Benefits of Domestic Bank Loans
to Private Companies in Ghana

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Abstract: The paper examines and provides empirical evidence for determining benefits of domestic bank loans to private companies in Ghana for the period between 1960 and 2018. What prompted this study is to ascertain the undulating trend tendencies of risks inherent in loan administration and estimating the extent of loan benefits persist to private firms using the Markov switch model. This paper uses the Markov switch model as estimator on the undulating trend propensities and persist benefits of loans to private firms in Ghana. The study obtained data by the World Development Indicators of World Bank data of 2018. The results reveal that loan benefits is much more persist in the regime 2, with positive significant at 1% level, achieving more high mean scores, better 50th and 75th percentiles and lower variance score comparatively. However, the regime 1 outcomes do not support persistent of loan benefits to the private firms. Better explanation model should identify other Africa countries to run the test for future research study. The study will be encouraged to expand the sample to cover more countries in the Sub Saharan Africa countries, by using the existing empirical archival data. Empirically, the paper test evidence of persistent loan benefits to the private firms in Ghana's context that can have resemblance lessons on other African countries using the Markov switch model.

Keywords: Loan benefits; private companies; Markov switch model; Ghana

JEL Classification: G21

1. Introduction

Depository financial institutions are seen to heighten growth in economy particularly through benefits from loans provision to private companies. Ho, Huang, Lin and Yen (2016) cited that safe and sound loan delivery to private companies induces expansion in economic activities, reasonable assurance of earnings, provision of jobs resulting to improve gross domestic product and risks minimisation.

It is asserted that attractiveness of loan delivery drives banks to engage in aggressive lending to private companies amidst the weak performance arising from different managerial impressions towards achieving more profits (Altunbas et al., 2010). Notwithstanding, loans benefits to private companies depict undulating trend tendencies of risks inherent in loan administration (Dang & Huynh, 2019), and

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raises concerns in estimating the extent of loan benefits to private firms using Markov regime switching model (Hamilton, 1989).

Studies have examined the extent to which loans abetted by local banks benefits private sector firms relative to their operational affairs, expansion and growth (Altman et al., 2004). Gilchrist and Zakrajsek, (2012; Hussain et al., 2006) demonstrated that short term source of external financing increases working capital requirements for corporate growth resulting in value creation and equity-holder wealth maximization. Nonetheless, studies have not attempted to investigate which regime periods are free from fluctuations or clearly defined for quality investment decision making for loan benefits. Hence, this paper contributes to quantitative accounting and finance research by investigating the application of the Markov switching model in the non-linear in nature (Hansen, 1992, 1996) of domestic credit/ loans in the private sector of Ghana companies. Secondly, the paper is carried out in the Ghanaian context, where the subject area under-researched, and unravels the importance of domestic credit benefit to private sector firms in Ghana.

Literature has shown that domestic loans provided by banks are associated with non-linearity of varying forms (Hansen, 1992, 1996) within the financial sector. For example, loan beneficiaries within the loan markets appear to exhibit severe recessions regarding 'good or bad' time for quality earnings or bad returns on the loan. Studies have emphasised the causes to a material change in government lending regimes arising from the political risks inherent in differences in government in power.

Ghana is noted for spiral inflationary wind-blow (Adom et al., 2015), that is unaccompanied by the increase in the volume of production. So, broad efforts by the firms to put judicious usage of the loans to improve earnings revealed an intermittent decline or slow increase in prices of goods and services. This pattern of behavior exhibits somewhat financial time series to move towards varying regimes due to changes in government political risks and financial show-down of panic conditions in Ghana. The recent melt-down of commercial banks and subsequent reconstruction of banks in Ghana has affected the loans market inherent benefits associated with operational dimensions of private companies.

The remaining part of this paper is structured as follows; sections 2 touches on the outlook of the credit/ loan market and melt-down resuscitation of Ghanaian banks, sections 3 addresses methodology employed in the paper, section 4 highlights empirical results including; normality tests of QQ plots, ACF and PACF plots, while section 5 focuses on discussion and concluding remarks.

2. Loans Outlook and Melt-Down Resuscitation in Ghana

Ghanaian firms rank within the emerging economies with intense dependence on domestic credit for the past years (Hamilton & Kim, 2002). This has resulted in dwindling earnings level partly due to small sized-firms. Moreso, the cost of borrowing is high (Hamilton & Kim, 2002), and despite the rising cost of capital in domestic loan disbursement, studies are silent on the volatile behavior of movements/ switches that occur in the loan reach-out periods. Besides, private sector firms in Ghana are noted for high participation in borrowing due to insufficient internal financing.

It is undoubtedly true that the domestic loan market still remains strong and wide in terms of financial crises (Hristov et al., 2012), and unpredictably reached-out. Profitability and earnings have witnessed tremendous improvement in good times, with private companies seeing some growth and improvement in short-term working capital at the loan market. These attractions serve as incentives for more loan investors to patronage the loan market. This is as a result of reasonable assurance of both

principal and interest repayments when fall due. This has been partly due to a low default rate. Notwithstanding, there are instances loans reached-out to private companies suffered poor steady repayment periods (Bertay, et al., 2013). Loan beneficiaries attributed this to the high cost of interest rate, poor timing period of recovery of the loan amount, and lack of flexible repayment procedures, especially within the turbulent economy.

The financial sector of Ghana remains attractive in view of sound profitability drive. Banks in the industry experienced an increase in loans reached-out, but witnessed an undulating trend of loan repayment in spite of strict loan stance. Sound and attractive profitability conditions serve to command other countries to expand their banking operations to Ghana, amidst the new minimum capital requirement of GHs400 million, causing a clean-up or decreased in number of banks. Loans reached-out by the banks experienced and recorded a steady growth and cutback from time to time marginally in Ghana loan market. A significant number of banks and other financial institutions have a strong passion for giving out loans to private companies, even though at a high cost, the industry still experiences a moderate default rate (BoG, 2009a).

It's on this premise that this paper attempts to assess 'perceived benefits' of domestic credit to private sector firms' during financial crisis and to determine optimal utilization of loan benefits by banks in applying the Markov regime switch model. This paper is placed on domestic credit delivery in Ghana's loan market as literature suggests that smothered filtered periods increase the predictive accuracy (Zhou et al., 2018) of the model in addition to giving reasonable assurance for attaining the validity of the estimated coefficients. On the contrary, literature suggest that banks in Ghana charge loan rates relatively higher and apply conditions that are unfavorable to exhibit unplanned behavior (Kwakye, 2020; Kwame & Ustarz, 2015).

3. Methodology

Given the unpredictable benefits of domestic credit abetted by local bank to private companies at different points in time, this paper employs Markov regime switch model estimation tool to help introduce time-variation in the parameters to help capture loans benefits at each regime to help appreciate benefits at each point in time. Undoubtedly, there remains a little attention in research about the subject matter in Ghana, compared to the successful application of linear time series techniques of autoregressive (AR) models, the moving average (MA), and the combined model of ARMA. The Markov regime switch model is robust to account for non-linearity asymmetric and volatility pattern due to inherent multiple equations at different regimes that switch between them. Data is obtained from the World Development Indicators (WDI) of the World Bank database for Ghana loan market, spanning from 1960 to 2018.

Measurement of variables

Domestic credit is used as dependent variable and measured as, lagged of gross domestic product, while the value of loans to the private sector is used as independent variable and measured as, lagged of gross domestic product.

Table 1. Operational Definitions and Data Source

Variable	Definition	Notation	Data source
Dep var Domestic credit/loan provided by financial sector	Domestic credit/loan lagged by the GDP	DOCRF	WDI 2018
Indep var Domestic credit to private sector by banks	Domestic credit/loan lagged by the GDP	DOCRP	WDI 2018

Model Specification

Within the Markov regime switch model, the observations are assumed to be drawn from a normal distribution whose parameters depend on the state variable (Hamilton, 1989). Under this model, different regime parameters would be remaining invariant at the defined periods (Hansen, 1992, 1989). On principle, the type of distributions have no restriction to describe x_t as normally distributed (McLachlan and Peel, 2000) with mean and variance given are as:

$$X_t = \mu_{st} + \sigma_{st}\, \varepsilon_{t-1}, \quad t=1, ….T, \tag{1}$$

Where $\varepsilon_t \div N(0,1)$ is a standard normal variables and conversions of normal distribution parameters as given;

$$Pi,j = Pr\ \{S_t = j l S_{t-1} = ¡\ \},\ ¡,j =1 …M \tag{2}$$

Where;

The term Pi,j are transition probabilities (Hansen, 1992; Hamilton, 1989; Malik and Thomas, 2012) from state 1 at time t-1 to state *j* at time t. In our estimation of modeling the data, the data is subjected to differencing to make it stationary as presumed of financial time series data.

For instance, internal factors of the firm are controlled by the association of a strong business cycle (Bruche and Gonzale-Aguado, 2010) intermittent behavior. Such unpredictable behavior has been exhibiting a generalized declined in liquidity of private firms. The decline in liquidity has led to an impressive rise of transaction costs that tends to limit the growth of loan market of Ghanaian banks', and may be also ascribed to other interconnected factors (Christiano and Rostagno, 2010).

Summary of descriptive statistics

This section presents basic descriptive statistics of the variables employed in the study in Table 2. The results reveal a maximum and minimum loan reached-out values of 14.1526 and -27.8970 respectively, indicating a large individual negative minimum number of value emerging to exhibit changing nature of the amount of loans, confirming the application of the Markov switch model. Both the first and second quartiles revealed negative values as compared to the positive values of 14.1526 in the 75th percentile.

Table 2. *Descriptive statistics*

Residuals	Values
Min	-27.8970
25th percentile	-2.5128
50th percentile	-0.5732
75th percentile	2.7323
Max	14.1526

The fit for the ordinary least squares results (see Table 3) explain the extent of a loan market is determined by what is giving to private firms correspondingly contribute to the loans from the financial sector. It statistically revealed a significant of 1% at the coefficient of 0.7398, with a T-value of 3.777. The result implies that a large reach-out of loans from the financial sector cause to increase in the volume of loans or credit to private firms. However, Figure 1 tends to stress the volatility of loans provided by the financial sector to private firms. The OLS model has an overall fit of P-value of 0.0003808, with an adjusted R-squared of 0.1862. Due to unplanned changes in the cyclical loan delivery data, underscored by time-variation and abruptly inability to meet the OLS assumptions, the paper applies the Markov chain model in modeling the varying states of loan beneficiaries.

Figure 1 shows the trend of time series for domestic credit or loans by the financial sector banks in Ghana. The amount of financial sector loans to private firms experienced a rising trend in the early years but sustained undulating dynamic changes overtime period at a slight dip in the middle of the year depicting a random walk to portray a weakened predictive power as external financing source. In addition, the loans by banks to the private companies in time series trend depicted a sharp slight rise but sustained a sharp downward constant trend to rise again at the tail end in a slow volatility picking up to provide better justification of application of the Markov switch model for this study (Bertay et al., 2013). Both situations revealed the recurring nature of time series with irregular time intervals of similar tendencies within the two-time series data.
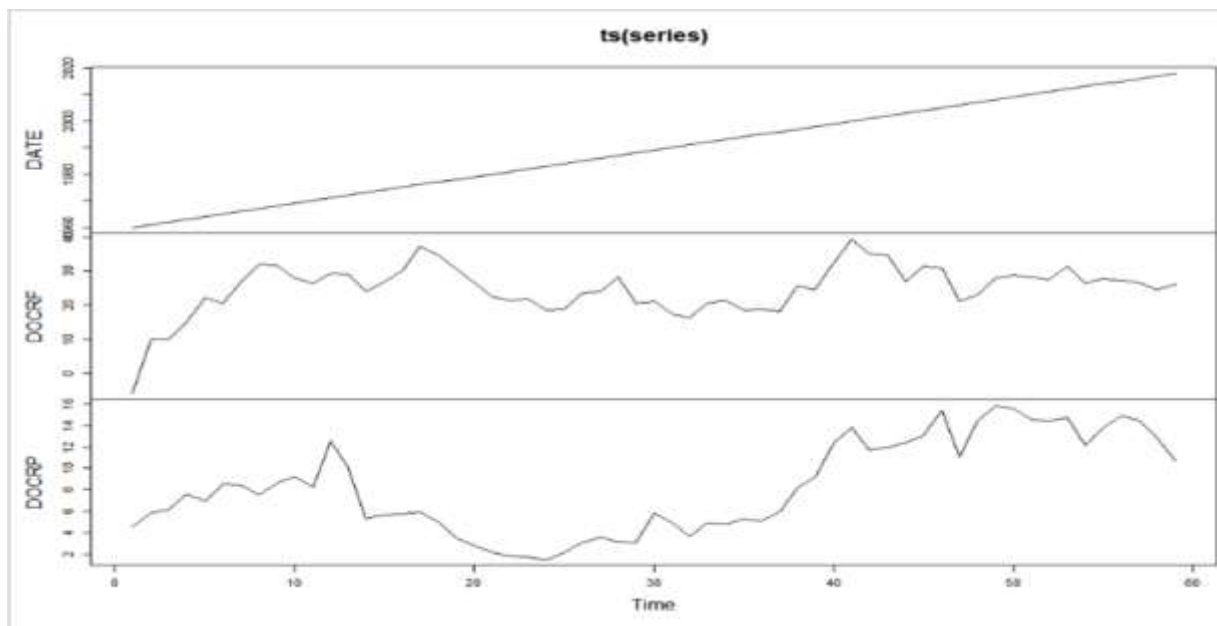

Figure 1. Trends of Patterns of DOCRF and DCCRP

The result indicates that regime 2 persist reasonable period of large reach-out of loans to private companies to maintain greater benefits, especially within the half years of the entire study period. This regime supports better information content like a large stream of cash flows, enjoyment of economic benefits such as tax relief and industrial emissions savings, confidence to loan investors in the assurance of interest income and principal steady payments, and low risk. Furthermore, the findings of the study pinpoint that regime 1 encourage high risk to loan investors due to strong unplanned changes, high lending rates, unstable streams of cash flows, leading to the disorder of loan trading activities.

Table 3. *OLS Fit Results*

Var	Est.	Std error	T-value	Pr(>|t|)
Cons	18.6947	1.8349	10.188	1.89e-14***
DOCRP	0.7398	0.1958	3.777	0.000381***
Adjusted R-squared:0.1862, F-statistic:14.27, P-value:0.0003808				

Significant codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Markov switch model results

The dynamic regression results are applied under the principles of the normal distribution that has both mean and variance identifying the state. This condition presumes the unobserved state variable (St), connecting to the Markov chain that depicts features of transition probabilities. This condition satisfies to estimate the fit model of Markov (Hamilton, 1989), indicating the regime of well-defined or unplanned pattern behavior becoming smothered for legitimate decision making about loans benefits to the private firms at relevant time periods.

Table 4. Markov Switch Results for Regime 1 and 2

Var	Regime 1		Regime 2	
	CONS(S)	*DOCRP(S)*	*CONS(S)*	*DOCRP(S)*
Est.	14.2879	1.4623	19.3164	0.6034
Std error	7.1596	0.8427	1.4149	0.1118
T-value	1.9956	1.7353	13.6521	5.4007
Pr(>|t|1)	0.04598*	0.08269*	<2.2e-16***	6.638e-08***
Multiple R-sq	0.1805	Var.:10.07	0.4765	Var.:3.02
Med. (50th)	-0.3286133		0.1216842	
Q3 (75th)	0.9299906		2.1228077	

Significant codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 4 shows the outcome of the Markov models for both regimes about the loans bank reached-out to private firms within the financial sector. Regime 2 reports a coefficient of (0.6034) at a statistically positive significant level at 1% than Regime 1 of the coefficient of 1.4623. Further, Regime 2 gives R-squared of 47.65% higher as compared with the Regime 1 of 18.05%. Regime 2 again reveals a high-rate of the mean score of 19.31%, compared with the Regime 1 moderate mean score of 14.29%. In addition, Regime 2 has a low variance of 3.02, as against Regime 1 variance of 10.07. Both median (50th) and 75th percentiles of Regime 2 display more favorable descriptive amounts comparatively, indicating that perhaps volatility of loans to private firms are persistent and may perceive by the loan beneficiaries as advantageous to their business operations especially in times of unfavorable stream of cash flows consistent with Varma and Cantor (2004). Regime 2 period exhibits strong loan reached-out to private companies, perhaps due to high volatility that persists the Markov chain in that period (Maciel et al., 2019). The results display greater mean and variance changes that are attributed to the dynamic pattern of the loans reached-out to private companies in Ghana.

Given the transitional probabilities as follows: p_{11}=0.8545, p_{12}=0.0933, p_{21} = 0.1455, and p_{22} = 0.9067 for determining transformation of unobserved variables (Malik and Thomas, 2012), low volatility of regime 1 cannot persist to transit to the regime 2 with high volatility power. The results explore the overall state variable possibilities that facilitate the transition matrix for the Markov model. The

probability to transit from Regime 2 to Regime 2 achieves a value of 0.9067, appearing closer to 1, indicating the existence of persistent time, devoid of any loan beneficial interruptions. The results depict incredibly sustained periods of interruptions for probabilities of 0.85 and 0.91 for 1->1 and 2->2 respectively.

The smothered probability graphs (see Figure 2) show the general outlook of both regimes 1 and 2 for the entire period of study. Regime 2 reveals smoothed persistent duration of almost half of the total study period with high volatility as conversely shown by Regime 1 with low volatility, suggesting that loan disbursement and beneficial are persisted in Regime 1. This can be inferred that loan beneficiaries tend to react to more earnings arising from judicious usage of the loan facility, especially at very little interruptions in their delivery of production activities in Regime 2. Again, late years of Regime 1 depicts high moderate volatility, suggesting fragile loan market conditions to exhibit a faster switch to Regime 2 at filtered well-defined probabilities. High volatility in Regime 2 may explain that judicious utilization of loan disbursement depicts a positive association on increase in loans reached-out by the financial sector in Ghana. It is undoubtedly true that loan disbursement market with high volatility will achieve a significant effect on production activities, which in turn enhancing improvement in earnings for achieving a competitive advantage in a fierce rivalry business environment. Regime 2 explains the model in much prevailing better conditions in an optimal benefit of the disbursement of loans, especially in improving cash flow transitory of private companies in Ghana.
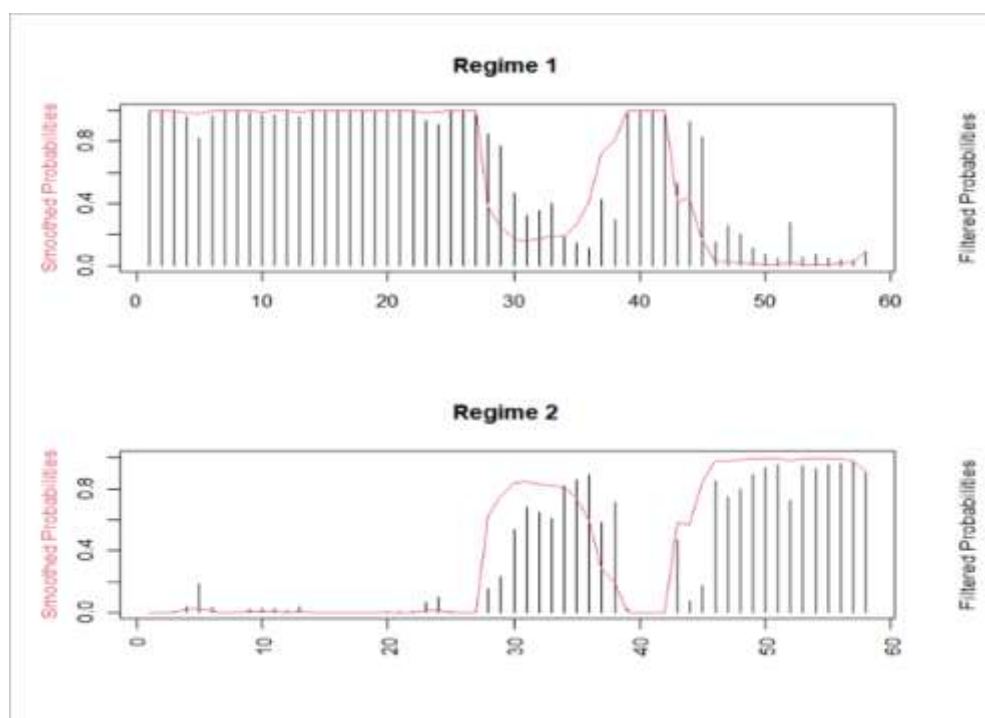

Figure 2. Smothered Probability Graph of Regime 1 and 2

Figure 3 shows the interactions of loans to private companies in smoothed probabilities for the period for the study. Figure 3 tells us the extent of information in either Regime 1 or 2 is well noticed and pronounced at the period the switch is marked and for how long the regime sustains. Regime 2 reveals consistent smoothed in the early years, but filtered probabilities in the late years of the span study period. Regime 2 marks high volatility at half of the entire study period, suggesting that loan disbursement has a significant benefit to the private companies. This finding ignores other external factors that are necessary ought to be considered. Therefore, there is a high tendency that regime 1

may easily switch to regime 2, so that loan disbursement to private companies would be enhanced for perfect detection.
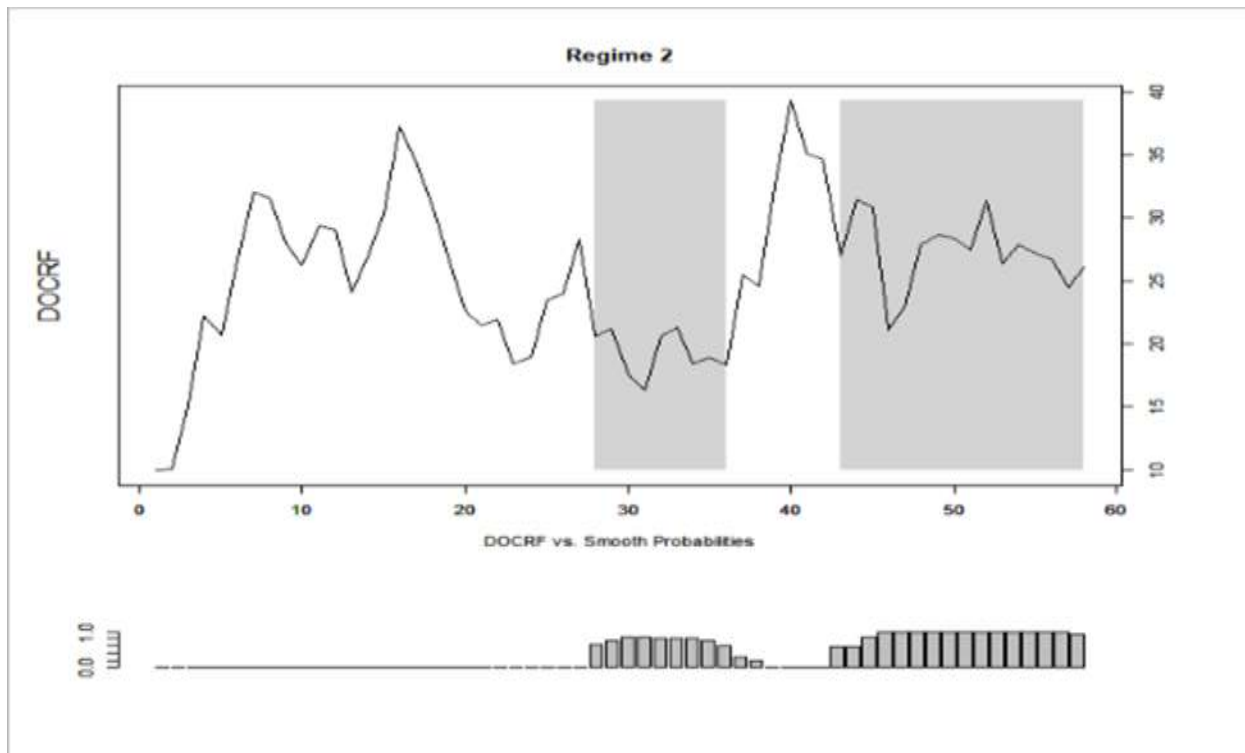

Figure 3. Loan to Private Companies in Smoothed Probabilities

Diagnostic for Normality

Figures 4 present the assumption that explains normality and stationarity of study observations of both regimes. Both pooled residuals and normal quantile-quantile (QQ) plots show distinctive normality observations. They revealed the regimes of the clear normal distribution, with apparent outliers at both tails. The implication of normal distribution gives reasonable assurance that the Markov model results will achieve a meaningful explanations and all surprises may be minimized.
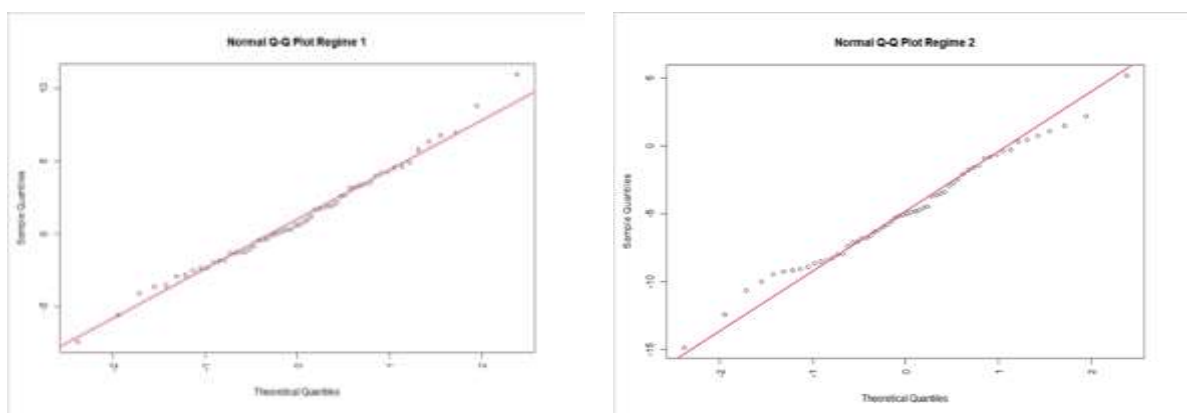

Figure 4. Normal QQ plots of regime 1 and 2

Figures 5 displays the stationarity observations under both autocorrelation function (ACF) and the partial autocorrelation function (PACF) of the residuals. It can be revealed that, ACF and PACF plots

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denote movement to 0, when lag increases, representing that the residuals attain stationarity. All these goodness of fit results ensure the relevance of selected explanatory variables in the model
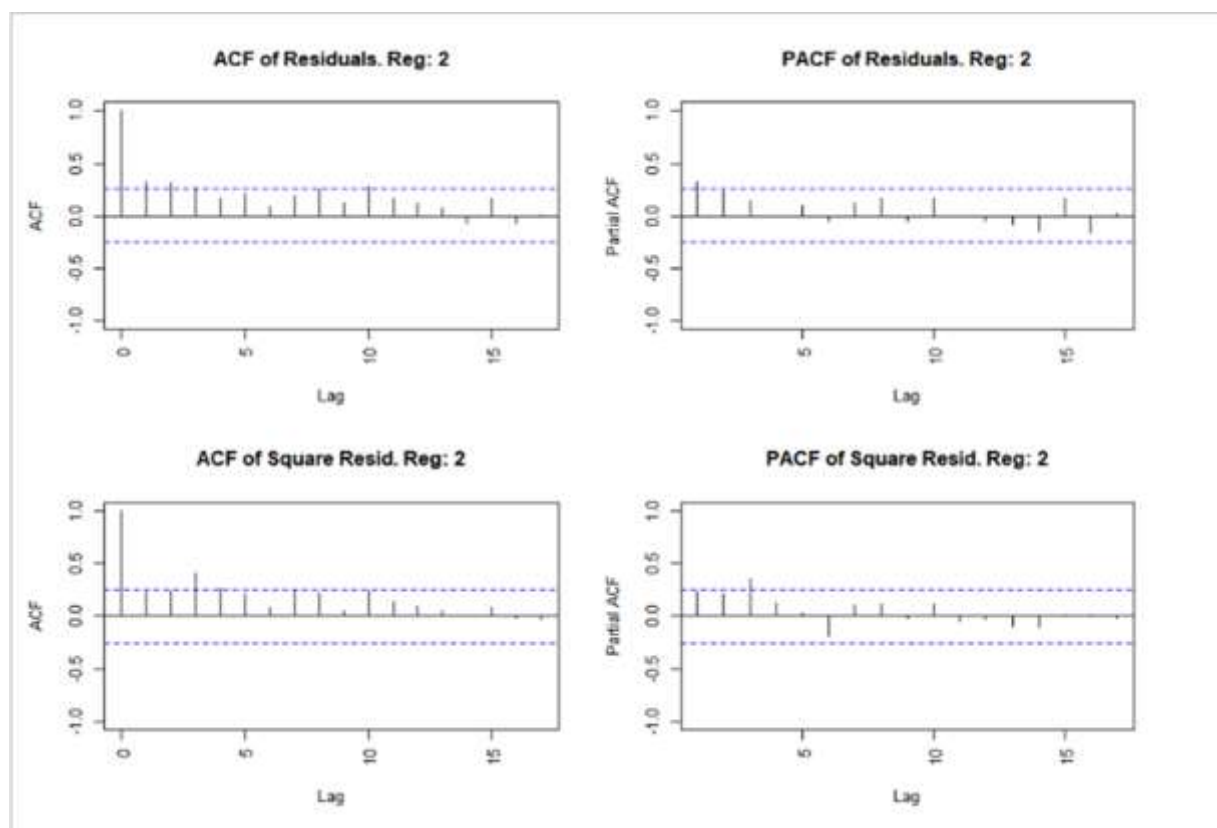

Figure 5. Residuals of ACF and PACF plots of Normality with Regime 2

5. Discussion

The paper investigated the planned changes of volatility regimes in the credit disbursement and benefits in Ghana's loan market participations. Using the Markov dynamic regressions the study affirmed that regimes exist in the loan reach-out across time. The outcome of the regression revealed that regimes are associated with the degree of volatilities exhibited by the financial time series of loan disbursement and benefit data. The analysis revealed two regimes of which mean and standards deviation parameters fit better under Regime 2 model selection. A key finding of this study is dominated by the degree of volatility associated with each regime identified.

The results of regime 2 revealed better information content in all manners of outcomes and therefore could compel regime 1 to transit to regime 2. Regime 2 sustained a high volatile loan market to persist for a reasonable period, suggesting a greater volume of loans reached-out to private companies in Ghana. This period affords loan customers enormous benefits as compared to regime 1, with low volatility reactions. It is undoubtedly true that loan investors may perceive an arbitrarily low risk to lend out, as the beneficiaries realized full judicious application of the loans to obtain sufficient cash flows for expanding the business operations for more earnings in order to obtain competitive advantage within the fierce business environment. In another strand, Regime 1 gives caution to loan investor firms within the financial sector to reframe from giving out loans due to risk crises exhibited

at the regime of the trading environment. Loan beneficiaries are espoused to the varying dynamics of heightened risk experiences that are perceived as disorder in trading activities (Nazemi et al., 2017).

6. Conclusion

We examined plan change benefits of loans reach out in a defined period of time, and effect of persistent loan disbursement regimes and associated volatilities to private companies in Ghana utilizing Markov switching model, an approach scarcely employed in studies' of this nature as witnessed in prior literature. The results from Regime 2 revealed a significantly positive larger means and standard deviation of high volatility as compared to lower amounts of regime 1 in the same variables. The descriptive statistics showed better positive higher amounts in favor of Regime 2, which suggests that risk to loan investors are persistently devoid of losing the loan and interest charged on the credit. Again, the results demonstrate that loan beneficiaries have a strong aversion to benefit more for the optimal usage of the loans, thereby achieving a strong predictive power to obtain a competitive advantage in the turbulent business environment. Our findings are consistent with the lending credibility theory which posits that quality lending and loan management improve reasonable assurance of loan records and enhances quality repayment as a result of lower cost of capital (Nazemi et al., 2017).

This study has provided insights into how loan disbursement and persistent degree of benefits to private companies can be investigated using the Markov switching model from accounting perspectives. This study seeks to enhance relevant information about loans reached-out to beneficiaries at defined periods for optimal usage to grow the private companies. Secondly, regulators and potential loan investors may employ this improved information quality for regulatory and investment decisions which could help grow the industry for larger loan reached-out.

Although loan disbursement and cash flows benefits are influenced by lending rates, our study could not factor in retrograding rates that normally impact cash flows on loans. This is because the study had the difficult in developing parameters to track potential structural changes. We believe, structural changes have the tendency to compromise efficient estimations. The paper recommends further research to incorporate lending rates on loan disbursement such that streams of cash flows could be rightfully assessed within the regime periods for policy recommendations in African countries.

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