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Credit Market Development and Investment Efficiency in Nigeria

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Authors' contributions

This work was carried out in collaboration between the three authors. We wrote the paper together, read it, and approved the final manuscript.

Review Article

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ABSTRACT

Stock markets provide important source of investment capital at relatively low cost. A well-functioning and liquid stock market helps investors to reduce unsystematic risk and increase the marginal productivity of capital. Developed credit market improves the efficiency of investments and resource use thereby contributing to higher economic growth and development of a nation. Unfortunately foreign private inflows in Nigeria are direct contributions by large parent-multi-national to their subsidiaries that dominate the oil and communication industries. Thus, institutional investors in Nigeria suffer dearth of investible surpluses characterized by inefficient investment and consequently is unable to match her huge export earnings with appreciable level of development. Investment efficiency is necessary for resources to be channeled to core growth activities of the private sector. This paper therefore examines the relationship between credit market development and investment efficiency in Nigeria using standard econometric methods of error correction mechanism. The results show at 5% level of significance that there is inverse and significant relationship between investment efficiency and interest rate in agreement with Keynesian theory of investment and provide evidence for the existence of a negative relationship between investment efficiency and trade openness to credit market development in Nigeria. It is recommended that interest rate management be used to promote investment efficiency, motivate savings and provide credits for investors at a competitive price. Perhaps a re-emphasis on use of cost and social benefit analyses for evaluation of investment will not be out of place.

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1. INTRODUCTION

Stock markets contribute to the mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios. In doing so, they provide an important source of investment capital at relatively low cost. A well-functioning and liquid stock market helps investors to reduce unsystematic risk and increase the marginal productivity of capital. In this vein, the body of literature on financial economics provide support for the argument that economies with better and efficient credit systems grow faster while those with inefficient credit systems bear the risk of bank failure, since credit institutions intermediate between the surplus and deficit sectors of the economy [1]. Thus, a functioning credit system alleviates the external financial constraints that impede the expansion of credit to firms and industries [2].

A relatively developed credit market improves the efficiency of investments and resource use thereby contributing to higher economic growth and development of a nation. A developed credit market generates growth-push economy in the long-run by attracting new classes of entrepreneurs with handful of innovative ideas [3]. According to [4], financial systems improve economic performance by assessing investment opportunities and exerting corporate control, easing risk management and lowering the costs of resource mobilization. As financial systems develop, they become more efficient in providing these services which enhance investment efficiency and economic growth. In [5], the author emphasizes the critical importance of the banking system in economic growth and highlights circumstances when banks can actively spur innovation and future growth by identifying and funding efficient investments.

The Nigeria financial sector attracts virtually no inward foreign portfolio investment. Almost all foreign private inflows are in the form of direct contributions by large parent-multi-national to their subsidiaries; mainly in the oil and communication industries. The size of insurance and mortgage finance sectors are relatively too small to support huge capital based investments. Hence, institutional investors in Nigeria suffer dearth of investible surpluses. The introduction of the bank consolidation policy in 2004 improved the development of the credit market by increasing the market capitalization to ₦9, 516.6b in 2004. According to [6], the Stock Exchange Commission (SEC) experienced improved professional management competence in supervision but as a result of the global financial economic crises of 2009, all share index and market capitalization dropped starting from the United States and spreading to other economies of the world including Nigeria. Despite this global financial crisis which reduced the market capitalization in Nigeria to ₦7, 030.8b, there has been persistent increase in the market's capitalization which stood at ₦14, 800.9b in 2012.

Nigeria like some other African states suffers inefficient investment and consequently is unable to match her huge export earnings with appreciable level of development. In particular, Nigeria earned enormous revenue from crude oil export between mid1970 and 2000, resulting in significant increase in public sector spending without corresponding evidence of development. One of the economic efficiency indicators developed by the United Nations is resource use intensity. In line with their suggestions, investment efficiency can be measured as GDI/GDP; defined as the ratio of gross domestic investment, GDI to Gross Domestic Product, GDP. Whereas investment efficiency in Indonesia increased from 12.49 percent to 32.09 percent between 1985 and 2001; and that in South Africa from 14.70

percent in 2002 to 18.97 percent in 2011 [7], investment efficiency in Nigeria struggled between 0.043 to 5.044 percent in 1985 and 2011 respectively [8]. Notably development in South Africa and Indonesia are better than whatever records Nigeria has achieved. Thus development of the credit market will require investment efficiency to channel resources to core growth activities of the private sector. This is supported by [9], who studied financial sector development and industrial production in Nigeria and concluded that despite the development in the credit market in Nigeria, economic development is yet to be achieved. Hence, this paper examines the relationship between credit market development and investment efficiency in Nigeria. The remaining part of this study is organized in the following sections; section 2 reviews the existing literature on the link between credit market development and investment efficiency, presents background information and stylized facts on credit market development and investment productivity in Nigeria as well as the methodology and dataset used for the empirical analysis. Section 3 reports the estimation results while section 4 concludes.

2. LITERATURE SURVEY

Whereas economists agree that investment is positively affected by output but negatively influenced by interest rate; several authors suggest that credit market development spurs GDP per capita by fostering investment efficiency. This is achieved not only by making funds available for accumulation but by channeling them to productive investments. Theoretical papers by [10], among others show that credit market development may relieve risky innovators from credit constraints, thereby fostering development through efficiency of investment. While earlier contributions by [11] suggest that credit market development fosters economic development simply by increasing investment efficiency and risk pooling because investment efficiency reduces risk associated with investment. In the later work of [12], he opined that the relationship between credit market and economic development is also driven by advances in efficiency of investment [13]. Provided evidence from a sample of twenty five countries that financial liberalization has predictive power on banking crises. In [14], the authors show that investment inefficiency persisted in the first three to four years of the financial liberalization policy implementation, before improvement in investment productivity started. This however is as a result of the gestation period on investment which does not allow immediate positive response to credit market development. Thus the sign of direct effect of financial liberalization on capital accumulation through increased international competition is said to be ambiguous. For instance, [10] suggested that the effect of competition may vary depending on the distance of a country to the world technology frontier. Moreover, the overall effect of financial openness on the stock of capital may be ambiguous, as capital reallocations may translate into net inflows for some countries and outflows for others. It is therefore expected that continuous improvement on investment efficiency is the sure way to maximize available funds in the credit market. Improved investment efficiency provides a significant basis for adequate supply of goods and services thereby improving the welfare of the people and enhancing social progress. Otherwise, as pointed out by [15], per capita income will scarcely grow, and inflation would be more difficult to control. In point of fact, it has been observed that sustained investment efficiency is responsible for the brilliant performance of the Asian Tigers and Japan in their prosperous years [16,17]. Recent developments in the world economy have also shown that countries with high investment efficiency are not only central to the determination of global balance of power (e.g. Japan and Germany), but also serve as centres of stimulus, where world resources (including labour) are redirected to, as opposed to countries with low or declining investment efficiency. Studies carried out by [18] as well as [19], have also shown that high investment efficiency increases competitiveness in terms of penetrating the world market.

Thus, a country with high efficiency in investment is often characterized by a very high capacity utilization (optimal use of resources), high standard of living, low rate of unemployment and social progress. The link between investment efficiency and credit market development in Nigeria therefore remains of interest to economists, hence this empirical investigation.

2.1 Data Set and Definition of Variables

Time series data between 1970 and 2011 from CBN statistical bulletin, World Bank and IMF financial reports were used for this study. CPS/GDP represents the ratio of private sector credit to GDP and indicates extent of credit market development in the economy [10]. Believe that there is a positive relationship between the credit market development and investment efficiency of every economy; therefore, the coefficient should be positive. As is suggested in [20] resource-use efficiency is measured by the ratio of resource-used to gross domestic product. Therefore, investment efficiency is measured in this paper by the ratio of gross domestic investment to GDP (i.e. GDI/GDP), thus, the coefficient is expected to be positive. Gross domestic product per capita (GDPPC) in accordance with [21] is used as a measure of economic development in this study. It is expected theoretically that efficient investment of credit will lead to improvement in the development of the credit market which will translate to economic development through the multiplier process. Interest rate (INTR) is the rate at which savers are rewarded. It also serves as a determinant of investment behavior in the economy. The coefficient is expected to be positive according to [22,23]. TOP is trade openness and is obtained by adding import and export divided by GDP. The higher the TOP rate, the higher will be the level of development of the credit market and according to the new growth model; the coefficient should be positive.

2.2 Trends in Credit Market Development and Investment Efficiency in Nigeria

Fig. 1 above represents the trends in credit market development and investment efficiency in Nigeria within the period of the study. As depicted in the figure, credit market development stood at 6.7 percent while investment efficiency was 0.32 percent in 1970. As a result of the increase in the nation's revenue occasioned by the discovery of oil in the economy, credit market further improved to 11.68 percent in 1979 without a corresponding increase in investment efficiency which reduced to 0.30 percent. After 1980 when investment efficiency increased to 0.34 percent, there has been persistent downward movement on its trend while the credit market has been swinging up and down till 2007. Between 2004 and 2009, there was sharp increase in the credit market development from 12.46 percent to 36.89 percent respectively, as a result of the 2004 bank consolidation policy. But the increase in the credit market development did not have significant effect on investment productivity as it struggled between 1.63 percent in 2004 to 3.01 in 2009. However, in 2010, credit market development decreased to 28.40 percent while investment efficiency increased to 5.04 percent. On the contrary, between 2011 and 2012 credit market development rose from 28.5 percent to 36.1 percent while investment efficiency decreased from 0.34 percent to 0.25 percent. Thus, the effect of credit market development on investment efficiency in Nigeria remains an empirical issue to be investigated. Evidences from other countries show that development in the credit market has positive effect on investment efficiency.

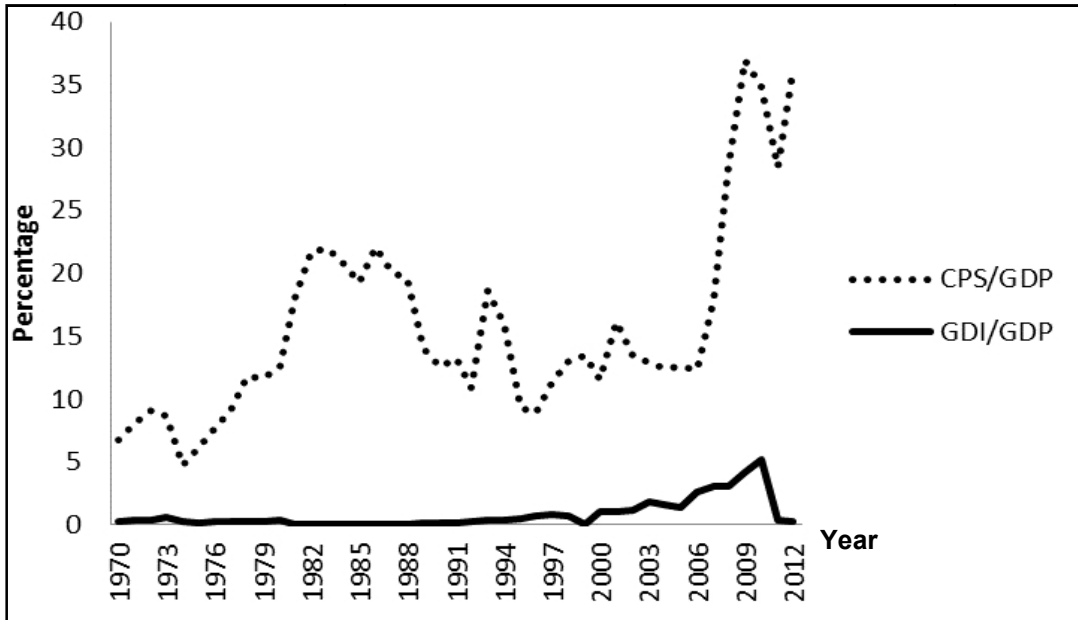


Fig. 1. Credit market development and investment efficiency in Nigeria

2.3 Theoretical Models

The study is focused on the impact of credit market development on investment efficiency. Financial liberalization hypotheses of [22,23] posit that relatively high interest rate will induce investment in productive projects which will in turn increase investment efficiency and economic development. This was based on the fact that a relatively high interest rate encourages investors to invest in productive projects knowing the opportunity cost of doing otherwise. Savers will also be encouraged to save more, thereby making more funds available for investment. Supply-leading hypothesis of [24], posit that new assess to supply-leading funds open new horizons as to possible alternatives, enabling the entrepreneur to “think big”. By implication, credit market development contributes to the establishment of new firms in new industries or in the merger of firms, by assuming entrepreneurial initiatives. The theory also affirms that high interest rate motivates the surplus unit to save more thereby making the market more liquid for investors to access fund, hence improved economic development. According to [25], the main implication of the new growth theory is that a policy which embraces openness promotes growth in the economy. In other words, trade openness is a determinant of economic development and the higher the degree of openness, the higher will be the level of income per capita which will stimulate credit market development and investment efficiency.

Thus investment efficiency is modeled as:

$$\frac{GDI}{GDP} = f \left(GDPPC, INTR, \frac{CPS}{GDP}, TOP \right) \dots\dots\dots (i)$$

Mathematically, it is assumed that it follows the linear model;

$$\frac{GDI}{GDP} = \theta_0 + \theta_1 \frac{GDPPC}{GDP} + \theta_2 \frac{NTR}{GDP} + \theta_3 \frac{CPS}{GDP} + \theta_4 \frac{TOP}{GDP} + \mu \dots \dots \dots (ii)$$

Where; $\theta_1 > 0$, $\theta_2 > 0$, $\theta_3 > 0$, $\theta_4 > 0$.

2.4 Estimation Method

The study adopted Augmented Dickey Fuller (ADF) test in examining the stationary properties of the variables while Johansen co-integration test was used to test for the existence of long-run relationship between the variables of the model. Granger causality test was conducted to determine the direction of causality of the variables in the model. Thereafter, error correction mechanism was used to estimate the coefficients of the model.

2.4.1 Unit root test

Augmented Dickey Fuller (ADF) test is used because it considers lagged values of the dependent variables in order to obtain an unbiased estimate of δ , the coefficients of the lagged variable Y_{t-1} . The ADF unit root test requires the estimation of the regression

$$\Delta Y_t = \alpha_0 + \beta Y_{t-1} + \sum_{i=1}^p \delta_i \Delta Y_{t-i} + \varepsilon_t \dots \dots \dots (iii)$$

- Where, ΔY_t = first difference of Y_t
- α_0 = the intercept
- δ_i = the trend coefficient
- β = the coefficient of the lagged term
- t = the time or trend variable
- p = the number of lagged terms
- ε_t = the white noise.

The hypotheses to be tested are:

- Ho: $\beta = 0$, i.e., Y_t has unit root (the time series is non-stationary)
- H1: $\beta < 0$, i.e., Y_t has no unit root (the time series is stationary).

If the calculated ADF test statistic is higher than MacKinnon’s critical values, then the null hypothesis (H_0) is accepted and the time series is considered non stationary or not integrated of order zero, i.e., $I(0)$. Alternatively, the rejection of the null hypothesis implies stationarity of the underlying time series. Failure to reject the H_0 leads to the test on the difference of the time series. In other words, differencing is conducted until stationarity is achieved and the null hypothesis is rejected [26]. The number of times the time series is differenced determines the order of integration.

2.4.2 Granger causality

According to [27], Granger causality test explains if there exists unidirectional or bidirectional causal relationship among variables of a model. This helps in deciding between single equation and simultaneous equation methods of model estimation. The general model when the variables are integrated of order zero i.e. when the variables are $I(0)$ is;

- Econometric is used to investigate whether the assumptions of the econometric method employed are satisfied in any particular case. The Durbin Watson (DW) test is used to establish the existence of autocorrelation in the model [29].

3. RESULTS AND DISCUSSION

3.1 Empirical Findings

The unit root results in Table 1 indicate that CPS/GDP, GDI/GDP, GDPPC, INT are all stationary after the first difference; in other words they are integrated of order I(1). While TOP is stationary at levels i.e. it is integrated of order I(0). This implies that the null hypothesis of non stationarity for the variables is rejected. We therefore proceed to establish whether or not there exist long run relationships among the variables using Johansen full maximum likelihood method.

Table 1. Result of augmented dickey-fuller unit root test

| Variable | ADF(Level) | ADF(1 st Diff) | Integration Order |
|----------|------------|---------------------------|-------------------|
| CPS/GDP | -1.5102 | -6.4077 | I(1) |
| GDI/GDP | 4.1827 | -3.3822 | I(1) |
| GDPPC | 0.5086 | -3.5586 | I(1) |
| INTR | -1.7915 | -7.1668 | I(1) |
| TOP | -4.5648 | -7.1784 | I(0) |

5% CRITICAL-2.9378-2.9399; Authors' compilation

3.1.1 Co-integration result

Furthermore, the trace test reveals the existence of 3 and 2 co-integrating relationship between GDI/GDP and its determinants at 5% level of significance respectively. From the result, we conclude that there exists a long-run relationship between GDI/GDP, CPS/GDP, INTR GDPPC and TOP. This is because there is at least one co-integrating vector as required by theory.

3.1.2 Granger causality result

The Granger causality test indicates that credit market development does not significantly cause investment efficiency to change in Nigeria. This is attributed to the fact that credit market resources in Nigeria have not been effectively utilized to spur investment efficiency.

3.1.3 Investment efficiency model result

The results as shown in Table 2, indicate a positive and significant relationship between investment efficiency at the current year with the efficiency of the past years. In other words, investment efficiency of the past years affects the current year's efficiency. The relationship between investment efficiency and interest rate is inverse and statistically significant. Implying that interest rate is a good parameter for measuring investment efficiency. This indicates that increase in interest rate will adversely affect investment efficiency in Nigeria. For instance, if interest rate is increased by 1 percent, investment efficiency will decrease by about 1.9 percent. This agrees with Keynesian theory which advocates that inverse relationship between interest rate and investment improves its efficiency and this violates

McKinnon and Shaw prescription. The study also shows the existence of a negative relationship between investment efficiency and credit market development in Nigeria.

Table 2. Result from the parsimonious correction model of D ((GDI/GDP))

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| C | 0.038319 | 0.047065 | 0.814164 | 0.4222 |
| D((GDI/GDP(-1))) | 0.552510 | 0.194019 | 2.847708 | 0.0080 |
| D((GDI/GDP(-2))) | 0.558843 | 0.291863 | 1.914744 | 0.0654 |
| D((GDI/GDP(-3))) | 0.881394 | 0.214534 | 4.108408 | 0.0003 |
| D((INTR(-1))) | -0.019235 | 0.010208 | -1.884240 | 0.0696 |
| D((CPS/GDP(-3))) | -0.007614 | 0.002789 | -2.730136 | 0.0107 |
| D((GDPPC(-3))) | -3.10E-05 | 1.65E-05 | -1.880916 | 0.0701 |
| D((TOP(-1))) | -0.107219 | 0.063817 | -1.680092 | 0.1037 |
| ECM1(-1) | -0.667945 | 0.188228 | -3.548591 | 0.0013 |
| R-squared | 0.677806 | Mean dependent var | | 0.120711 |
| Adjusted R-squared | 0.588925 | S.D. dependent var | | 0.385604 |
| S.E. of regression | 0.247230 | Akaike info criterion | | 0.246401 |
| Sum squared resid | 1.772562 | Schwarz criterion | | 0.634251 |
| Log likelihood | 4.318377 | Hannan-Quinn criter. | | 0.384395 |
| F-statistic | 7.625978 | Durbin-Watson stat | | 2.119290 |
| Prob(F-statistic) | 0.000019 | | | |

Authors' Computation

As indicated in the result, a unit increase in credit market fund will decrease investment efficiency by 0.76 percent. This is due lack of emphasis on the use of cost-benefit and social-benefit analyses criteria as a basis for allocating credit market funds for private sector and public sector investments respectively. We know that such processes ensure that funds are channeled to efficient investments in preference to less viable ones. Also, the gestation period in investment does not permit its immediate positive response to development in the credit market as a result of the overhead cost involved in large capital-prone investments. The effect of increase in income per capita is adverse on investment efficiency; this is evidenced by the empirical result which shows that 1 percent increase in income per capita will reduce investment efficiency by about 3.10 percent. This is attributed to the fact that the income is in the hands of few citizens who acquire them illegally and therefore cannot invest the funds freely and legitimately to improve investment efficiency. Rather, they resolve in keeping the money idle in their homes or send them abroad (i.e. capital outflow), thereby preventing the increase in income per capita from having positive effect on investment efficiency. Furthermore, the relationship between trade openness and investment efficiency is negative against the a priori expectation. Evidence shows that a 100-unit increase in trade openness will have a 10 percent adverse effect on the investment efficiency in Nigeria. This is as a result of high volume of import over export in Nigeria which does not encourage domestic investment, hence; its efficiency is negatively affected.

The adjusted R^2 0.59 shows that about 59 percent of the variations in investment efficiency are caused by the variations in the independent variables. We, therefore, say that the variables are fairly good fit in explaining the variations in the dependent variable (GDI/GDP). On the statistical significance of the variables in the model, the result shows that individually all the variables except trade openness are statistically significant. This is confirmed by the high value of the F-statistic (7.62), which shows that collectively, the variables are statistically significant at 5 percent level of significance. By implication, variables in the

model are reliable for making economic policies as regards investment efficiency in Nigeria. The Durbin-Watson statistic of 2.1 falls in the acceptance region; this indicates the absence of serial autocorrelation in the model and that the model is stable and reliable for economic predictions. The error correction mechanism (ECM) is negative, fractional and statistically significant, which indicates the existence of long-run relationship between the dependent and the independent variables in the model. There is also a fast speed of adjustment of about 66 percent of short term error in the model being corrected in the long run at a given period.

The CUSUM and CUSUM square tests are used to test for the stability of the variables in the model. The result shows that within the period of the study, the variables in the model were stable as shown by the movement of the trend within the bounds at ± 5 percent levels of significance. The CUSUM in Fig. 2 and CUSUM of squares in Fig. 3 are used to test for the stability of the variables in the model. The result in Fig. 2 shows that within the period of the study, the parameters of the model are stable as shown by the movement of the trend within the bounds at ± 5 percent levels of significance.

However the CUSUM of squares indicated otherwise, as shown in Fig. 3. The residuals do not indicate evidence of stability since there are movements of the trend outside the bound of ± 5 percent levels of significance.

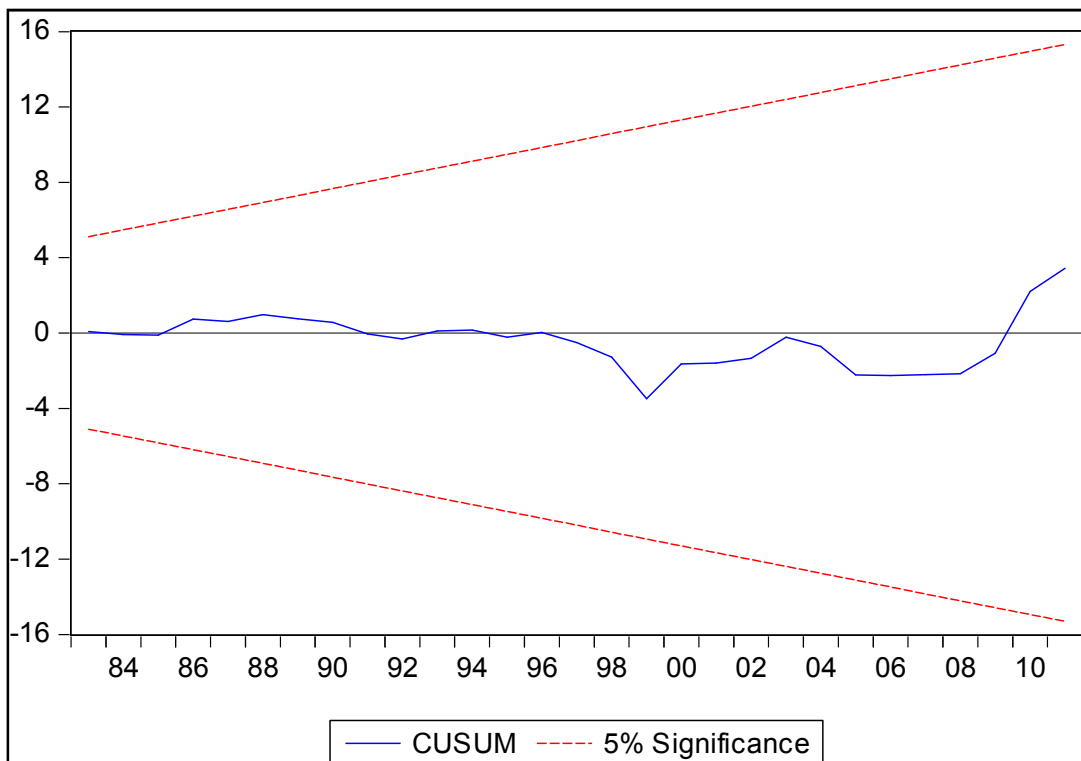


Fig. 2. Stability test for parameter

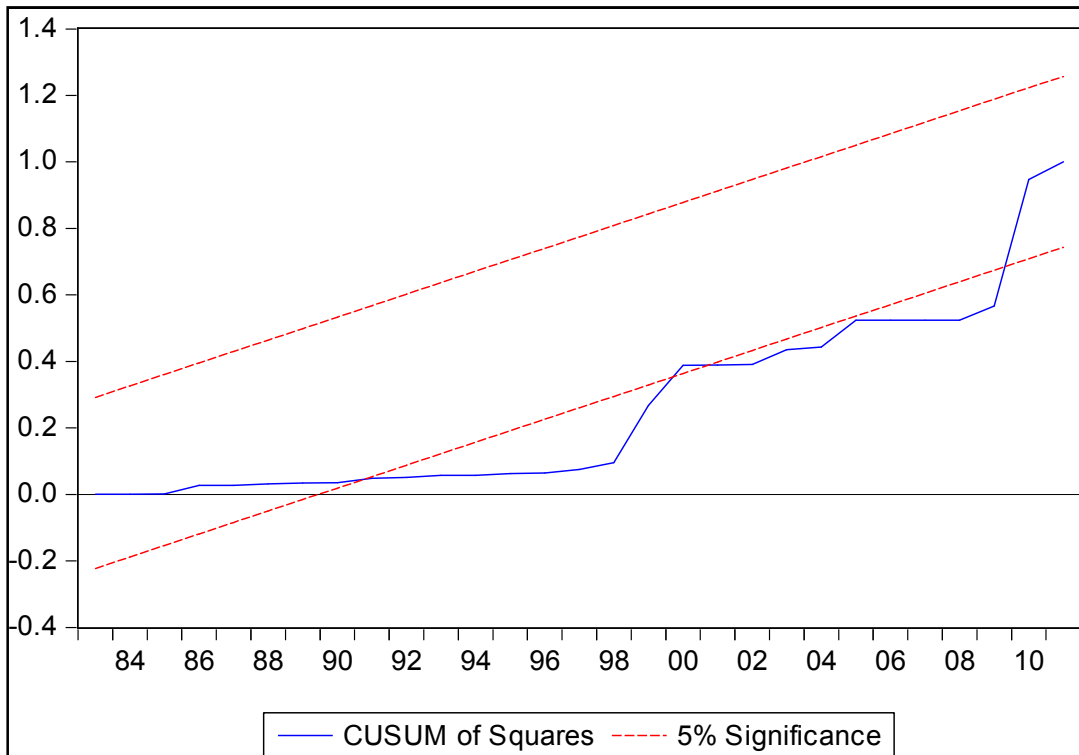


Fig. 3. Stability test for residuals

4. CONCLUSION AND POLICY IMPLICATIONS

This study examined the relationship between credit market development and investment efficiency in Nigeria from 1970-2011 using error correction mechanism. It is observed that credit market development contributes significantly to investment efficiency which is key to improving the level of economic development. Since interest rate provides the channel for credit market to encourage investment efficiency, it is therefore recommended that interest rate management be used to promote investment efficiency, motivate savings and provide credits for investors at a competitive price. Consequently a re-emphasis on use of cost and social benefit analyses for evaluation of investments will not be out of place in allocation of credit market funds to private and public sector investments respectively. This will ensure that they are channeled to efficient investments. Through this, development in the credit market can contribute significantly to economic development via investment efficiency in Nigeria. Furthermore, from the empirical findings in the credit market development model, increase in deposit rate does not motivate savers to save more; this may be attributed to low per capita GDP which determines the rate of savings. Therefore, per capita income should be increased so that people can save more thereby making adequate funds available in the credit market. This will in turn improve investment efficiency and economic development through the multiplier process. Lastly, the economy should be more export-driven to encourage a healthier atmosphere for improved balance of trade and control of imports especially of consumption goods. This may encourage trade openness and ensure that it contributes significantly to credit market development in Nigeria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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