Mitigation Technique and Microfinance Risk Exposure: The Role of Optimum Loan Amount in Plateau State – Nigeria

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Abstract— Microfinance banks (MFBs) were created to provide credits to low-income workers, the poor, small businesses and household traders. This role has brought about credit risk exposure upon the MFBs which has led to financial distress and bankruptcy in most cases. As such, this study sought to contribute in addressing this issue by assessing the interaction of mitigation techniques of MFBs with optimum loan amount. Both primary (169 sampled staff) and secondary (credit default rates ranging 1-10 years) data were collected from MFBs in Plateau state to test three research hypotheses. These data were analyzed using multiple regression models and simple percentages on SPSS (Statistical Package for Social Science). The results revealed that mitigation technique is positively and significantly related with microfinance risk exposure, and that optimum loan amount did not moderate mitigation technique and microfinance risk exposure relationship. It equally resolved that the credit risk of the few microfinance banks in Plateau state resulting in 16.17% is not better than the 6.02% earlier established for Nigeria by the World Bank in 2020. The study was found to strengthen the assumptions of asymmetric information theories, but did not align with the theory of optimum financial structure as optimum loan amount could not moderate the existing relationship. Nevertheless, practitioners were advised to take the issue of optimum loan amount serious and also use it as a mediator, since it shows the potential of reducing credit risk exposure in the model.

Keywords—Mitigation Technique, Optimum Loan Amount, Microfinance Risk Exposure, Credit Default

I. INTRODUCTION

Globally, sound and functional banking sector are considered to play an important role of providing specialized financial services to individuals and investors and thereby contribute to the overall efficiency of the economy. Among the specialized services is lending (loans and advances) which is central to banking industry services and income generation. In playing this role, lending institutions are exposed to credit risk which is dangerous to their survival. Though, there are many banking risks even as risk is inherently inevitable in every business, credit risk is most fundamentally faced by banks [1],[2]. Credit risk refers to default on the part of the borrower or debtor who failed to fulfil stipulated terms of a loan contract with a lending institution [3]. This has become a common syndrome worldwide, but higher in most developing countries. In line with this, the World Bank latest ranking of countries' credit risk of non-performing loans in 2020, placed Nigeria on 31st position high with 6.02% out of 102 countries. Macao and Estonia have the least non-performing loan rating of 0.35% each. This calls for the attention of scholars and industry players to provide strategies and interventions that would further reduce the rate of credit risk, especially for microfinance banks.

Microfinance banks (MFBs) are structured to deliver financial needs of the poor, low-income workers, small businesses and household trading expenses. Microfinance banks have developed unique approach of generating savings from borrowers apart from the conventional deposits paid by customers. For example, they collect counterpart funding before giving out loans to customers and also include a portion of savings for borrowers in their repayment schedule. Consequently, and in recognition of the vital contributions of these banks to financial inclusion, economic development and growth; the Nigeria's government through its Central Bank (CBN) setup regulatory authorities to enhance better economic contributions [4]. This on one hand, was mainly to make the banks more reliable in safe-keeping customers' deposits and valuables, and on the other hand to protect banks from default loans.

The rising rate of default loans in banks has been responsible for banking sector distress at all times. Responsible for sectorial non-performing loans are the attitudes of borrowers who abandon their loans responsibilities in some banks and take up new loans in other banks, or having large numbers of credit defaulter. In Nigeria, this situation may have been possible because banks failed to strengthen the utilization of bilateral status

enquiries to checkmate such moral hazard circumstances. As banks continuously neglected such collaborations in lending activities, the CBN equally did not have credit information platform to monitor these activities. This led to the need for a consolidated credit risk database. Hence, Credit Bureau or Credit Risk Management System (CRMS) was established in 1991, all to enhance a sound banking system.

The measures of credit risk in banks' loan portfolio can be evaluated through various ratios, such as portfolio at risk (PAR) and loan loss provision coverage ratio (LLPCR) [5]. These ratios have helped in ensuring improved credit risk monitoring and risk sharing when combined with information technology and financial innovation [6]. In line with this, the CBN provided that to improve credit repayment culture, reduce incidences of non-performing loans and enhance credit risk management, Bankers Committee had to adopt the Global Standing Instruction (GSI) to enable the recovery of loans when there is customer default. The GSI leverages Bank Verification Number (BVN) database as banks collaborate using the Nigeria Inter-bank Settlement System (NIBSS), which authorizes banks to retrieve money from any account of a defaulted borrower. Though, these efforts have significantly improved banking situation in the country, there are still a few issues of banks' bad debts, collapses, bankruptcies and distressed situation. Reference [4] have attributed this problem to poor credit management or mitigation techniques of most banks, while issues surrounding optimum loan amount is currently considered.

Mitigation techniques refer to standard credit management measures and collateral agreement policies lending institutions utilize to reduce or prevent borrowers from defaulting in their obligations. It indicates the ability to shrewdly control customer credit lines efficiently [7]. As a result, credit administrators have developed pre-post mitigation management processes along with macroprudential approaches to ensure effectiveness and efficiency of loan repayment. Scholars on the other hand noted that sound mitigation techniques usage is necessary for financial institutions to perform well, whereas deteriorating credit quality leads to poor financial performance [8]. On the other hand, optimum loan amount is regarded as the quality and quantity of credit in the most favorable condition. Similar to the view of reference [9] on optimum stratification, lenders and borrowers may determine the standard of loans that can realistically be paid back on time. This is due to insinuations that credit which cannot guarantee adequate investment and returns means the financial resources are not optimally allocated to improve the overall business performance of the borrowers [10].

Based on the foregoing, there is the problem of loan default amongst microfinance borrowers which this current study seeks to address. This is based on the motivation that previous studies majorly investigated the relationship between mitigation techniques and performance of financial institutions, with very few researches on the

relationship between mitigation techniques and credit risk exposure of lending institutions [11],[12]. Nevertheless, none of these studies considered the logical effect of creating an intervention with optimum loan amount within the existing relationship. Thus, it is necessary to examine the moderating role of optimum loan amount on mitigation techniques and microfinance risk exposure. This relationship is important in ascertaining how providing optimum credit to borrowers may interact with mitigation techniques to enhance loan performance, which can also improve Nigeria's ranking of non-performing loans. In addition, the information asymmetry and optimum financial structure theories are used to provide comprehensive framework to support this study.

Therefore, this study follows the structure of introduction in section I; related literature review and hypotheses formulation in section II; methodology of design, population, sampling and instruments in section III; while sections IV and V present results and discussion, and conclusion/future scope respectively.

II. RELATED WORK

Every research relationship or problem has some assumptions behind it, and these assumptions are embedded in theories. The theories of information asymmetry and optimum financial structure are believed to logically possess useful propositions in explaining the relationships of this study. The theory of asymmetric information assumes that disparity in knowledge between the lenders and borrowers usually results to inefficient outcome of credit risk exposure. Imbalance knowledge will make it difficult to identify good or bad credit seekers, and this can lead to adverse selection/moral hazard situations [13]. Based on the theory, it is necessary for the lenders to have updated understanding of the borrowers' debt profile, while the borrowers in turn should acquire adequate understanding on the conditions of the loan. Also, imbalance knowledge may permit the accumulation of non-performing loans to thrive as a result of lack of a credit information sharing mechanism by banks [5]. Nevertheless, the information asymmetry theory cannot explain the role of optimum loan amount, thus, there is need to integrate another theory in this work.

Lin and Sun in 2008 tested the theory of financial structure on panel banking data structure in China. The results showed that economy grows faster when small banks play the active role of providing optimal financial structure in the banking sector [14]. This theory emanated from the Modigliani-Miller (M&M) proposition of capital structure approach in 1958, which assumes that microfinance banks are mandated to mobilize and allocate financial resources efficiently in order to minimize systemic risks [14]. In other words, if microfinance banks can allocate available credit optimally to needed firms in the economy, it will propel firms or businesses to generate largest possible return on investment, which may in turn guarantee efficient loan repayment by borrowers. Therefore, if efficient financial resources are provided to microfinance borrowers

(instead of establishing minimum and maximum credit standards), it can bring about best investment returns which may further lead to efficient loan repayment (see figure 1).
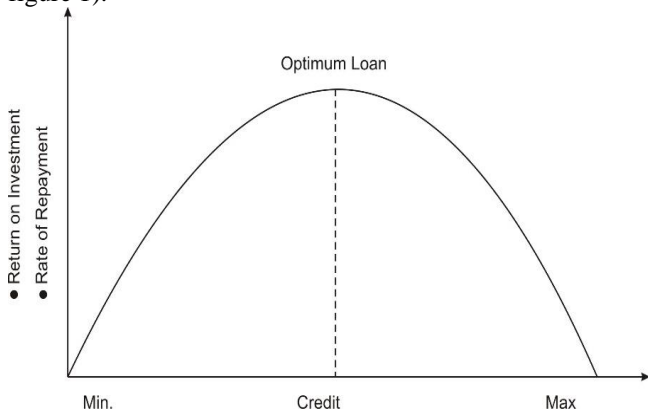

Figure 1: Optimum Loan Graph

Figure 1 hereby suggests that if minimum or maximum credit (other than optimum credit) is provided to borrowers, it may result in low investment return and subsequently low repayment rate. Thus, MFB lenders and researchers are called to consider the effects of optimum amount of credit to borrowers, and easy accessibility of loans for better inflows of investments [15]. Correspondingly, some studies have found statistically significant effect between credit management policy and bank financial performance [7],[16],[17],[18],[19],[20]. On the other hand, the study by reference [12] have found that SMEs' risk exposures are substantially affected by operators' business understanding which otherwise influences record backup system and loan collection strategies.

Though, there is consistency in findings among the researches that investigated the linkage between credit risk management and financial performance of organizations, there is also the need to introduce a moderator instead of a mediator in the relationship of this study. Reason being that mitigation technique and credit risk exposure have not been adequately measured, thus creating more research need. Furthermore, the independent variable (mitigation techniques) has a positive inclination, while the dependent variable (credit risk exposure) has a negative disposition which is almost opposite to bank performance. In this case, it is logical to introduce a moderator to help improve mitigation technique and loan risk exposure relationship based on the opinion of reference [21].

The use of optimum loan amount to moderate the relationship between mitigation technique and credit risk exposure constitutes a novel knowledge gap. Lenders have hardly considered what amount of credit can bring efficient returns for borrowers' investment, instead they have continuously set both minimum and maximum credit standards without considering the implications on borrowers' investment need. Again, the research on mitigation techniques, optimum loan and credit risk exposure has not gotten scholarly attention in recent time, and most importantly, on MFBs operating in Plateau State.

Hence, this research purpose will be achieved by testing the following hypotheses.

Hypothesis one: mitigation technique does not significantly affect microfinance credit exposure in Plateau state.

Hypothesis two: optimum loan amount does not moderate mitigation technique and microfinance credit exposure relationship in Plateau state.

Hypothesis three: credit default rate of microfinance bank borrowers in Plateau state is not better than 6.02% rating.

III. METHODOLOGY

Research Design
Research design describes the blueprint for investigating a problem to a conclusive end. The main approaches involved in designing a research structure are quantitative, qualitative and mixed methods [22]. Based on the type of research, the quantitative approach is adopted in this study to be able to generate credible data on the current circumstances. To achieve this, the time horizon plans of both longitudinal and cross-sectional survey designs were employed so that MFB entities' data can be assessed at multiple time intervals, and individual participants are also surveyed at a specific point in time.

Research Population and Sampling
In a scientific inquiry, the characteristics of the population are paramount to successful surveys. Being the total number of elements to be surveyed, the population for this study is divided into two categories: 6 MFBs (who accepted to provide their data) out of 14 of them operating in Plateau State and 294 MFBs staff. From the 6 MFBs, 1 to 10 years panel data each (2012 to 2021) were collected, while from the 294 staff of MFBs, quantitative data were collected. Consequently, the first sample size for this study consisted of 40 dataset of credit default rate or loan performance rate which were derived from the records of the six MFBs. The second sample size consisted of 169 key staff of MFBs on which questionnaires were administered. The 169 staff were determined from Yamane's formula $[294/(1+294\times0.05^2]$ for estimating a representative sample size to avoid tendencies of systematic and sampling bias in the data [23],[24]. The determination of sample size from the population became necessary since not all staff of MFBs are knowledgeable about risk mitigation and credit risk exposure, whereas the purposive sampling technique was used to carry out the survey.

Instruments and Data Analysis Method
The importance of data collection instrument is to capture reliable evidence that would help address certain research problems. These instruments are usually chosen based on the purposes such data can serve and the sources (primary or secondary) where the needed data can be found. In this study, since data from both the primary and secondary

sources are suitable to meet the research purposes, the unpublished document diaries (which keep records of yearly credit performance of MFBs and their default rates in percentages) and questionnaire instruments were utilized for data collection.

In measuring the variables on the questionnaire instrument, risk mitigation scale was adapted from reference [25]; optimum loan amount scale was compiled from references [16],[26],[27]; while credit risk exposure scale was adapted from [28]. These scales were carefully adapted considering the necessary conditions for validity and reliability.

Furthermore, this study employed SPSS to perform both descriptive and inferential data analyses. The main tool of analysis utilized the multiple regression models to analyze the questionnaire instrument in order to establish the effect of mitigation technique, optimum loan amount and microfinance risk exposure, while the simple percentage was used to establish credit default rates.

IV. RESULTS AND DISCUSSION

Results
Out of the 169 (100%) questionnaires administered to respondents, 165 (98%) were properly filled and returned while 4 (2%) were not returned. More so, there was no missing value found in the dataset as missing value pattern analysis was conducted. Box-plot chart of outlier analysis revealed the presence of outliers for some of the global variables, and these were treated. The histogram suggested that normality of data was met since it was neither skewed to the right nor to the left. Again, the P-P (probability-probability) plot for the model further supported the histogram result that the assumption of normality of the residual have been met. There was absence of multi-collinearity problem since Tolerance and Variance Inflation Factor values fell between >0.10 and <4 suggested benchmark respectively [29].

Furthermore, respondents' profile demonstrated gender sensitive as 93 (56%) of respondents were males while 72 (44%) were females. Age range of respondents showed 21 (13%) for 18-25 years, 72 (44%) for 26-35 years, 50 (30%) for 36-45 years, while 22 (13%) for 46 years and above. It could therefore be inferred that those of 26-35 years participated the most in the survey. Their level of education also indicated that 25 (15%) of the respondents have National Diploma/National Certificate of Education (ND/NCE), 43 (26%) have Higher National Diploma (HND), 57 (35%) have Bachelor Degree, while 40 (24%) have Master's Degree. This means that majority of the respondents possess Bachelor Degree. Consequently, the characteristics of the respondents are fair in anticipation of producing credible data.

Table 1: Summary of the Model

Model	R	R Square	Adjusted R Square	Std. Error	F	Sig.
1	0.263a	0.069	0.057	1.96277	5.999	0.003
2	0.263b	0.069	0.052	1.96886	3.975	0.009

Table 2: Regression Results

Model & Variables	B	Std. Error	Beta	t	Sig.
1. (constant)	9.479	1.372		6.908	0.000
MT	0.069	0.030	0.175	2.314	0.022
OLA	-0.194	0.075	-0.196	-2.588	0.011
2. (Constant)	9.494	1.956		4.854	0.000
MT	0.068	0.066	0.174	1.029	0.305
OLA	-0.195	0.119	-0.197	-1.647	0.101
MT*OLA	0.000	0.004	0.002	0.011	0.991

　　a.　Dependent variable: MRE (Microfinance Risk Exposure)
　　b.　MT (Mitigation Techniques); OLA (Optimum Loan Amount); MT*OLA (Interaction of MT and OLA)

Table 3: Portfolio at Risk (PAR) of Selected MFBs

Year/MFB	1	2	3	4	5	6
2021	19.39%	26.1%	60%	0.579%	18.81%	18.56%
2020	45.95%	34%	50%	0.23%	15.53%	26.28%
2019	28.85%	1%	30%	0.46%	13.87%	9.15%
2018	22.38%	0%	36%	0.93%	12.56%	6.9%
2017	17.39%	------	12%	0.19%	9.83%	9.04%
2016	13.57%	------	------	0.037%	5.27%	9.48%
2015	12.78%	------	------	0.035%	3.22%	2.74%
2014	------	------	------	------	2.72%	------
2013	------	------	------	------	4.2%	------
2012	------	------	------	------	5.34%	------
Average % 16.17%	22.90%	15.28%	37.6%	0.35%	9.135%	11.74%

In table 1, it can be seen that model 2 (with the interaction term) did not account for increase variance (2, 0.069) over model 1, without the interaction term (1, 0.069) but the model 2 was significant as 0.009 probability value is less than 0.05 error level. Though, the first and second models are significant (0.003, 0.009 < 0.05), but there is no improvement in the regression and residual values of 0.263.

Furthermore, table 2 clearly shows that mitigation technique and optimum loan amount were significant (0.022, 0.011 < 0.05) in the model 1 (without the interaction term), but at the introduction of interaction term (MT*OLA), they became all insignificant (0.305, 0.101, 0.991 > 0.05). This provides adequate reason of the absence of potentially moderation effect between mitigation technique and optimum loan amount on microfinance risk exposure. Therefore, this outcome does not require further analysis of moderation effect and moderated plot using the "PROCESS Macron" to further assess their probability values, data for visualizing conditional effects (to plot moderation graph) and probably the bootstrapping limits of confidence intervals [30]. Notwithstanding, the negative outcomes of optimum loan amount (-0.196 or -0.197) seems to be an effective means of reducing microfinance risk exposure better.

Table 3 presents the descriptive analysis of credit default rates or PAR of six MFBs in Plateau state. Their data availability ranged unevenly from 1 to 10 years because some of them started business less than ten years ago. It has been observed that MFB number 3 has the highest PAR of 37.6% followed by 1 (22.90%), 2 (15.28%), 6 (11.74%), 5 (9.135%) and 4 (0.35%) as the least. This is corroborated by the 16.17% grand PAR average of the six MFBs. Higher PAR of banks means that large proportions of credit were not returned or otherwise. With these results,

it can be deduced that: hypothesis one is not supported because mitigation technique has positive and significant effect on microfinance risk exposure (Beta, 0.175; t, 2.314; sig., 0.022<0.05); hypothesis two is supported because optimum loan amount does not moderate the relationship between mitigation technique and microfinance risk exposure (Beta, 0.002; t, 0.011; sig., 0.991>0.05); and hypothesis three is upheld because microfinance credit risk in Plateau state (16.17%) is not better than 6.02% for Nigeria in 2020.

Discussion

The hypothesis one of this study found significantly positive linkage between mitigation technique and microfinance risk exposure. This means the credit worthiness analysis of identifying loan seekers' character, capacity, collateral and conditions before granting credit has not recorded serious improvement on microfinance risk exposure over the years. A negative relationship would have meant better between mitigation technique and risk exposure, such that the higher the techniques the lesser the microfinance risk. This also entails that the credit management system and the use of qualified guarantors are yet to bring credit risk under successful control. The responses of participants and the panel data percentages attest to the fact that microfinance risk exposure is actually increasing. On the other hand, the mitigation technique of business verification is consistent with the finding of reference [12] that business risk exposure is significant with operators' understanding of businesses. This has helped to ensure that borrowers do not abscond after collecting the credit.

The result of hypothesis two established that optimum loan amount did not moderate the relationship between mitigation technique and microfinance risk exposure. The reason for this outcome could be as a result of overwhelmed practices of pegging minimum and maximum credit amount by MFBs before granting of loans. Such practices are antithetical to the optimum capital structure model which may inhibit efficient allocation of credit to borrowers. This therefore may cause optimum loan amount not to be suitable for moderation as it ought to be low, moderate or high, rather than only optimum. Consequently, the performance of optimum loan amount in the model seems to be a good mediator in addressing the microfinance risk exposure. This will require microfinance banks to mobilize and allocate financial resources in an optimum and efficient manner.

Hypothesis three has also established that default rate of microfinance bank borrowers in Plateau state is not better than 6.02%. Though this may be due to a limited scope of the data, it is discovered from the panel data percentages that the individual MFB PAR average was doubled or went very high from the year 2019 and 2020. This implies that the economic atmosphere may not have been very favorable for small business borrowers, especially since the Covid-19 break-out and this may have contributed to the increase in credit risk of MFBs. In realizing these portfolios at risk, MFBs have employed different mitigation techniques which include guarantors' undated cheques, stock hypothecation, collaterals, group formations and methodologies, business verification or know your customer, and aligning repayment with client cash flow. Others include remittal debit, standing order, borrowers' post-dated cheques, follow-up before and after loan disbursement, and proper loan analysis. In line with this, scholars have earlier suggested that too much strict credit risk mitigation may limit the business turnover of most organizations [31]. Thus, credit risk mitigation requires a lot of flexibility and persistency in implementation especially for the situation of MFB 3 to reduce its excessive risk exposure of 2021.

V. CONCLUSION AND FUTURE SCOPE

This study concluded a positive and significant relationship between mitigation technique and microfinance risk exposure, and that optimum loan amount did not moderate the relationship between mitigation technique and microfinance risk exposure. It equally resolved that the credit risk of the few microfinance banks in Plateau state resulting in 16.17% is not better than the 6.02% earlier established by the World Bank in 2020. It can be resolved that the data of this study provided mixed support to the stated hypotheses. Hence, putting these findings together suggests that risk mitigation management and loanable amount are not sufficient enough to drive efficient loan performance for MFBs. As such, and based on theoretical implication, this study strengthens the assumptions of asymmetric information theories, but did not align with the theory of optimum financial structure as optimum loan amount could not moderate the existing relationship. Nevertheless, lenders need to take the issue of optimum loan amount serious as it shows great potential of reducing credit risk exposure in this study model.

On the other hand, a major limitation of this study lies in the little panel data collected from the six microfinance banks out of the fourteen of them operating in Plateau state and more in Nigeria as a whole. Nevertheless, this may not interfere with the reliability of results because primary data were also collected from relevant staff of the MFBs. To improve these concerns, similar studies could be extended to include a larger sample from other branches of MFBs in Nigeria. Further research should also be conducted to probe borrowers' perspective on the causes of loan defaulting as regarding economic viability of the country. Lastly, as part of contribution to knowledge, further researches should use optimum loan amount as independent and/or mediating instead of moderating variable as a means of reducing credit risk exposure to the barest minimum.

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