflow of the reserve assets. Therefore a surplus demand for money results in contradictory adjustment, which in turns serves as a catalyst for foreign exchange reserves inflow, and results in BoP surplus. This necessitates domestic monetary expansion and later restores BoP to the equilibrium position. Fleermuys (2005) cited in a study by Bobai (2013) established that MABP equates the demand of money to that of a stock; therefore, the inflows or outflows of money are regarded as the disequilibrium is related to expected and actual stocks, which can be attuned through a surplus of income over expenditure or conversely. Fleermuys (2005) established that for a country to correct the excesses between expenditure and income, the flow of money restores the desired and actual money stock to equilibrium. He argued that although monetary authorities have influence on flow of money supply, the influence on the stock of money supply is what they lack. Hence it is inferable that countries which have exchange rates fixed have endogenous money supply system.

The Elasticity Approach

In the year 1937 Robinson found that the only effect monetary policy has on BoP is its power to drive credit creation. The approaches of elasticity stress the impact of change in exchange rate on the imports and exports of a country; for that matter on the trade account balance when other variables like income are ignored (Robinson, 1947)

This equilibrium approach is devoid of the capital account resulting from surplus or insufficient exports which results from imports causing a BoP surplus or deficit; this has a main influence on the current account to the BoP. Again, the approach dwells on the assumption that the price elasticity of supply is infinity. Marshall-Lerner condition is applied in this concept, and it refers to the total of the elasticities of demand for imports and exports in absolute terms; and must be more than 1 for devaluation to enhance BoP (Fleermuys, 2005).

The Absorption Approach

The Absorption approach was developed to highlight the significance of income changes in the adjustment process. The absorption approach intends to show how devaluation might change the link between expenditures or between absorption and income – in both nominal and real terms. Great emphasis is laid on the current account balance. This approach lays emphasis that the devaluation of a currency would lead to an increase in inflationary prices, which would in turn revoke the initial effect of an increase in prices. This resulting process could be prevented if only inflation itself deflates the combined demand for goods through an income redistribution effect or through a reduction in the real value of existing money balances (Fleermuys, 2005). Coppin (1994) cited in (Bobai, 2013) iterated that one aspect that these two alternative approaches have in common is that they assume that BoP disequilibria are permanent. Furthermore, criticisms have been meted out to the two approaches particularly for not considering capital account of the BoP. The current account is the only point of focus of these mechanisms and thus the particular impacts of capital movements on BoP.

Empirical Review

Adamu (2004) did a study to determine the dynamics of BoP adjustment in the countries of the West African Monetary Zone (WAMZ). The outcome was that money highly influenced the determination of deficits of BoP. It was clear from the results that both interest rate and domestic credit had inversely relationship with net foreign asset with statistically significant coefficients. In addition, the result established a direct relationship between log of GDP and net foreign asset with significant coefficients.

Danquah (2008) used Autoregressive Distributed Lag (ARDL) approach to cointegration and error-correction representation on the annual data between the periods 1986 and 2005. The study sought to examine the effects of exchange rate on Ghana's imports and exports demands, and also, the effects of exchange rate on Ghana's external trade. The findings of the study indicated that flexible exchange rates have small influence on Ghana's external trade. The findings established that both short-run dynamics and long-run causal relationships between the demands for imports exist. Demand for exports and the trade balance on one hand and the real effective exchange rate, the real domestic product, foreign reserves, import price index, export price index and foreign income on the other hand.

Ayentimi (2013) examined MABP in Ghana using annual data set that covered 1980-2010. He used the augmented Dicker Fuller model, where time series data was tested for stationarity or otherwise of the data. Co-integration analysis was performed on the variables, and the results showed that net foreign assets (NFA), domestic credit, inflation, interest rate and

GDP growth commonly drift variables, making linear relationships between these variables over long period of time thus translating into equilibrium relationships of economic variables. Further test by OLS revealed that BoP in Ghana was not entirely a monetary phenomenon. In all three variables GDP growth, interest rate, and domestic credit were significant in the determination of NFA. Although the findings generally fulfilled predictions and expectations of literature, the result revealed that disequilibrium in BoP is not entirely in tandem with the effect of monetary variables. BoP was found to be strongly affected by expenditure of government.

Odili (2014) in his study examined the impact of exchange rate on balance of payment in Nigeria, using annual data from 1971 to 2012. He used ARDL co-integration estimation model to find if there was any long-run and short-run relationship between the variables of the model. The findings established a positive and statistically significant relationship in the long-run and again found a positive but statistically insignificant relationship in the short-run between BoP and exchange rate.

RESEARCH METHOD

Koutsoyiannis (1977) noted that the crucial step in attempting to study the relationship between variables is to specify the relationship in a mathematical form. In our study, the explanatory variables used include Exchange Rate, Net Domestic Credit (NDC), Broad money supply (MONEY SUPPLY), Inflation Rate and Interest Rate. Net foreign assets (NFA) was used as the dependent variable in the model. Monthly data covering the period January 2006 to February 2018 were utilised to test Ghana's monetary approach to balance of payments. The data was obtained from the Bank of Ghana monthly statistical bulletins covering the period under consideration. The rationale for choosing the given range of data had some considerations. In addition to the basis of data availability, most of Ghana's debt was cancelled in 2005. Ghana embarked on cedi redenomination from cedi to Ghana cedi in 2007. Again, Ghana adopted GDP debasement in 2011. Production of crude oil and exporting same all fall within the chosen time series. All variables were transformed into natural logarithms in order to ease the interpretation of the results and to reduce possible heteroscedasticity. Explicitly, the equation for estimation is given as

$$\ln NFA = \beta_0 + \beta_1 EXCHANGE\ RATE + \beta_2 NDC + \beta_3 MONEY\ SUPPLY + \beta_4 INFLATION\ RATE + \beta_5 INTEREST\ RATE + \varepsilon$$

Estimation Procedure

We utilised the Autoregressive Distributed Lag approach to cointegration developed by Pesaran and Shin in 1999 to analyse the short and long run linkages between the selected variables

(Pesaran and Shin, 1999; Pesaran et al, 2001).The ARDL can be used to test for a linear relationship between variables that are either $I(0)$ or $I(1)$ as well as for a mixture of $I(0)$ and $I(1)$ variables. This is superior to the Johansen cointegration technique which is only appropriate for variables integrated of the same order(Duasa, 2007; Adom et al, 2012).

The ARDL(q,p) model given by

$$\Delta y_t = \beta_0 + C_0 t + \sum_{i=1}^q \varsigma_i \Delta y_{t-i} + \sum_{j=0}^p \omega_j \Delta x_{t-j} + \gamma_1 y_{t-1} + \gamma_{12} x_{t-1} + \varepsilon_t$$

The coefficients β_0, C_0 are the drift and trend coefficients respectively and ε_t is the white noise error. The coefficients ς_i and ω_j for all j corresponds to the short-run relationship while the γ_j ; $j = 1, 2$ corresponds to the long-run relationship.

Unit Root Test

To test the time series data for stationarity a common method is to apply the Augmented Dickey-Fuller test (ADF)to test for a unit root (Dickey and Fuller, 1979; Brooks, 2014). A time series with a unit root is said to be non-stationary. There are other common methods for determining the stationary of a variable such as the Phillips-Perron (PP) test. The test are similar to the ADF test but with a few alternations in order to allow for autocorrelated residuals. Both the ADF test as well as the Phillips-Perron (PP) test wereutilised to test for stationarity of the variables under consideration.

The unit root tests for the variables are conducted by investigating the following hypothesis test:

H_0 : Unit root is present i.e. the time series is non-stationary

H_0 :No unit root is present i.e. the time series is stationary

Table 1: Unit Root Test of the Series

Variable	ADF	Philips-Perron(PP) Test	
LN (Exchange Rate)	0.100 (0.9660)	0.065	(0.9636)
LN (Net Foreign Assets)	-1.972 (0.2991)	-1.964	(0.3024)
LN (Net Domestic Credit)	-1.177 (0.6834)	-1.059	(0.7312)
LN (Money Supply)	-3.774 (0.0032)*	-3.621	(0.0054)*
LN (Inflation Rate)	-1.190 (0.6779)	-1.574	(0.4965)
LN (Interest Rate)	-0.980 (0.7604)	-1.115	(0.7092)

* indicates significance at the 5% significance level. p-values in parenthesis

ANALYSIS AND RESULTS

Estimation of the ARDL model

Table 4 presents the results of the co-integration status of the model employed in this study using the ARDL Bound test. The model exhibited long-run relationship when Net Foreign Assets (NFA) was redressed on the vectors of variables: Exchange Rate, Net Domestic Credit (NDC), Broad Money Supply (MONEY SUPPLY), Inflation Rate and Interest Rate. The lag structure (lag 1) was selected based on the Schwarz Information Criterion (McQuarrie, 1998). The output on Table 2 indicates that there is no serial correlation among the variables. Moreover, Table 3 shows that the variables in the model jointly have a long run relationship. Thus in the long run, we expect the variables to move in equilibrium. Table 4 is the outcome of the model for the long run relationship between the variables. It can be noticed that Exchange Rate, Net Domestic Credit, Inflation Rate and Interest Rate have significant impact on the balance of payment position in the long run.

The implication from the output in Table 4 is that, though the Money Supply in the model may have a long run effect on net foreign assets, its effect is not statistically significant. The Adjusted R-squared value which denotes the explanatory power is 78.5% and this shows that the model is statistically fit. The algebraic signs of the log of all the chosen variables are in consistent with theory. For example, the log of Inflation has a negative effect on NFA which theory predicts. Money reserves is insignificant which is not in line with what MABP by theory predicts.

Table 2: Breusch-Godfrey
Serial Correlation LM Test

F-statistic	0.570256	Prob. F(2,130)	0.5668
Obs*R-squared	1.252349	Prob. Chi-Square(2)	0.5346

Table 3: Wald Test for Long Run Equilibrium

Test Statistic	Value	df	Probability
F-statistic	2.08E+32	(6, 131)	0.0000
Chi-square	1.25E+33	6	0.0000

Table 4: Estimated Long-run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.915303	1.195211	-5.785841	0.0000
LNEXCRATE	-1.705240	0.142861	-11.93638	0.0000
LNNDNC	1.164631	0.065819	17.69447	0.0000
LNLMONEY	0.086655	0.157412	0.550502	0.5829
LNINFLATION	-1.009427	0.209027	-4.829170	0.0000
LNINTEREST	2.659803	0.371827	7.153333	0.0000
R-squared	0.792396	Mean dependent var		8.694096
Adjusted R-squared	0.784981	S.D. dependent var		0.771844
S.E. of regression	0.357905	Akaike info criterion		0.823129
Sum squared resid	17.93343	Schwarz criterion		0.945743
Log likelihood	-54.08840	Hannan-Quinn criter.		0.872950
F-statistic	106.8721	Durbin-Watson stat		0.502455
Prob(F-statistic)	0.000000			

Error correction Model (ECM)

The error correction model (ECM) provides a framework for establishing links between the short-run and long-run approaches to econometric modeling. The result of the balance of payment error correction model is presented in Table 5. As expected, the error correction term for this model is both negative and significant. The system is getting adjusted towards long run equilibrium at the speed of 19.13%. Thus, about 19.13% of the disequilibrium of the previous period is adjusted back to the long-run equilibrium in the current period.

We can observe from Table 6 that the coefficient of exchange rate is barely significant at the 5 percent level of significance. However, net domestic credit and broad money supply have a highly significant effect on the balance of payment position in the short run. The value of R-square (0.505941) for the model shows a relatively high overall goodness of fit of the model and that variation in net foreign assets can be explained with the changes in explanatory variables in the model.

Table 5: Estimated Error Correction Results for the ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.023736	0.271204	0.087521	0.9304
D(LNEXCRATE(-1))	-1.251116	0.547001	-2.287230	0.0238
D(LNNDC(-1))	0.009705	0.075042	0.129329	0.8973
LN MONEY(-1)	0.326232	0.136232	2.394676	0.0180
D(LNINFLATION(-1))	0.243562	0.304086	0.800964	0.4246
D(LNINTEREST(-1))	-0.364588	0.426906	-0.854025	0.3946
D(LNEXCRATE)	0.223713	0.548566	0.407814	0.6841
D(LNNDC)	0.743431	0.073993	10.04728	0.0000
LN MONEY	-0.332536	0.132384	-2.511906	0.0132
D(LNINFLATION)	-0.566599	0.323834	-1.749658	0.0825
D(LNINTEREST)	0.733803	0.425592	1.724193	0.0870
ECT(-1)	-0.191297	0.048291	-3.961321	0.0001
R-squared	0.505941	Mean dependent var		0.001367
Adjusted R-squared	0.464769	S.D. dependent var		0.262386
S.E. of regression	0.191960	Akaike info criterion		-0.383403
Sum squared resid	4.864029	Schwarz criterion		-0.135918
Log likelihood	39.60498	Hannan-Quinn criter.		-0.282839
F-statistic	12.28860	Durbin-Watson stat		1.861909
Prob(F-statistic)	0.000000			

Table 6: Wald Test for Short run Coefficients

Null hypothesis	p – value
Exchange Rate (-1) = Exchange Rate = 0	0.0513
Net Domestic Credit (-1) = Net Domestic Credit = 0	0.0000
Money Supply (-1) = Money Supply = 0	0.0390
Inflation Rate (-1) = Inflation Rate = 0	0.1659
Interest Rate (-1) = Interest Rate = 0	0.1542

The plot of the stability tests of the model are presented in Figure 1 (CUSUM). The result shows that the model is stable since the critical bounds at 5 percent fall in between the two 5 percent lines, an indication that the results can be considered for policy formulation.

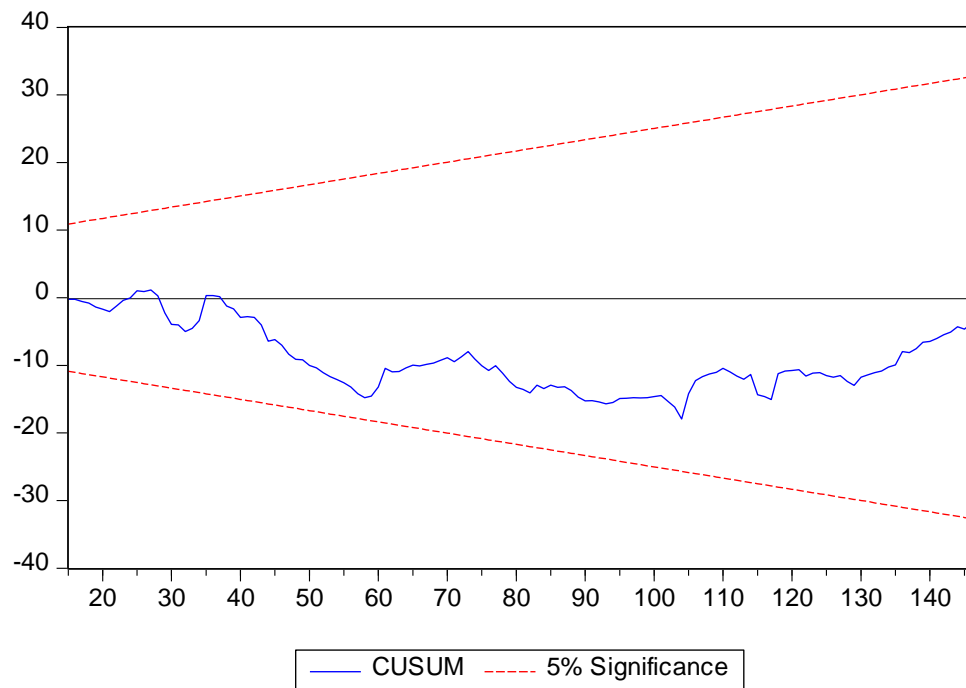


Figure 1: Cumulative sum of recursive residuals of the ARDL model

CONCLUSION AND RECOMMENDATIONS

The research set out to examine the MABP in Ghana using monthly data set from January, 2006 to February, 2018. Using the augmented Dicker Fuller test as well as the Phillips-Perron test, the time series data was tested to establish the stationarity or otherwise of the data. ARDL cointegration analysis which refers to a group of variables that drift together was performed on the variables. The empirical results from the ARDL cointegration procedure revealed that there was a long-run relationship between the independent variables and net foreign assets in Ghana. Exchange Rate, Net Domestic Credit, Inflation Rate and Interest Rate have a significant impact on the balance of payment position in the long run. The error correction term for this model is both negative and significant. About 19.13% of the disequilibrium of the previous period is adjusted back to the long-run equilibrium in the current period. The coefficient of exchange rate is barely significant at the 5 percent level of significance. However, Net Domestic Credit and Broad Money Supply have a highly significant effect on the balance of payment position in the short run. The policy implication this results showed is that the balance of payments in Ghana is a purely monetary phenomenon; since most of the variables appear to have a short-run as well as a long run relationship with net foreign assets. This is in accordance with the predictions of the MABP, thus the results of this study appear to comply with the strong assumptions of the MABP. Ghana needs to strengthen her monetary and fiscal policies that will eventually trigger the reduction of demand for imports, cost of exports, and price levels. To this end, authorities in

charge of monetary policy formulation for the Ghanaian economy can consider prudent monetary policies aimed at managing the money supply in the economy as a short-run and long run mechanism on the balance of payment position of the country. Future studies can consider increasing the span of the data points used in order to obtain sharper results.

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