Liberalization of the Financial Sector and Access to Credit by the Micro and Small-Scale Enterprises: Conintergration Analysis

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Abstract

The financial system of sub-Sahara African countries had long been shackled with extensive imprudent regulations operated on inefficient grounds. This paper estimates the impact of macroeconomic factors on credit to the private sector with emphasis on micro and small-scale enterprises in a regime of financial sector liberalization in Ghana. The paper demonstrates the predicaments of Ghana's inability to liberalize its financial sector and the consequent limitations imposed on access to financial services by the micro and small-scale enterprises. We used the Augmented Dickey Fuller (ADF) test for unit root and the Johansen-Juselius multivariate approach to cointegration to test for stationarity and a long-run relationship among the variables in the model. Error correction model (ECM) was used to estimate the short-run impacts. The results indicate that variations in credit to the private sector in a liberalized financial sector are explained significantly by the variables in the model in both the long-run and the short-run. An indication of a large percentage of financial deepening is demonstrated by the study, which leads to an expansion of the volume of institutional credit to enterprises including the micro and small-scale enterprises after the financial sector liberalization in Ghana.

Keywords: Cointegration, Stationarity, ADF Test, Error Correction Model, Micro and Small-Scale enterprises

1. Introduction

The financial sector of any modern economy plays a significant role in the growth and development process of that country. The sector mobilises savings and then effectively allocates it across investment projects. It provides insurance to risk-averse savers and investors and in an open economy, it helps domestic lenders and borrowers to compete effectively on the international capital market. The sector as a whole creates new jobs and career opportunities for individuals in the society. (Caprio et al 1993).

However, the financial sector in Sub- Sahara Africa countries (SSA), including Ghana had been characterised by weak resource mobilisation, high credit losses, high intermediation costs and excessive political interference. Stiglitz (2001) asserted, "history does not offer many examples of successful economies that did not accord the market a central role in the allocation and monitoring of capital". Thus in a repressed financial sector, where policies governing it are the preserve of the government, financial institutions hardly achieve success under such repressive environments.

Theory states that financial sector should be fully liberalised in the same way that governments are advised to stay off the product market in order to remove constraints and controls to enhance improvement of efficiency of financial resource allocation (McKinnon 1973; Shaw 1973). The predicament of governments of developing countries, including Ghana was their inability to liberalise the financial sector. This has hindered entrepreneurs of micro, small and medium scale enterprises to have more access to financial services for expansion.

Prior to 1983 Ghana operated a tightly regulated financial system with dismal impacts on economic development. In April 1983 the government of Ghana introduced a strict budget, which contained a programme of far reaching economic reforms known as the Economic Recovery Programme (ERP). This programme was followed by the Structural Adjustment Programmes (SAP I and II) which have been aimed at both economic stabilisation and structural adjustments. Included in the package of the ERP was the financial sector liberalisation because of an acute prolong economic crises and unorthodox measures which followed tight financial controls which had severely damaged the financial system leading to both financial shallowing and bank distress. (Gockel, 1995).

2. Ghana's Definition of Micro and Small-scale Enterprise

The productive sector of any modern economy is made up of enterprises categorised into micro, small, medium and large scale, depending on the size and extent of productive capacity. According to Storey (1994), there is no single, uniformly acceptable definition of a micro and small-scale firm. Firms differ in their levels of capitalisation, sales and employment.

The most commonly used criterion in defining micro and small enterprises in Ghana is the number of employees of the enterprise. The problem with the employee criterion is the confusion arising out of it, in respect of the arbitrariness and the cut off points used by the various official sources. Other sources also use fixed assets in the enterprise as a criterion in defining small and micro enterprises. The National Board for Small-Scale Industries (NBSSI) in Ghana applies both the fixed asset and the number of employees' criteria.

Osei et al (1993) in defining small-scale enterprises in Ghana uses an employment cut off point of 30 employees to indicate small-scale enterprises. The small-scale enterprises are broken down into 3 categories as follow;

     (i)   firm employing less than 6 people - micro
     (ii)   firm employing between 6 – 9 people - very small
     (iii)   firm employing between 10 – 29 people - small

The definition used by this study is also based solely on employment rather than multiplicity of criteria with micro enterprises employing less than six (6) people and the small-scale enterprises employing between six (6) and twenty-nine (29). For these enterprises to increase production of goods and services, increased flow of financial services is very essential.

Basically the financial services that are available to these categories of enterprises in Ghana are;

(i)   Retained Earnings (internal cash flow of the firm).
(ii)   Equity financing (selling of shares in the firm).
(iii) Borrowing (issuing of bonds and other forms of debt from the banks and non-bank financial institutions)
(iv)   Transfer financing (friends, relations etc.)
(v)   Personal savings (self-financing)

While some medium and almost all large scale enterprises that constitute a small percentage to aggregate output and small proportion of the economy have access to formal sources of financial services in Ghana, the micro and small-scale enterprises that form a large percentage in terms of aggregate output and size are limited to retained earnings, borrowing from the informal sources (money lenders, rotating savings, credit associations, saving collection i.e. "Susu"), and a very limited access to formal sources (the commercial banks, saving banks, etc.) in spite of their increasing demand for more financial services in order to expand output of goods and services and also increase the level of employment in the country.

Although the financial sector policies were aimed at supporting priority sectors through the use of sectoral credit guidelines and preferential interest rates, the supply of credit to these sectors declined in real terms. Credit to the whole of the non-government sectors amounted to only 3.6 percent of GDP in 1985, having fallen from 9.8% of GDP in 1977 (World Bank 1986). In 1987, Ghana initiated the liberalisation of its financial sector by removing controls on interest rates and the sectoral composition of bank lending and by introducing market-based instruments of monetary controls.

Liberalisation was expected to provide easy access to micro project credit facilities from the banking system at affordable capital costs. The implication is that in Ghana micro and small firms significantly contribute to economic growth and development so that with access to bank loans these entrepreneurs could expand their businesses and thereby contribute to economic growth of Ghana.

3 Pre-Financial Liberalisation Policies in Ghana

3.1   Monetary Policy

The main instruments of monetary policy in Ghana had traditionally been quantitative ceilings on the domestic asset creation of the banking system and reserve requirement.

Credit ceiling and sectoral credit controls had been one of the major instruments of Bank of Ghana's financial policy in the period 1960-90. The credit ceilings were derived from Bank of Ghana's macroeconomic ceilings on the banking system's net domestic assets which are set according to monetary and inflationary projections. The ceiling was categorised into credit to the rest of the economy and credit to the government and to cocoa financing. (Gockel, 1995)

3.2   Low Interest Rate Policies

With the low interest rates, Bank of Ghana set minimum rates for deposits and to place ceilings in lending rates to serve as incentives to attain higher levels of investment. Thus, Ghana's interest rate before liberalisation lacked flexibility with the results that at a generally high rate of inflation, real interest rates became increasingly negative, that is

    $i = r - p$
    i = real interest rate, (productivity of capital)
    r = nominal interest rate (lending or borrowing)
    p = rate of inflation
       r is kept low so that where $p > r$, and $i < 0$

When these rates were determined, they were allowed to be effective for extended period of time, at least one year. This gave individuals little incentives to hold savings in bank accounts. Therefore, monetary holdings

became larger than monetary aggregates on comparative basis. The lending rates were practically the same for overdraft facilities and for more risky lending. In the case of the agricultural and manufacturing sectors which were considered by the banks as the more risky sectors, controlled lending rates tended to be too low so that there was not much incentive for the banks to give loans.

3.3 Reserve Requirement

Bank of Ghana imposed reserve ratios for cash and secondary liquid assets. The cash reserve requirement was a two-tier system; one for demand deposits and another for savings and time deposits. These were to be held as either cash in bills or balance with the Bank of Ghana without interest.

Reserve requirements in Ghana averaged over 50 percent by 1983 and about 32 percent in the period 1987-89. The effects on the banking system of such high reserve requirements are two-fold: firstly, a substantial amount of the available funds is directed away from potential borrowers. Potential borrowers had to look elsewhere for financial needs and indication was that there was a growing informal financial sector. (Aryeetey and Gockel, 1991, and Gockel 1995). Secondly, when banks are forced by high reserve requirements to hold large amounts of low or zero-yield assets, major distortions to interest rates arise; where it is possible there will be increases in the margin between deposit and lending rates. In Ghana, while both rates were largely controlled, the minimum deposit rate tended also to become the maximum. Moreover, the banks resorted to high service charges to borrowers.

3.4   Unorthodox Monetary Policies

Bank of Ghana carried out two major monetary policies in attempts to mop up excess liquidity in the economy to halt inflation. The first exercise was the currency conversion undertaken in 1979. This was followed by demonetisations of the fifty (50) cedis notes (the highest denomination of the Ghanaian currency at the time). There was also the freezing of bank deposits in excess of 50,000 cedis, while bank loans for financing trade inventories and businesses deals of more than 1,000 cedis were required to be conducted by cheque.

According to Brownbridge and Gockel (1995), the pre-reform policies led to severe financial shallowing in Ghana. The broad money as a percentage of Gross Domestic Product (GDP), which was relatively stable at around 20% from 1964 to 1974, rose briefly in the mid 1970's to a peak of 29% in 1976 and then collapsed to 12.5% in 1984. Bank deposits also became less attractive relative to cash.Aryeetey and Gockel (1990) found that streeting banking was increasing in contrast to formal sector intermediation.

Credit to the non-government sector amounted to only 3.6% of GDP in 1983. This low figure was due to the decline in financial depth, and also crowding out by the government's borrowing requirement. In 1983, government took 87% of net domestic credit.

3.5 Micro and Small-Scale Enterprises Relation with the Financial Services Sector

According to JFC (2003), "there is a large gap between micro and small-scale enterprises and financial institutions". Lack of policy clarity and action specificity tended to exacerbate the marginalisation of micro and small enterprises, thus affecting their relationships with financial services sector. In Ghana's pre-liberalisation era, the foreign banks and commercial banks had the majority of their branches concentrating their activities in the cities. They had traditionally shunned rural areas and the micro and small enterprises.

According to Steel (1994), private firms' access to bank credit has been restricted in many developing countries because governments and public enterprises had been given first claim on financial resources. Table 1 reveals the ratio of private lending to total lending as well as ratio of private sector credit to G.D.P in percentages in four African countries. Indeed, private sector share of total lending is very low and this affected the growth of micro and small enterprises.

Aryeetey et al (1994), analysing the impact of liberalised financial policies in Ghana, established that liberalised financial policies positively affected incentives to lend. However, other measures taken to stabilise the economy and strengthen the banking system had a short-run negative impact on credit availability to small enterprises. They concluded that tight monetary policies resulted in higher interest rates on government paper than on loans to long-standing commercial clients. This led in turn to non-competitive higher rates to new, smaller borrowers.

3.6 Indexes for Measuring Financial Deepening

Perhaps the earliest formal model in favour of financial liberalization was the one provided by McKinnon (1973) and Shaw (1973). One basic argument put forward by the McKinnon-Shaw hypothesis of financial sector liberalisation is that it leads to financial Deepening. Thus financial sector liberalisation accompanied by an increase in real interest rates encourages individuals to hold more financial assets, which is associated with high levels of savings, investment and growth.

There are three indexes of measuring financial deepening. The three indexes of financial deepening are used to measure the impact of financial liberalisation on the portfolio choices of individual economic units.

The three indexes are

a)   The narrow money supply (M_1) as a proportion of Gross Domestic Product (GDP)
b)   Broad money supply (M_2) as a proportion of Gross Domestic Product (M_2/GDP)
c)   The broad money supply (M_2) plus private foreign denominated deposits, government Treasury bills

and government stocks (M_2) as a proportion of GDP (M_3/GDP)

M1 is defined as currency plus demand deposits

M_2 is defined as M_1 plus savings and time deposits

M_3 is defined as M_2 plus foreign denominated deposits, government Treasury bills and government stocks.

For the purpose of this study, financial deepening will be measured by the ratio of broad money (M_2) as a proportion of Gross Domestic Product (M_2/GDP). This is because M_2/GDP has been the traditional measure of financial deepening. Also in Ghana like many developing economies the most widely used financial assets are currency, demand deposit, and time deposits unlike in developed economies where Treasury bills and other financial assets are widely used. Hence the appropriate measure for financial deepening in Ghana is M_2/GDP. Both the financial depth and the volume of lending to the private sector were used as indicators of financial development.

4. Method of Study

The analysis of the impact of macroeconomic factors on private sector credit is examined by estimating a linear regression model. The data were collected from the Bank of Ghana annual reports. The model specification is outlined in equation (1) below. We began by testing for stationarity of the variables using the Augmented Dickey Fuller Test (ADF). We proceed to present the test for cointegration having established that the variables were integrated of the same order and, finally, we present the results of the study.

5. THE MODEL

This paper adopts the model used by Mwadira et al (2002) to estimate the model of impact of macroeconomic factors on credit to the private sector in Ghana. Mwadira *et al.* (2002) in estimating the impact of macroeconomic factors on credit to the private sector in Zimbabwe used GDP, BfGD and i as the main determinants of credit to the private sector.

The function is specified as

$$C_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 BfGD_t + \alpha_3 i + U_t \ldots\ldots\ldots\ldots..(1)$$

Where

C_t = Credit to the Private sector at time t

GDP_t = Gross Domestic Product at time t

$BfGDt$ = Bank financing of government budget deficit at time t

i_t = lending interest rate at time t

U_t = the error term at time t

An analytical framework has been used to explain the effect of these macroeconomic factors on credit to the private sector. The model links credit to the private sector to the performance of Gross Domestic Product, lending interest rate and Bank financing of government budget deficit.

5.1 Gross Domestic Product (GDP_t) and credit to the private sector (C_t)

The Gross Domestic Product of a nation influences credit to the private sector. Theoretically, it is expected that a direct relationship would exist between GDP and amount of credit advanced to the private sector. If a nation's GDP is high, the private sector's share of credit is likely to be high and vice versa, *all things being equal.*

5.2 Bank financing of government budget deficit ($BfGD_t$) and credit to the private sector (C_t)

Fiscal deficit is caused by increased government expenditure in excess of its revenue. There are several ways of financing government budget deficit. One of these ways is by borrowing from the banking sector. However, if the budget deficit is financed by the banking sector, it affects credit expansion to the private sector through a rise in interest rate. According to the loanable funds theory (Tsiang, S. C. (1957)), government borrowing from the banking system reduces supply of loanable funds to the private sector (crowding out effect). The higher the amount of government budget deficit financed by the banking sector, the smaller the amount of loanable funds available to the private sector, especially small-scale borrowers.

5.3 Lending Interest rate (It) and credit to the private sector (Ct)

Macroeconomic environment affects the performance of the banking sector, by influencing the ability to repay borrowed loans. The demand for loans with unpredictable returns from investment and quality of collateral determines the cost of borrowed funds to investors. An unstable macroeconomic environment and poor economic growth present uncertainty about investment returns and these raise the lending interest rate as the level of non-performing loans go up. This squeezes the banks margins. As the level of non-performing loans increases banks have to charge high risk premiums to cover their default risk. Low lending rates do not allow banks sufficient margins to accommodate the increased expenses associated with lending to small and new borrowers.

However, at high lending interest rate, borrowers also consider cost of borrowing very high and therefore would borrow less and therefore their credit is affected by high lending interest rate.

6. Cointegration Analysis of the Model

6.1 Stationarity Test

The first test to be conducted is the stationarity test or integration properties of the data series to determine whether each of the data series in X_t is non-stationary (i.e. unit root exists) or stationary (i.e. unit root does not exist).

6.2 Augmented Dicky-Fuller (ADF) Test

The study uses the Augmented Dickey-fuller (ADF) test to test the stationarity of the variables in the model. The ADF test is an extension of the Dickey-Fuller (DF) test and is superior to the DF series, since the DF test does not consider the possibility of auto-correlation in the error term.

The ADF test overcomes the problem of auto-correlation in the error term (Ngugi & Kabubo, 1998) and allows a higher order auto-regression process such that,

$$\Delta X_t = C(\alpha-1)X_{t-1} + \sum \alpha_1 \Delta X_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots(2)$$

where ρ is the number of lagged differences in X_t necessary to make ε_t serially uncorrelated. The hypotheses involved in the ADF test are,

Null hypothesis (H_0): $\alpha_1 = 0$
     and
     Alternative hypothesis (H_1) : $\alpha_1 \neq 0$

If the test statistics of the variables in the model is less than the critical values the null hypothesis is accepted. However, if the observed statistics is greater than the critical value, the null hypothesis is rejected and the alternative hypothesis is accepted.

Accepting the null hypothesis (H_0) means unit root exists, thus the data series is non-stationary.

Accepting the alternative hypothesis means unit root does not exist or the data series is stationary.

6.3 Cointegration Test

After establishing the stationarity of the variables in the model, cointegration analysis is used to test the long-run relationship between the variables in the model. Cointegration test provides a likelihood ratio statistics to test for the maximum number of independent equilibrium vectors in the cointegration matrix.

The study uses the Johansen-Juselius (1990) maximum likelihood approach in the context of multivariate regression test. This test is an extension of Johansen (1988) cointegration approach which employs two test statistics; the trace statistics and the maximum eigen values. This test is generally applied to variables (X_1) integrated of the first order (i.e. X_i - I(i)). Any variable integrated of order one (i.e. I(i)) becomes stationary after first differencing if the differenced variable is now of a lower order i.e. of order zero – I(0).

These variables are said to be cointegrated if a linear combination of these variables assumes lower order of integration. These variables must always be of the same order of integration individually i.e. they are individually non-stationary integrated of the same order, but their linear combination is integrated of a lower order, (Ndung'u 2001).

Equation (1) can be referred to as the cointegration regression. If the variables are cointegrated then the parameters in the equation are said to be cointegrating vector. This means that an error correction (E.C) model can represent a short-run credit function jointly with the long-run relationship.

The E.C model which will represent the short-run specification is as shown below.

$$\Delta C_t = \alpha_0 + \alpha_1 \Delta GDP_t + \alpha_2 \Delta BFGD_{t-1} + \alpha_3 \Delta i_{t-1} + \alpha \Delta V_{t-1} + \varepsilon_t \dots\dots\dots\dots (3)$$

Where Δ denotes the first-order time difference. The E.C model can be estimated separately or jointly to obtain the short-run and long-run relationship.

To estimate E.C model jointly the following equations are estimated together.

$$C_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 BFGD_t + \alpha_3 i_t + U_t \qquad \dots\dots\dots\dots\dots (4)$$
$$\Delta C_t = \beta_0 + \beta_1 \Delta GDP_{t-1} + \beta_2 \Delta BFGD_{t-1} + \beta_3 \Delta i_{t-1} + \beta V_{t-1} + \varepsilon_t \qquad \dots\dots (5)$$

The above two equations are estimated together to give;

$$\Delta C_t = C + \alpha\beta + \beta_1 \Delta GDP_{t-1} + \beta_2 \Delta BFGD_{t-1} + \beta_3 \Delta i_{t-1} + \beta V_{t-1} + \alpha C_{t-1} - \alpha\beta_1 GDP_t - \beta_2 BFGD_t - \alpha\beta_3 i_t + \varepsilon_t \dots(6)$$

The term with Delta (Δ) signs give the short-run parameter estimates whilst the terms without the Δ sign give the estimate for the levels. To establish the cointegration relationship among the variables included in the model for credit to the private sector, a multivariate cointegration test by Johansen-Juselius (1998) method is used. The test starts with the standard vector autoregressive (VAR) relation.

The VAR model is considered as follows

$$X_t = (C_t + GDP_t + BFGD_t, i_t) \text{ i.e variables included in the model} \dots(7)$$
     U = a vector of constant with 4x4 dimension
     D = Dummy to capture shocks during the liberalisation period
     E = white noise

The first difference operator Δ is used to re-parameterised equation (7) to get

$$\Delta X_t = \sqrt{\Delta X_{t-1}} + \dots + \sqrt{}_{k-1} \Delta X_{t-k+1} + \pi X_{t-k} + U + \theta D + e \dots\dots\dots\dots\dots(8)$$
     Where; $\sqrt{}_1 = -(I - \pi_i \dots \pi \quad i-1 \dots\dots k-1)$ and $\pi = -(I - \pi_i \dots \pi_k)$

Equation (8) is the vector error correction (VEC) model. The equation includes the short-run relationship as well as the long-run relationship.

Three situations may occur, Adam (1992).

- (i)   If π is fully rank [i.e. $n(\pi) = \lambda$] $\rightarrow$ the matrix is stationary and the data in the vector are not I (1).
- (ii)   If the rank is zero (i.e. $n(\pi) = 0$) $\rightarrow$ the variables are individually I(1) but not cointegrated, meaning the error-correction model cannot be used
- (iii)   If the rank is greater than zero but less than λ (i.e. $0 < h(\pi) < r, \lambda$) $\rightarrow$ there are r cointegrated vectors which can be identified in the E.C.M

6.4 Hypothesis

For the trace test, the null hypothesis (H_0) is

Ho : $r \leq r_o$ i.e. the eigen value is less than or equal to the theoretical r at a chosen level of significance and the alternative hypothesis (H_A) is

H_A : $r > r_o$ eigen value (empirical r-statistics is greater than the theoretical r.

Accepting H_o implies that π is full rank, which means an E.C.M, cannot be specified.

Accepting H_A implies an existence of a given required r cointegrating vector, meaning an E.C.M can be specified and estimated. The trace test relation is given as

T(trace) = -T $\sum \ldots$ ln (1-λ) …..(3:9)

Where

λ = estimated eigen values

T = sample size

For the maximal eigen value test, (λ-max statistics)

The null hypothesis (H_o) is

H_o : r = 0 implying that the rank of π matrix is zero and the alternative hypothesis (H_A) is

H_A : r = r_0 + 1 which implies an existence of a required number of r cointegrating vectors for an E.C.M.

Accepting H_o means the empirical λ-max is less than the theoretical value.

Accepting H_A (i.e. rejecting H_o) means the empirical λ-max is greater than the theoretical value.

Accepting H_A is a means of validating the trace test implying E.C.M exist.

The maximal eigen value test relation is as below

λ-max = -Tln(1-λ_{r+1})……(3:10)

where

λ = estimated eigen values from π

T = sample size

6.5 Hypotheses

The hypotheses to be tested based on the objective of the study are that

- (a) The monetary and fiscal policies implemented during the liberalization period have not led to increased credit expansion to the private sector
- (b) The financial sector liberalization has not resulted in an improvement in the performance of micro and small-scale enterprises in Ghana

6.6 Empirical Results and Survey findings

The study analyses the Augmented Dickey-Fuller (ADF) Test and Cointegration results of the model on the effects of macroeconomic factors on credit to the private sector. The estimates were obtained using the E-views version 3:1 software package (P.C Give 9:10 session)

6.7 Results of the Data

(i)   Unit Root Test Results

As indicated, the study uses the ADF test to test the stationarity of the variables in the model. The ADF test performed shows that the variables in the model are non-stationary and we do not reject the null hypothesis of non-stationarity. However, after first difference at the 5 percent level of significance, the variables in the model are stationary. The test statistics of the variables are less than the critical values therefore the null hypothesis of non-stationarity is rejected and the alternative hypothesis of stationarity is accepted. This means that after the first differences, the mean and auto covariances of the series do no depend on time (Johansen *et al.,* 1991). The results of the ADF test are displayed in the table 2.

(ii)   Cointegration Test Results

From Table 3 both the maximal Eigen values and trace Eigen value statistics reject the null hypothesis of no cointegration. The alternative hypothesis of cointegration is accepted. There is at least one cointegration at 5 percent significant level. From the data results, the trace value of 132.65 exceeds the 95 percent critical value of 47.66. Also the λ-max value of 67.43 exceeds the 95 percent critical value of 4.65. Hence the alternative hypothesis of at least one cointegration vector is accepted. From table 3 both the trace and

λ-max indicate that there are at least two cointegrating equations at 5 percent level of significance. This means that an error correction (E.C) model can be specified to represent the short-run dynamics and the long-run relationship jointly or separately.

(iii) Regression Results of the estimated models- The Long-run results

The long-run credit to the private sector equation was first run by the ordinary least square (OLS) method. The results show that apart from Interest rate (i) coefficient, none of the other estimated parameters was statistically significant, though the F-statistics was significant which implies that the overall regression is good. The R^2 of 0.753 shows that 75 percent of the variations in the credit to the private sector in the long run is explained by variables included in the model viz Gross Domestic Product, Bank financing of government budget deficit and lending interest rate.(Table 4)

$R^2 = 0.753$

F = (5,14) = 8.5227 [0.0007]

DW = 1.87

(iv) The Short term Results

The error correction model (E.C.M) was used to estimate the short-term dynamics of the series since there is a cointegration relationship among the variables in the model. The E.C.M results show that not only do the estimated parameters have wrong signs (with the exception of GDP) they are also insignificant. The F-statistics and the D.W estimate are also poor. However, the result indicate that the adjusted r-squared (R^2) = 0.817 is quite high which means that 81 percent of the variations in credit to the private sector in the short-run is explained by the variations in the variables included in the model viz Gross Domestic Product, interest rate and Bank financing of government budget deficit. The regression results for the E.C.M is presented in the table 5.

Adjusted R^2 = 0.817

F = (5,13) = 11.632 [0.0002]

DW = 1.69

AR 1-2 F(2,11) = 0.97215(0.4085)

ARCH F(1,11) = 0.42029 (0.53011)

Normality x^2 (2) = 0.92135 (0.6309)   RESET F(1,12) = 0.07798 (0.7848)

7. Financial Deepening

One basic argument of the Mckinnon-Shaw model of financial liberalization is that real deposit rates at the level of market clearing level encourages financial savings and thus increases the flow of loanable funds through the organized financial system. This increases financial deepening leading to an expansion of the volume of institutional credit. For the purpose of this study, the broad money (M_2) as a percentage of GDP measures financial deepening.

The ratio of broad money (M_2) as a percentage of Gross Domestic Product (GDP) (i.e. M_2/GDP) indicates that financial development in Ghana had been repressed prior to financial liberalization. The M_2/GDP was generally low and declined in most years since 1977 and reached a low level   of 12.5 in 1984 from 29.7 in 1977. The financial depth (M_2/GDP) has increased to a high level of 43% of GDP by the end of 2007. From a low figure of 12.5% of GDP in 1984 (Pre-liberalization), it increased to 17.1% in 1988. Though it fell to 13.4 in 1991, it increased again to 18.7 in 1994 and again to 19 in 1996 and 26.8 in 2001.It increased further to 40.9% in 2003, 26.4 in 2004, 39.4% in 2006 before reaching the high level of 43% in 2007 (IMF-Ghana: 2007).

8. Conclusion

In this paper, we have tested the stationarity of the variables in the macroeconomic model of Mwadira et al (2002) by looking at both the short-run and long-run relationships of the variables in the model. We have examined the effects of liberalization on the model in facilitating credit to the private sector including micro and small-scale enterprises.

Cointegration relationship was established among the variables in the model for credit to the private sector using a multivariate cointegration test. After first differences at 5% level of significance, the variables in the model are stationary. The model proves that the mean and auto covariances of the series do not depend on time. Both the trace value and the λ-max value exceed the critical value. There are, at least, two cointegrating equations at the given level of significance. The long-run credit to the private sector equation was run by the Ordinary Least Square (OLS) method. The error correction model was used to estimate the short-run dynamics of the series. Both results have demonstrated that significantly large variations in credit to the private sector including the micro and small-scale enterprises in both the short and long-run are explained by variations in the variables in the model.

Conclusively, the study has demonstrated that micro and small-scale enterprises in the study area have had significantly large access to credit in the post-liberalization regime than the pre-liberalization era. Financial

deepening has also been very significant, rising from a low level of 12.5% of GDP in 1984 (Pre-liberalization era) to a high level of 43% of GDP in 2007(Post-liberalization era).

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Table 1: Credit Allocation between Private and Public Sectors

Ratio of Private lending to Total lending (%)			Ratio of Private sector Credit to GDP (%)	
1986	**1990**	**1993**	**1981 – 86**	**1987 - 1992**
Ghana 13.6	27.6	35.6	2.4	4.1
Malawi 52.5	40.4	14.6	9.1	39.5
Nigeria 63.5	44.9	17.4	17.4	47.2
Tanzania 7.2	14.6	27.1	2.3	2.2

Source: **The World Bank Economic Review, Vol. 11 May 1997,No 2**

Table 2: Results of Unit Root Test

Variable	ADF Test Statistics	Critical Values	I (d)
D credit	-5.136	-3.7	I (1)
D GDP	-3.889	-3.7	I (1)
D BFGD	-8.785	-3.7	I (1)
D I	-4.119	-3.7	I (1)

Source: Data Estimation

Table 3: Johansen Test for Cointegration

Null hypothesis	Trace	Trace @ 95% C.V	Λ-max	Λ-max @ 95 % C.V
$\rho = 0$	132.650	47.66	67.43	4.65
$\rho \leq 1$	19.275	21.61	18.57	19.32
$\rho \leq 2$	7.631	14.32	6.32	12.26
$\rho \leq 3$	0.0765	6.63	0.076	5.38

Source: Data Estimation

Table 4:   Long-run credit to the Private Sector

Variable	Coefficient	t-values
Constant	-224.93	-1.948
GDP	0.08048	3.717
BFGD	1.15573	1.973
i	0.87276	1.006

Source: Estimation from Data

Table 5: Regression Results for the E.C.M

Variable	Coefficient	t-values
Constant	-224.26	-2.174
GDP	0.0777	4.037
BFGD	0.1246	1.679
i	0.4873	0.778
Dummy	7.8402	0.160
EC-2	-0.429	-1.721

Source: Data Estimation

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