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Financial management and credit risk: a simple linear regression model for CMAC microfinance institutions listed on the BVL

Ericka Nelly Espinoza-Gamboa, Master's Degree in Management and [1] , Hugo Eladio Chumpitaz-Caycho, Doctor in Education[2], Manuel Alberto Espinoza-Cruz, Doctor and Master in Administration[3], Ruben Dario Mendoza-Arenas, Doctor in Education [4], Marisol Paola Delgado Baltazar, Master in Didactics in the teaching of Physics and Mathematics [5],

[1,] *Faculty of Financial and Accounting Sciences, Universidad Nacional Federico Villarreal, Lima, Perú, email: eespinozag@unfv.edu.pe*

[2] *Faculty of Engineering, Universidad Privada del Norte, Lima, Perú, email: Hugo.chumpitaz@upn.pe*

[3] *Faculty of Business and Administration Universidad Tecnológica del Perú, email: espinozauniversidad@gmail.com*

[4] *Faculty of Industrial and Systems Engineering, Universidad Nacional del Callao, Lima, Peru*, *email: rdmendozaa@unac.edu.pe*

[5] *Faculty of Natural Sciences and Mathematics, Universidad Nacional del Callao, Lima, Peru, email: mpdelgadob@unac.edu.pe*

Abstract: The objective of this research was to conduct an analysis to determine whether financial management influences the credit risk of microfinance companies CMAC listed on the Lima Stock Exchange between 2016 and 2020, applying a simple linear regression model. To this end, a methodology was used that was guided by the following criteria: it was applied, non-experimental, with a quantitative approach of non-experimental design at the causal and longitudinal correlational level. The set of financial statements was evaluated to find a predictive model. The population and sample of the study included all municipal banks in the microfinance sector listed on the Lima Stock Exchange. The result shows an acceptable goodness of fit. The standard error of the estimate is low, indicating an optimal fit. The model is viable, as there is a significant relationship between the variables. The regression model obtained is: credit risk = 80.49 - 0.11 financial management. Based on the results, it can be concluded that the variables analyzed show that the regression model works because there is a causal relationship between the variables. Therefore, the greater the growth in financial management, the greater the effectiveness in credit risk management.

Keywords – Financial management, finance, credit, delinquency and credit risk.

I. INTRODUCTION

The problem originated describing the volatile and changing behavior of the variables financial management and credit risk in the Municipal Savings and Credit Banks registered in the Lima Stock Exchange in the pre-pandemic years that embraced from 2016 to the period in which the Covid2019 occurred, in 2020, based on the problems of evaluation, portfolio structure, quality of recovery of payments of loans placed according to microfinance environment, In view of this, the work will be of great help, due to its practical application, with the use of publicly available financial indicators from the BVL and SBS portal with real data, with which investors can bet on the purchase of stock packages with favorable indexes, in addition to entrepreneurs who inject new capital into the activities of the financial and economic sector, managing to provide varied, clear and concrete options for future investment activities [1].

In this sense, the authors saw that the levels of leverage and the injection of capital from new investors could be attacked by variables such as the risk of recovery of the credit portfolio placed before the pandemic, the fall of the most stable economies foresaw the devastating panorama which would be decreasing, before showing certain signs that the concentration in economic sectors such as mining, industrial, commercial among others, would be seriously affected impacting the other sectors, with tendencies that the investments in portfolios would decrease, but even the insurance funds were not so stable despite the association of the loans of the banks, with tendencies that the investments in portfolios would decrease, but even the insurance funds were not so stable despite the association of the loans of the banks, with tendencies that the investments in portfolios would decrease, Insurance funds were not as stable despite the association of lending by banks, with tendencies for portfolio investments to decline. Insurance funds were not as stable despite the association of lending by banks dominated by mortgages accompanied by life insurance, which for those who obtained loans with prosperous businesses were harmed in the aftermath of the pandemic cual parte de la base de estrategias dinámicas con gran acierto y efectividad permitiendo la viabilidad del desarrollo de la expansión de diversos sectores económicos financieros con lo cual se mejoraría la calidad de vida sobre todo desde el punto de vista social, atribuyendo a ello la colaboración de las tendencias conservadoras y la tecnología asociadas a recuperar las carteras de créditos colocadas para evitar el quiebre de las empresas [1], [2].

At the national level, the credits currently have different scenarios where you could take into consideration, variants such as location, seasonality, exchange rate, monetary policies, international relations and governance issues, where there is the structure of gamification of investments, and would evaluate the constant relations that financial institutions have regarding the information on the repayment of commitments acquired by entrepreneurs from various economic sectors, the quality of placements is important that means that the risk of financing for them is to know that the operational risks in the evaluation prior to the placement of loans; Likewise, in general, the credit lines give optimal support to short-term placements, thus generating

commercial strategies so that companies can obtain credits with adequate credit ratings, controlling the repercussions of credit risk in the event of non-payment of the same and the quality in the granting of placements, which should be made with eco-sustainable policies [3], [4], [5].

In this regard, it has been considered an outstanding pillar in the development of financial management and the relationship with globalization, which could be analyzed from different angles, which would have had a favorable impact on several economic sectors, especially in the mining sector, several advanced countries that already envision finance as an associative tool with technologies and artificial intelligence, This is a flour that in an influential and important way generates great advances that would already be applied with the use of social networks and banking applications, for which most entrepreneurs rely on emerging technologies, according to the dynamics, changes and the vital need for economic growth; Developed countries, located in the European, Asian and American continents, are already leading with advances arising from macroeconomic models, where a panorama is emerging that will have an impact on financial and credit risk management processes, both in the repayment of loans placed and in the significant quality of the investors' portfolio, affecting formal profit and non-profit organizations [6], [7], [8]. [6], [7], [8].

It is evident that starting from the scenario of the financial crisis that Spain experienced, it could be said that it began in a need to evaluate what has happened in the financial effects of the fall of mortgage loans and how it affected the multisectoral scale in the Mediterranean economy; because in Madrid, there were many investment trends with capitalism despite the environment with the nature of fall in the repayment of loans; however in Mexico, a little more orderly in its management in the face of a mortgage financial crisis inherited from the strategies of the United States, giving it tools of repercussions with financing in sectors such as tourism, making the fall will be moderate compared to the previous year to the entry of new capital. [9], [10].

Likewise, fixed capital and the formation of new blocks of investors would make the financial recovery in the United States and Mexico safer with respect to the level of risk in the placement of loans granted in an economy that recovers more easily in a sustained manner, limiting its willingness to change; in general, most countries such as those mentioned have experienced increases and decreases considered on the granting of credit between 2013 and 2020, which is maintained with conservative expectations [11], [12].

At the national level, the problem was considered as worrying, since the various investigations were directed to analyze how financial management helped in the recovery of credit risk in the economic sector, which had already been the focal point in the various investigations, so in the works carried out both in the literature and the results of the research articles were oriented to detail this fact in order to evaluate the behavior of the variables of the study, i.e. how financial management and credit risk are related, in the years 2016 to 2020, already coming out of the global health crisis called Covid2019 which generated a financial, economic and social blow related to an important issue such as health, the closure of businesses, the fall in the recovery of growth of shares in BVL, closure of companies, loss of jobs, massive deaths of people, all a very negative scenario impacting the microfinance scenario [13], [14].

On the other hand, several important elements were evaluated such as the moment in which the Mypes in time of pandemic Covid2019, could not assume the payment of the credits assigned to pasera that they committed to pay, resulting in negative recovery and collection ratios, with a high risk of credit liquidity, with increasingly weaker investment capital in economic sectors with negative balances leading to bankruptcy to many businesses unfailingly [15], [16].

In the study to be presented, we will provide guidelines with alternatives to improve with solution strategies for the problems raised are diverse. At first, the Municipal Savings and Loan Associations (CMAC) only focused on providing financial intermediation services, but now they also fund themselves and list shares on the BVL, so it is important that they should have predictive and comparative studies prior to attracting new shareholders to invest, already in scenarios with parameters with estimated indicators that control the effects such as over-indebtedness, and with these instructions to attract new shareholders with more alternatives of purchase offer sizing a sustained growth, to improve their processes in the investment structure, credit portfolio placement, collection policies and monitoring of customers with social responsibility to maintain optimal business indicators with this financial management is the basis of the study. As a second moment to offer the option that would be to apply the philosophy of sustained growth and with more expansive expansion policies in a positive way and in a positive way constructive on the basis of training aimed at micro-entrepreneurs to give them ideas of entrepreneurship with credit culture and if it were the case that they fall into over-indebtedness can have several alternative solutions including for example the purchase of raw materials at a lower cost, know the procedures for imports and exports at lower cost, obtain loans with favorable rates to purchase commercial premises avoiding the payment of rents, try to place salaries based on the level of sales provided to avoid over indebtedness on the issue of payment of remunerations, keep abreast of the tax issue, with this we can counteract and achieve adequate tax shields avoiding overpayments inadequate, especially in these times located in a growing wave of recession, with fall in compliance with the payment of debts incurred by entrepreneurs versus the need to grow and obtain balances with profit at the end of each year [1].

The justification was based on the intention to propose new improvements with innovative proposals by analyzing the behavior of the financial management variables for the Municipal Savings and Credit Banks listed in BVL, which is

based on the behavior of the financial business sector plus the support to improve the quality of life of the population in the social aspect It is also important to involve these indicators and the study variables because the resources that are captured by the municipal savings banks through financial intermediation tools are provided to families who wish to improve their indicators and quality of life, placing them in the portfolio of good clients with indicators of formalization and banking with which we generate more job options generating better in quality of the placements of the granted credits and in the current financial road. Theoretically and practically, it has a study that has been evaluated based on financial ratios of the BVL and SBS portals, supported by the innovation of high impact scientific articles with concrete formulation of thematic ideas and problematic concepts giving the optimal study of the variables.

Likewise, the research profile helps to increase better conditions with favorable circumstances in order to be used and take care of the invested capital of the shareholders who wish to buy shares making viable in emerging populations and entrepreneurs giving them opportunities to get out of poverty indicators, therefore the method applied is too important since we have the support of the managers and workers of the CMACs studied according to the lines of research aligned to the financial, entrepreneurial and economic theme according to the current regulations, which helps to have an ethical support in research with continuous improvement [16], [17], [18], [19].

It should be noted that the research improvements are supported with the various scientific contributions hosted in databases such as Scielo, ScienceDirect, EBSCO, Scopus WOS and Dialnet. Generating a reflexive impact on the importance of the study variables within the financial sector with respect to the investment performance of Municipal Savings and Loan Associations CMACs listed on the LSE in the years 2016 to 2020 [20].

The objective is to study how financial management impacts credit risk in CMACs registered with BVL using a simple regression model, in 2016-2020. Also, it is intended to verify whether the model taken into account can measure the degree of correlation, assessing whether the data collected are associated directly or indirectly, which would provide the light to study why it would not be just random, to improve the predictive trends of the financial management and credit risk variables of the CMACs listed on the BVL. Therefore, several corrective strategies could be developed to support optimization in the use of resources linked to the study problem outlined in the research as a goal to be achieved [20].

It has been evidenced that there are studies that analyze the variables alone or together, but only as complementary information, not providing the deserved support and productivity, as is the study of the Czech food supply companies, from 2003 to 2017, thus highlighting the importance that there is still little research, with the variables, in the micro-financial and economic sector in countries such as Peru versus other territories located in Latin America, opening possibilities for further studies in this regard [21].

II. THEORETICAL FRAMEWORK

The study variable number one, is financial management, within the definitions of authors is based on the conceptualization that it would be that process of decision making for optimal corporate management, conducive, measured and controlled management processes in various entities, so much so, that the financial issue is too important especially in a post pandemic environment caused by the Covid2019, which hit all economic and financial sectors, therefore the theme of the study would be based on optimally managing resources in order to control and apply the previous recommendations of the projections with predictive indicators of commercial operations which can be of great help in order to generate optimal profits considering that each institution can leverage through loans or credits of the CMACs favoring sensitive populations who want to move forward out of the environment of poverty, improving their quality of life with responsibility and ethics [22], [23], [24],[46].

When researching financial management, it is also important to consider that global economies face simultaneous problems, including financial instability associated with global changes and an urgent need to improve climate factors. So much so that financial management is now associated with a green investment approach, which is crucial for raising new resources and is sustainable in the long term with banking regulation. It is characterized by viable financial interaction with measurable credit risk, but when environmental issues are not respected, it creates a very high and direct risk in capital management. The new financial management regulation in China was of significant importance, guiding investors toward favorable results. Since 2018, it has been addressing system risks in parallel by adjusting incentives for investors who engage in green financing. Therefore, recent studies would be driven by arbitration control and reallocation of financial resources that support projects that largely mitigate pollution using renewable energy, with the application of circular energy regulations in research; oriented to focus on financial management using the regulation of corporate credit risk behavior effectively, improving financial reforms, which guide real results in a responsible framework with global political bases that use regulatory structures encouraging the attraction of new investments, thus achieving optimal governance, in a sustainable market with harmony between investments and the increase in so-called green investments. So-called green versions, respecting the climate issue [57].

The second study variable is called credit risk, which would be defined according to the regulations of the Peruvian Central Reserve Bank - BCRP, which would indicate that they are procedures, standards and policies based on measuring the impact that would cause a contingency within the recovery of credit placement, such debt has already been agreed between the client and the microfinance institution gamarra [14],[25],[26],[47], [48]. However, for the SBS, the lack of payment by the client would originate losses or business failure

based on Resolution No. 3780-SBS (2011), which defines credit risk as the absence or lack of willingness of the client to comply with the obligations agreed upon in the loan according to the contract, These debts contracted in a discreet manner directly or indirectly, which would be causing direct damage by not paying the credit, appearing in the credit bureau system as a client with delinquency, which has become an important issue in most CMACs and financial intermediation entities globally, which is why the risks linked to the procedure of evaluating loans is associated with positive and negative impacts as a result of the recovery of payments of the loans granted. Therefore, it is necessary to assess and evaluate the risk appetite with the threshold with limits on the balance of loans to those customers at risk of over-indebtedness, looking at ways to minimize the impact if it were to occur and the customer could not meet the credit obligation of credit payment, the trends are related to evaluate and economic, i.e. both scenarios [27], [28], [29],[49], [50]. Such is so, that in international scenarios the credit based on the bank credit risk the LIBOR-overnight index swap is used, which speaks of the calculation of the repayment index to eliminate arrears in loan repayments, punishing those who fail to comply with the agreed in the contract, from 2018 onwards studies report that credits should be subject to seasonality giving progressive installments not fixed, In the months of risk in the payment cycle it is required to lower the quota and in the high months to raise the quota, these are not fixed payments but with variable payments according to the income per month according to the sales level of the business both in micro and macro enterprises resulting in a real financial balance being important in the issue of results with adjustments in the financial statements of the entrepreneurs [30], [30], [31], [32], [33], [34], [35].

With regard to credit risk, various banks located in Nigeria have encountered difficulties in managing credit and liquidity risks correctly, which has a direct impact on the proper functioning of financial indicators and, above all, on shareholder confidence in the sector. Therefore, it can be said that there is an effect on risk management practices, especially the disclosure of information with transparency, which in the financial sector, including banks, microfinance, and financial sectors, the population affected in this study comprised 13 Nigerian commercial banks, of which 12 were intentionally selected based on data availability. In this case, the study comes from global development indicators and was analyzed from 2012 to 2023. The analysis technique used was panel regression analysis, and the method was extended at times for endogeneity. Evera1 12 software was used for data management for the variables of liquidity risk and company size. Due to significant effects on the financial issue, it can be said that credit risks were managed in an effectively conservative manner. Commercial banks in this country experienced an increase in delinquency, which can be seen in their financial performance. The opposite is true in risk disclosure, which analyzes liquidity indicators directly with transparent information. Therefore, the study recommends that banks strengthen their prior risk assessment framework to improve prior information and the performance of financial indicators with economic stability [56].

III. METHODOLOGY

The work was oriented to a quantitative approach for the collection of information, it is descriptive of longitudinal causal correlational level, with the support of simple linear regression to achieve to find a predictive model because there is a great possibility that there are studies of the relationship of the variables analyzed in a random way which are not going to be subject to a hypothesis test with relationship, The study variables are topical and specific to study the real phenomenon associated with the problems arising from the behavior of both variables, which will be measured within the scenario of the Municipal Savings and Loan Associations-CMAC registered in the BVL [36], [37], [38], [39], [40].

The detailed information was from public source, for this was performed the extraction of data from financial indicators was executed under this scenario, it started from the deductive theme of the information by the accessibility of the Lima stock exchange portal and then becomes inductive since it starts with a theoretical framework of general data and then goes a study in specific [42], [43]. Passed from the theoretical to the practical, the research we can say that it is applied because it was applied because it developed a research-oriented method tracing an objective of nature with real problematic in which the environment already exists; we are only complementing the information that already exists with more data, analysis and interpretation of the actual results [42], [43], [44].

In order to apply research methods and techniques consistent with the data extracted from the financial statements of companies in the microfinance sector, the Financial Management and Credit Risk ratios from the Lima Stock Exchange bulletin [36], [37] were used, which establishes the following ratios:

Financial Management = Solvency ratio / Efficiency and management ratio / Liquidity ratio

Credit Risk = Non-performing loans ratio / Direct credits with non-preferred collateral ratio

Therefore, the documentary analysis technique would be applied to the correlation analysis of the CAMC variables detailed in Table N° 1, below, the companies are listed, where the current microfinance sector is observed with 12 Municipal Savings and Credit Banks with a total of 1872 financial statements [46], [47]. Table N° 3 shows the sample after selection of the inclusion criteria, with 30 elements comprising the Balance Sheets and Income Statements for the years 2016, 2017, 2018, 2019 and 2020.

TABLE I
RESEARCH POPULATION

Municipal Savings and Loan Associations supervised by the SBS			
N°	CMAC	Years founded	No. of EEFF
1.	CMAC Arequipa	1985 - 2020	140
2.	CMAC Cusco	1988 – 2020	128
3.	CMAC del Santa	1990 – 2020	120
4.	CMAC Huancayo	1989 – 2020	128
5.	CMAC Ica	1980 – 2020	160
6.	CMAC Maynas	1994 – 2020	104
7.	CMAC Paita	1989 – 2020	124
8.	CMAC Piura	1982 - 2020	152
9.	CMAC Sullana	1982 – 2020	152
10.	CMAC Tacna	1992 – 2020	112
11.	CMAC Trujillo	1982 – 2020	152
12.	CMCP Lima	1920- 2020	400
Total			1872

[a]Table 1 was prepared based on the total number of CMACs registered in the BVLL portal in the LSE portal

TABLE II
SELECTION CRITERIA

N°	INCLUSION CRITERIA	EXCLUSION CRITERIA
1.	CMACs supervised by the BVL are the most important in the financial system.	CMACs not supervised by the BVL
2.	CMACs that make investments in the BVL with financial statements audited by international internal control firms in force..	CMACs not listed on the BVL
3.	CMACs with favorable financial performance indicators.	CMACs with weak financial indicators and negative balances.

[a]Table 2 Cirteria of analysis of selected CMACs registered in the BVL

TABLE III
RESEARCH SAMPLE

N°	CMAC	Years founded	No. of EEFF
1.	Municipal Savings and Loan Associations	2016 to 2020	10
2.	Municipal Savings and Loan Associations	2016 to 2020	10
3.	Municipal Savings and Loan Associations	2016 to 2020	10
Total			30

[a] Table 3 was prepared based on data from the Lima Stock Exchange (BVL)

Regarding Table N°3, non-probabilistic convenience sampling was used, based on the criteria to be applied by the researcher considering the fulfillment of the research objective. For the study, the 3 entities called CMAC have been selected as they are the best known in the Peruvian financial system, besides being the only ones with access to investors' portfolios with high income in stock market indicators in BVL [36], [37], [38].

III. RESULTS

TABLE IV
LINEAR REGRESSION AND MODEL SUMMARY

Model	R	R2	R2 corrected	Standard error of the estimation.
1	0,311[a]	,096	-,205	5,11847
a. Predictor variables: (Constant), Financial management with credit risk.				

[a] Table 4 results with the use of linear regression were performed with data from the EEFFs of the microfinance CMACs listed on the LSE. of the EEFF of the microfinance CMACs listed on the LSE.

Table 4 shows an indicator of 96%, i.e. it is important to have appropriate financial management that will affect the efficient management of credit risk with respect to the companies studied. The goodness of fit is observed. The correlation coefficient, R =.311, shows that the relationship between the variables is high. The R-squared indicates the proportionality of variance of the dependent variable that is explained by the independent variable. It is also called the coefficient of determination. In this case, it shows that .096 of the variation in financial management is due to the credit risk of the financial companies registered in the LSE, which is acceptable. So is the adjusted R-squared, i.e. by lowering the R-squared by model refinement. And, the standard error of the estimation, i.e. the variability of the liquidity variable that is not explained by the regression line is low (5.11847), showing a better fit in a pre-regressive way.

II TABLE V
REGRESSION COEFFICIENTS

Model		Unstandardized coefficients		Standardized coefficients		
		B	Desv. Error	Beta	t	Sig.
1	(Constant)	80.493	26.374		3.052	0.000
	Financial Management	-0.111	0.196	-0.311	-0.566	0.003
a. Dependent variable: Credit Risk						

[a] Table 5 results with the use of linear regression were performed with the EEFF data of the microfinance CMACs listed on the LSE.

Table N° 5 shows the coefficients of the model. The constant indicates that the origin of the regression line is positive and the coefficient, Financial Management rotation, indicates its slope. The latter reveals the increase in credit risk

for each unit of change in financial management. So, the regression model is:
Credit Risk = 80.49 - 0.11 Financial Management.

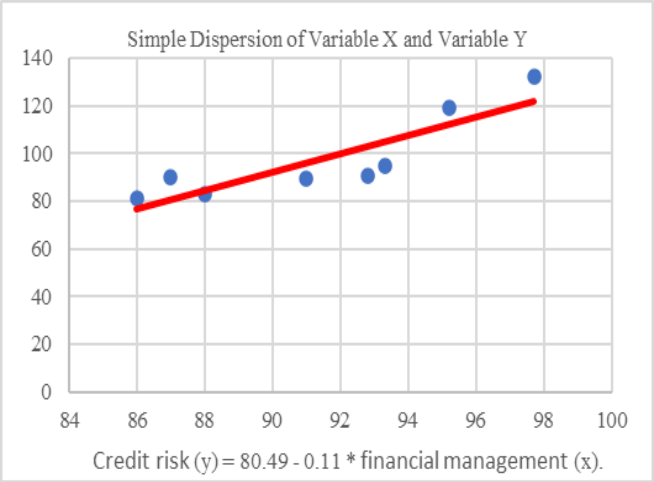

Fig. 1 Analysis of the variables based on the Lima Stock Exchange (BVL) Bulletins from 2016 to 2020. Lima Stock Exchange (BVL), from 2016 to 2020.

According to Table 2 and Figure 1, it was observed that the p-value was 0.003, meaning that its significance is < 0.05. Therefore, this model indicates that there is moderate dependence of the first variable on the second with a constant level.

In Table 2 and Figure 2, the calculated t was 3.052. Therefore, Ho is rejected. Thus, the researcher's hypothesis (H1) is accepted, and the existence of a relationship is considered, considering the regression between financial management and credit risk in the general objective of this thesis.

To arrive at the regression model proposed, the data base with which the two variables were worked on is shown in Table N° 4 y 5. It represents the information of the ratios for the years 2016, 2017, 2018, 2019 and 2020.

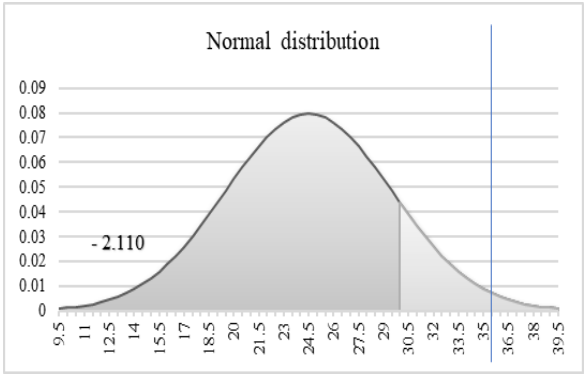

Fig. 2. Analysis of the acceptance range based on the Lima Stock Exchange Bulletins from 2016 to 2020.

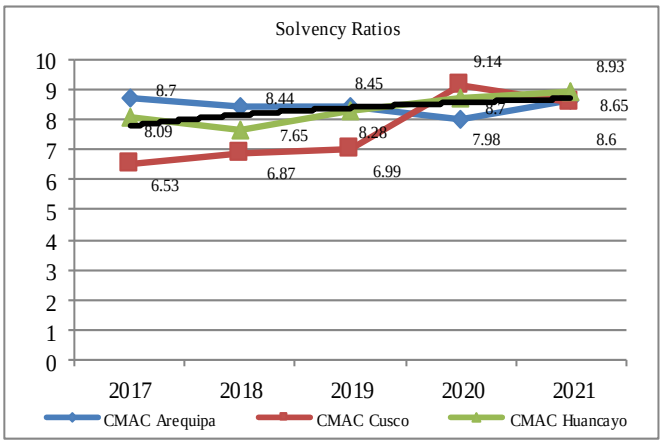

Fig. 3. Comparative analysis of solvency ratios based on the Lima Stock Exchange (BVL) bulletins from 2016 to 2020.

According to Figure 3, CMAC Arequipa in 2021 obtained a value of 8.65, CMAC Cusco in 2019 was 9.14 and 8.93 for CMAC Huancayo in 2020, which could indicate that, if they have reasonably high assets with respect to the invested amount, the company's solvency ratio could be higher than that of CMAC Huancayo.

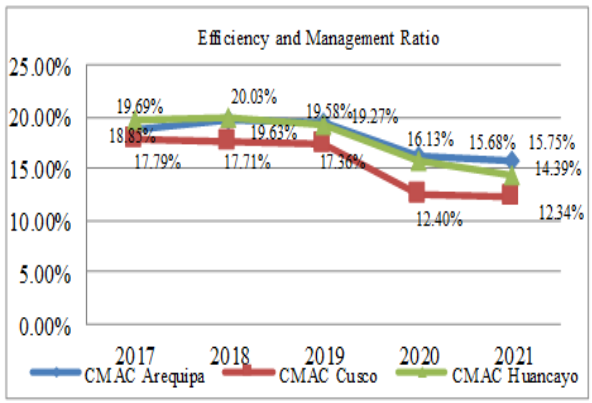

Fig.4. Comparative analysis of the efficiency and management ratios based on the Lima Stock Exchange Bulletins (BVL) from 2016 to 2020.

In accordance to Figure 4 obtained following calculations the year 2017 as the best scenario for CMAC Arequipa which had an efficiency and management ratio of 19.62%, CMAC Cusco 17.71 and CMAC Huancayo 20.03%, that is to say that for each monetary unit that the company owes grows with the average of 19.12% for each sol invested in assets with this they will be able to cover their obligations in the established term.

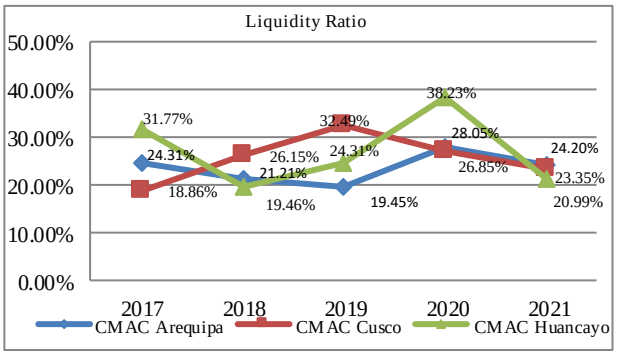

Fig.5. Comparative analysis of liquidity ratios based on the Lima Stock Exchange Bulletins (BVL), from 2016 to 2020.

Figure 5 shows that for 2019, CMAC Arequipa obtained the highest ratio with a current ratio of 28.05%, CMAC Huancayo with 38.23% and CMAC Cusco with 32.49%, which would mean that for every sol that the entities owe, they would have assets in soles to pay off short-term debts.

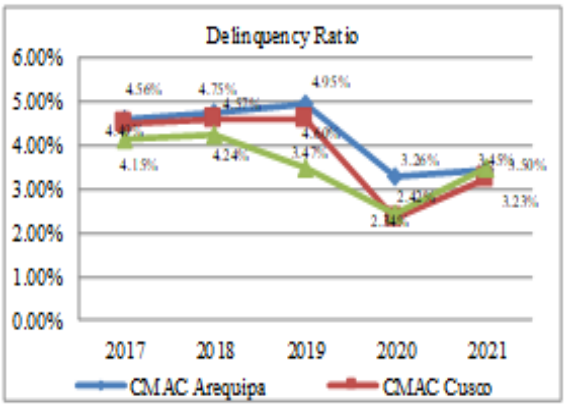

Fig.6. Comparative analysis of the delinquency ratios based on the Lima Stock Exchange (BVL) Bulletins, from 2016 to 2020.

According to Figure 6, the delinquency ratio of more than 30 days including judicial was 4.56%, 4.49 and 4.15% for the year 2016 in the 3 Municipal Savings and Loan Associations-CMAC, respectively, having increased with respect to 2017, by 0.19% 0.08% and 0.08% with respect to the previous year in the order in mention. The year in which it increased notably was for 2018 and 2020 with 4.95% for CMAC Arequipa and for CMAC Cusco with 4.60% on average affecting the result of the analysis with undulating trends.

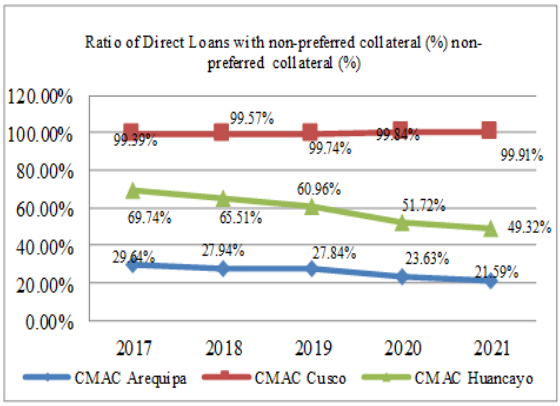

Fig. 7. Comparative analysis of the ratios of Direct Credits with non-preferred guarantees (%) based on the Lima Stock Exchange (BVL) Bulletins, from 2016 to 2020.

According to Figure 7, the ratios of Direct Credits with non-preferred guarantees (%), stood at 29.64%, 99.39% and 69.74% for the year 2016 with respect to CMAC Arequipa, CMAC Cusco and CMAC Huancayo having increased progressively with respect to the year 2017. Likewise, the highest increase in arrears is observed for the year 2020 for CMAC Cusco, reaching 99.91%, due to the placement of loans with guarantees that are difficult to execute by the legal recovery area but by the Covid 2019 environment.

V. DISCUSSION

The linear regression model works under the conditions indicated in the study summary. It can be noted that the coefficients and indicators have moderate results. However, it should be noted that the evolution of financial management must be appropriately mapped with prior controls to measure the impact on credit risk, as with any financial company, including replicating the model in all economic sectors listed on the Lima Stock Exchange [36], [37]. As expected, the number of problems affects optimal financial management, and for this reason, decision-making to control the level of risk is becoming increasingly important in both Peruvian and Ecuadorian companies, due to difficulties in maintaining the level of placements in the financial markets [53], since the financial issue goes hand in hand with competitiveness [54]. In view of this, there would be agreement with the research carried out on the subject, which studied the same variables in the financial sector. The study focuses on the analysis of financial risks, applying various household surveys and also evaluating investment indicators. The results were based on the assumption that credit risk would be high due to the increase in debt, which would affect the return on capital invested at the outset [48].

The study shows that between 2016 and 2020, the financial statements of companies in the microfinance sector, especially those relating to municipal savings and loan associations, have varied. This is reflected in the balance sheets and income statements, which show that both variables have fallen considerably. The regression model obtained supports the idea that if predictive decisions had been made in financial management, the impact on credit risk would have been moderate, thereby allowing for better prior controls and, as a result, solvency and liquidity ratios with less volatility [36], [37], [55].

To this end, business intelligence is essential in continuing to be applied with the use of solvency, efficiency, and management ratios, in addition to liquidity indicators, with which we analyze the financial management variable. The first results of intelligent information management, in the context of Covid-19, are allowing entry into financial markets with strategies for recovering delinquent portfolios according to delinquency indicators and direct credit ratios with non-preferred guarantees; that is, components of the credit risk variable. Therefore, credit placement strategies must be taken into account, which must be properly recorded in a collection and payment management system, with adequate monitoring, so as not to affect financial management. This must be supported by policies and guidelines for credit risk monitoring, in order to properly present financial statements, from which the data for both variables have been obtained, and to make the analysis optimally accessible [36], [37].

However, in a study conducted on the Municipal Savings and Loan Associations Tacna S.A. Puerto Maldonado in 2016, the objective of the research was to determine to what extent delinquency is related to profitability. The first finding was the possible existence of a coefficient with a high level in the delinquency ratio due to the low evaluation to place the credits so that improvement strategies would be found to recover short-term payments [36],[37],[38] [39],[49].

Another study that agrees with the quality of the loan portfolio and its impact on financial solvency was applied in savings and credit cooperatives in the Puno region, 2012-2016, wrote that the objective of the research was contrasted with the processing of data on financial ratios, which confirmed the steady deterioration of the quality of the loan portfolio based on several factors, including internal and external, which is consistent with a high level of correlation [50].

Likewise, the results of the research are consistent with the data that showed that most microfinance institutions have high levels of delinquency rates in their loan portfolios due to inefficient credit risk management, but the results were acceptable [51].

VI. CONCLUSIONS

The construction of a simple linear regression model of financial management (dependent variable) with credit risk for companies in the financial sector listed on the Lima Stock Exchange has been demonstrated. The regression model works because there is a relationship between the variables analysed, but it is not only random to prove hypotheses, but rather it is oriented to a causality approach. The more strategies aimed at controlling credit risk, the more financial management will improve. Pearson's causal correlation coefficient is strong. The R-squared, i.e. the proportion of data in which it is possible to predict liquidity as a function of asset turnover, is acceptable, including the adjusted R.

In addition, it is feasible to conclude a regression model from these two variables, as the tests applied show. Likewise, the model constructed with the constant and the coefficient based on the t Student, indicates that they are significant. Then, the simple linear regression equation was solved as follows: credit risk = 80.49 - 0.11 financial management in the financial sector of the Municipal Savings and Loan Associations (CMAC) listed on the Lima Stock Exchange (BVL) with a moderate level, which clearly indicates that if an appropriate financial management is carried out, credit risk would improve widely.

This means that when this dimension is properly managed, the ratio of delinquencies greater than 30 days will increase and affect the recovery of direct loans with non-preferred collateral; therefore, it is good to implement strategies to improve loan collateralization with preventive policies.

Finally, it is recommended to carry out multivariate research, which increases the knowledge of the variables studied as well as adding other related variables, expanding the sample to know the implications in a more general and global context associated with various economic sectors to link continuous improvement policies generating further quality research. Different variables and sectors can be included to build a multiple regression model, logistic structural equations, or comparative models with other financial institutions to enrich the analysis of future studies.

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