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Evolution of financial sustainability. Case of municipal savings and credit banks, Peru 2010-2021

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Abstract

The Municipal Savings and Credit Banks (MSCB) have become relevant in the financial market, providing easy access to credit from Small and Medium Enterprises (SMEs). Therefore, the research focuses on analyzing the level of financial sustainability of the SMEs in Peru 2010-2021. For this, the CAMEL method was used to identify the level of financial strength from the financial data available in the Superintendency of Banking and Insurance (SBI). The results reveal that the SMEs Arequipa and Huancayo lead the ranking, but the SMEs Del Santa and Paita show weakness in financial indicators such as profitability and risk of default.

Keywords: Sustainability, finances, profitability, delinquency, customers.

1. INTRODUCTION

The financial system is an important determinant in the macroeconomic performance of economies, many authors have agreed that the development of the financial system has favored the growth of

productive activities in a country. In addition, they point out that financial and government entities play a relevant role in the distribution of instruments through financial intermediation and in the economic progress of the public and private sectors (Tovar y Moreno, 2007) [13].

In Peru, the monetary policy developed by the Central Reserve Bank generates effects on the credit supply, boosting the economic activity of companies. Financial institutions will find it necessary to calibrate their interest rate in order to provide services that benefit their customers through loans or deposits. The use of the credit market by Peruvians has a significant impact on the economy, stimulating consumption, investment, fiscal spending and foreign trade in a positive way. Financial shocks can be negative for monetary policy, as long as they alter the means that link financial and real variables to inflation. Consequently, It is important to analyze the risks in the financial markets to develop preventive measures in order to contain their impact in the monetary and financial sphere. (Hansen y Sulla, 2013) [12] [6].

In the financial market, large banks represent 87.7% of the Peruvian credit system, therefore information on their economic and financial performance is abundant, however, this is not the case in the microfinance sector (Comex, 2022). Throughout the period from 2010 to 2021, the municipal savings and credit banks have increased their portfolio from 801 million soles to 28,936 million soles. Likewise, they are taking greater participation in the Peruvian financial market because they allow MYPES to access their financial instruments quickly, thus promoting their business activities (Portocarrero, 2022). At the same time,

The CMACs were created in the 1980s. Over time, they positioned themselves as an important element of the decentralization and democratization of credit in the country, since, as a capitalist entity, they managed to give people from various social sectors access to credit and received support in the regional production process. This improved the financial situation of many small and micro-entrepreneurs, generated sources of work and contributed to increasing opportunities. (Aguirre, 2015).

According to the Peruvian Federation of Municipal Savings and Credit Banks (FEPCMAC), the success of the CMACs is based on their autonomy, coverage of their total costs, local and regional orientation, gradual institutional development, and their own financial and credit technology. In order to strengthen the administrative and financial management of local governments, Law 23039 was promulgated in May 1980, which regulates the creation and operation of municipal savings and credit banks outside the area of Lima and Callao. The objective was to encourage community savings and, in this way, support the activities of small and medium-sized companies within their jurisdiction, by serving local credit by granting collateralized loans. The CMACs are

regulated by the Superintendency of Banking and Insurance, in accordance with the General Law of the Financial System and the Insurance System, approved by Law 26702. They are subject to the monetary and credit regulation of the Central Reserve Bank of Peru (BCRP). Over the years, the CMACs have increased their level of placements. These amounted, as of December 2013, to S/. 11,900 million, which implies a growth of 11.11% compared to the previous year [16].

The research evaluates the sufficiency of economic, human and technical resources of the municipal savings and credit banks of Peru to achieve adequate management from 2010 to 2021. Financial strength has been evaluated using the CAMEL method (Capital, Assets, Management, Earnings, Liquidity) because it allows analyzing financial, operational and regulatory compliance factors, summarizing the general situation of the financial institution in a single indicator, standardizing the analysis of the situation of individual institutions. The scores in this methodology vary between one (highest score) and five (lowest score) in each of the previous categories (Crespo, 2011).

For the collection of information, the main source is found in the regulatory entities that notify the results to the board of directors of each financial institution, municipal savings and credit banks in this context, in order to avoid a financial panic if the results are not as expected. (Federal Reserve of San Francisco, 2017). In Peru, the main regulatory authority is the Superintendency of Banking and Insurance (SBS), financial information is also provided, which is found in the Superintendency of the Stock Market and on the websites of each financial institution.

A study by Claessens y Horen (2014) showed that economic crises arise from the financial sector, especially due to deficiencies in the productive structure of financial institutions, delinquency, and high levels of risk. They propose that, to avoid them, factors such as assets, risks, capital, management and even financial leverage must be constantly evaluated. This research provides a great contribution to the understanding of financial crises, such as the one that occurred in 2008 in the United States with subprime mortgages. It is essential to identify financial institutions that provide security, high yields, credit accessibility and trust.

The COVID-19 pandemic has generated an increase in delinquency in the payment of credits, a decrease in profitability and liquidity in financial institutions in our country. Banco Económico SA was no exception, so a correct analysis and interpretation of its financial statements will help to understand the multiple difficulties that this entity went through. The implementation of the vertical and horizontal analysis in the Statements of profits and losses in the 2019, 2020 and 2021 years, the use of the CAMEL methodology and the application of the VaR statistical method,

will reflect the various complications in this difficult period. Likewise, the measures adopted by the governments of the day and what was the financial impact on the institution will be analyzed. In the monograph presented, the proposed solutions to each of the problems encountered will be known in order to improve the financial situation of the institution in the coming years in the face of possible similar eventualities. [28]

Financial sustainability is that yearned for by any company, however, economic externalities catapult a company into business insolvency, therefore, this research aims to evaluate the financial sustainability of microenterprises in the sectors of the economy, the purpose is to determine the optimal level through financial ratios, to give the reader the key parameters in which a microenterprise must develop to survive, together with the aforementioned, we proceed to analyze the microenterprise from the perspective of the financial structure, the impact by advertising, taxes and sources of financing; the tools used are the fixed effects model, Hausman adjustment, Turkey test and the Levene statistic.

Between 1998 and 2019, of the 12 municipal savings banks in Peru, four have managed to consolidate economically and financially, another three moderately and five have difficulties. The objective is to determine the key success factors in municipal savings banks in Peru during the period, supported by the application of the business success hexagon model in order to prove that when the relationship is direct and significant between financial income with profits and profits with patrimony, the Municipal Funds achieve better profits and consolidate patrimony, assets and financial income and guarantee financial success. 12 Municipal savings banks have been analyzed, 228 accounts between the years 1998 - 2019, from the perspective of econometric analysis.

With the enactment of Law 30822, the Superintendence of Banking and Insurance assumes direct regulation and supervision of the cooperative sector that was in charge of the National Federation of Savings and Credit Cooperatives. This new stage allows savings and credit cooperatives to access new opportunities and generate challenges for the development of their competitiveness in the financial market. This research mainly analyzes the determinants of the financial sustainability of the savings and credit cooperative sector in Peru, and also identifies the factors that influence the setting of the spread. The study employed a causal descriptive research design. In the econometric analysis, a balanced data panel is used with a sample of 34 savings and credit cooperatives in Peru for the period 2010-2017. Estimates were made using the static fixed effects model to assess sustainability and the static random effects model for the spread. The results showed that the interest rate spread, number of years in operation, size of assets and return on assets are explanatory variables of financial sustainability.

Meanwhile, variables such as the ratio of deposits to total assets and the number of members are not significant in the model. Likewise, macroeconomic variables such as the inflation rate and the exchange rate had no effect on the financial sustainability of the COOPACs. On the other hand, the solvency ratio variables,

With everything mentioned, it seeks to answer: How has the financial sustainability of CMAC evolved in Peru 2010-2021? It is hypothesized that the CMACs still have financial sustainability, but have had a negative evolution in Peru, which is reflected in the deterioration of their financial indicators.

2. METHODOLOGY

The research is quantitative, descriptive and longitudinal, the sources of information were: Superintendency of Banking and Insurance of Peru (SBS), Superintendency of the Stock Market (SMV) and Central Reserve Bank of Peru (BCRP).

As a collection technique, documentary analysis has been used, this methodology allows retrospective searches and obtaining the necessary documents, together with the recovery of information. The respective sources of information were entered digitally to extract statistical information and financial statements from CMAC.

The data obtained was processed in the Microsoft Excel software for its mathematical, table and figure functions. Each table is double entry where the main column corresponds to the CMAC and the main row corresponds to the year, containing the financial ratios that have been compiled and calculated.

To estimate the scores and apply the CAMEL method, the quintiles have been considered as the unit of measurement, since they segment the fifth part of a distribution ordered from lowest to highest; or vice versa, according to the characteristics of the variable under study.

The quintiles as an indicator define the order of a CMAC with respect to the set of Municipal Savings Banks, where it contemplates scores from 1 to 5, with the number 1 being the one with the best classification or greatest financial strength, and the number with the worst classification or least financial strength. 5.

To determine the meaning of the scores obtained by the CAMEL method, the work carried out by Wimkar and Tanko (2008) has been taken into account; likewise, all the decimals have been considered in order to also be able to analyze the trend that a CMAC may present within a score obtained.

Table 1. MEANING OF SCORE BY THE CAMEL METHOD

Score	Range	Description	Meaning
1	1.00 - 1.49	Robust	Sustainable in all aspects
2	1.50 - 2.49	Satisfying	generally sustainable
3	2.50 - 3.49	Normal	Weakness in some variables
4	3.50 - 4.49	Marginal	serious financial problems
5	4.50 - 5.00	Unsatisfactory	Unsustainable in all variables

Note. Own elaboration based on the study by Wimkar and Tanko (2008).

To obtain the score of each CMAC, the weighting of the CAMEL method of [18] has been taken into account.

Table 2. WEIGHTING OF THE CAMEL METHOD

ANALYSIS VARIABLE	INDICATOR	WEIGHING
Capital - Capital	solvency ratio	25%
Assets - Assets	NPL ratio	20%
Management - Management	efficiency ratio	25%
Earnings - Profitability	ROE ROA	15%
Liquidity - Liquidity	Liquidity ratio in NC	15%

Note. Own elaboration based on the article of [18].

According to the study variable contemplated by the CAMEL method, the score of 1 or the best financial solidity will correspond to the financial ratios that present the highest ratios of capital, return on equity (ROE) and return on assets (ROA); as well as those with lower delinquency ratios, operating expenses (efficiency) and liquidity.

The aggregation of the financial ratios in 5 categories, have been calculated on the quintiles of the 11 CMACs, excluding CMPC-Lima, throughout the study period. These scores serve as a reference point to classify the CMACs. Considering the variables used in the study by

Sarwar and Asif (2011), the classification scores have been updated according to the CAMEL method.

Table 3. SCORING ACCORDING TO THE CAMEL METHOD

Analysis variables	Score				
	1	**2**	**3**	**4**	**5**
capital ratio	>=17.57%	17.56% - 15.83%	15.82% - 14.76%	14.75% - 13.72%	< 13.72%
NPL ratio	<=4.55%	4.56% - 5.84%	5.85% - 7.44%	7.45% - 12.28%	> 12.28%
efficiency ratio	<=57.10%	57.11% - 61.03%	61.04% - 66.23%	66.24% - 74.67%	> 74.67%
Profitability Ratio (ROE)	>=16.90%	16.89% - 13.26%	13.25% - 8.80%	8.79% - 0.44%	< -0.44%
Profitability Ratio (ROA)	>=2.49%	2.48% - 1.76%	1.75% - 1.32%	1.31% - 0.00%	<0.00%
liquidity ratio	<=25.24%	25.25% - 30.00%	30.01% - 34.83%	34.84% - 42.55%	> 42.55%

Note. Own elaboration based on the article by Sarwar and Asif (2011)

This methodology allows quantifying the data in Microsoft Excel and structuring the results and their respective analysis as follows:

To verify the hypothesis:

- Figure showing the evolution of the CMAC Average CAMEL Score.
- Table of the Weighted score of the CMAC.
- CMAC Mean CAMEL score figure.

According to rank:

- Figures of the evolution of the CAMEL Score with satisfactory, normal and marginal levels.

According to the indicator:

- Figures of the evolution of the average score of the CMAC for each indicator.
- Tables of the average score of the CMACs for each indicator.

Sample

For our analysis, the Caja Municipal de Crédito Popular de Lima has been excluded because its organizational structure differs due to the conformation of its board of directors in comparison to the other CMACs (created by Law No. 10769 of January 20, 1947 and was regulated through Council Agreement No. 0062 of 1971, owned by the Metropolitan Municipality of Lima, with economic and financial autonomy, and began operations on September 8, 1949).

For the study period, only 11 Municipal Savings and Credit Banks (CMAC) have been considered:

Table 4. CMAC sample

MUNICIPAL SAVINGS AND CREDIT BANKS OF PERU (CMAC)			
CMAC Arequipa	CMAC Cusco	Santa's CMAC	CMAC Huancayo
CMAC Ica	CMAC Maynas	CMAC Paita	CMAC Piura
CMAC Sullana	CMAC Tacna	CMAC Trujillo	

Note. Own elaboration based on the SBS source.

Problem

How has the level of financial sustainability of the Municipal Savings and Credit Banks of Peru evolved 2010-2021?

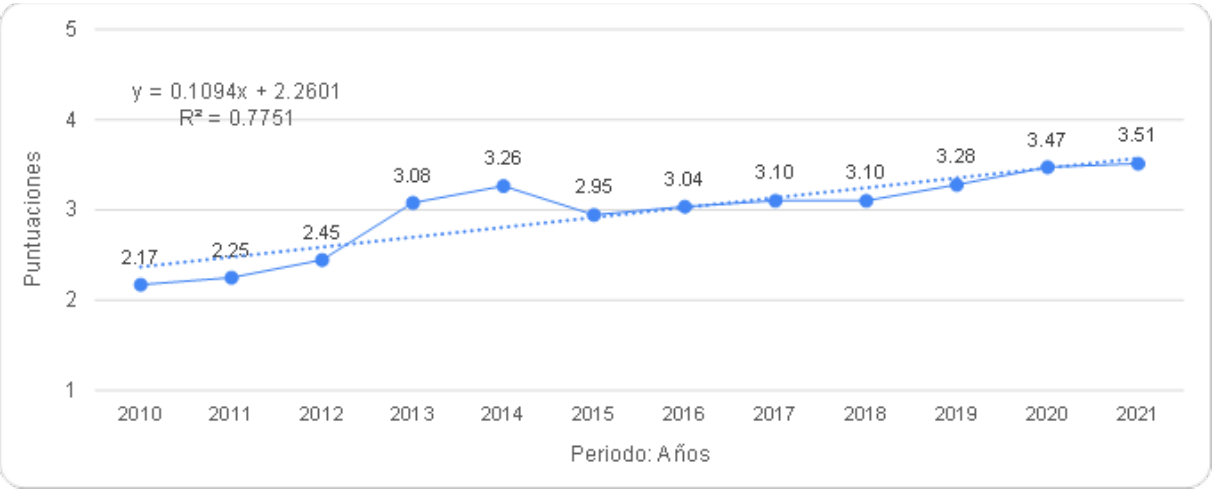
Hypothesis

The evolution of the financial sustainability of the Municipal Savings and Credit Banks of Peru during the period 2010-2021 has been deteriorating, due to economic, political and social factors, both national and international.

3. RESULTS

According to the CAMEL method that has been used to determine the financial sustainability of the Municipal Savings and Credit Banks of Peru during the 2010-2021 period, we have the following results:

Figure 1. Evolution of the CMAC Average CAMEL Score (Period 2010-2021)



Source: self made.

Figure 1 shows the evolution of the weighted scores according to the CAMEL method of the 11 CMACs for the study period; where score 1 is of better financial strength, and as it approaches score 5 it is of less financial strength. It is observed that the financial sustainability of the CMACs has been deteriorating during the period 2010-2021; going from 2.17 points for the year 2010 considered as a satisfactory level that means that the entities are generally sustainable, to 3.51 points for the year 2021 considered as a marginal level that indicates that the entities present serious financial problems.

As can be seen, the deterioration trend is well marked, gradually passing from a satisfactory level for the years 2010-2012; to a normal level for the years 2013-2020 and finally to a marginal level for the year 2021, obtaining a determination coefficient of 0.7751.

This is mainly due to economic, political, social, environmental, etc. factors; both internal and external that the System of Municipal Savings Banks of Peru is going through during the study period; For example, customer over-indebtedness as a result of the most aggressive competition in the Banking System, discouragement of investors due to political uncertainty, reduced sales and high expenses for repairs due to the El Niño Phenomenon, increased fuel prices, shortages of agricultural inputs and exchange rate as a result of the Conflicts in the Middle East and excessive increases to cover health expenses due to COVID 19.

When we analyze the average of the entire study period of the CMAC, it is found with a score of 2.97 within the normal category, implying that there is deterioration in some variables. As can be seen in table 4.

The average coefficient of variation of the CMAC is below 0.3, which demonstrates homogeneity in the treatment of the sample, that is, the data is closer to its average. In the case of CAMC Cusco and CMAC Sullana, slight heterogeneity is shown, the data is slightly more dispersed than their averages.

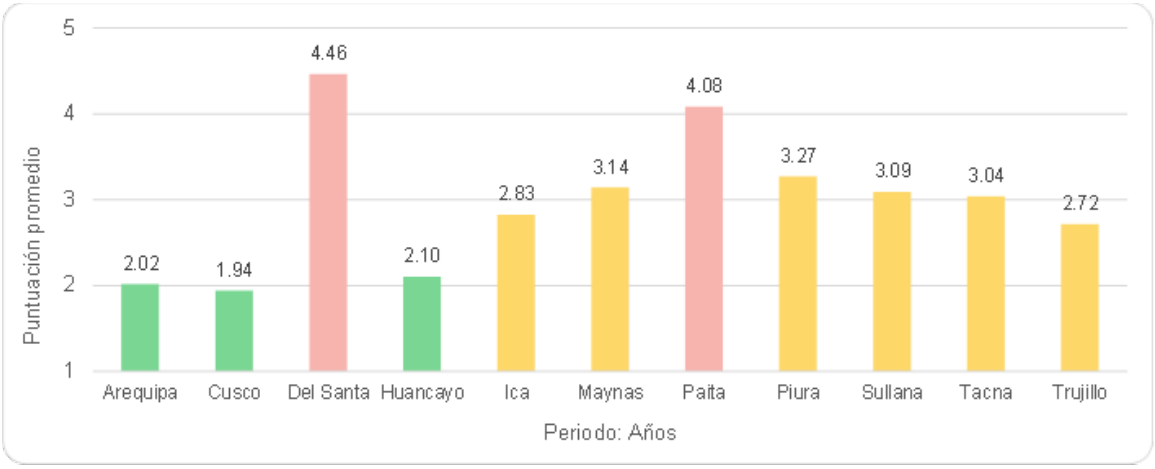
Table 5. Weighted score of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	1,45	1,00	3,55	1,35	1,40	2,10	3,15	3,75	1,80	1,50	2,85	2,17
2011	1,50	1,00	3,70	1,50	1,55	2,80	3,90	2,95	1,70	2,30	1,85	2,25
2012	1,95	1,15	3,60	1,90	2,65	2,90	4,50	2,55	1,45	2,05	2,20	2,45
2013	2,25	1,50	4,60	1,95	3,90	3,30	4,65	3,45	3,00	2,70	2,55	3,08
2014	2,45	1,85	4,70	2,20	3,75	3,90	4,50	3,90	2,90	2,95	2,80	3,26
2015	2,30	2,20	4,70	1,50	3,50	2,80	4,30	3,35	2,50	3,00	2,25	2,95
2016	2,35	2,10	4,60	2,15	2,95	3,30	4,35	2,95	2,85	2,95	2,85	3,04
2017	2,20	2,10	4,85	2,30	3,10	3,75	3,95	2,80	2,85	3,30	2,90	3,10
2018	1,95	2,10	4,75	2,15	2,85	3,25	3,55	3,25	4,10	3,10	3,05	3,10
2019	1,95	2,50	4,50	2,50	2,65	3,30	3,85	3,50	4,75	3,35	3,20	3,28
2020	2,00	2,85	5,00	2,85	2,90	3,20	4,10	3,40	4,45	4,25	3,20	3,47
2021	1,85	2,95	5,00	2,85	2,70	3,10	4,20	3,40	4,70	5,00	2,90	3,51
PROMEDIO	2,02	1,94	4,46	2,10	2,83	3,14	4,08	3,27	3,09	3,04	2,72	2,97
Desv. Stand.	0,3023	0,6390	0,5100	0,4730	0,7244	0,4485	0,4145	0,3761	1,1184	0,8900	0,4033	0,43
Varianza	0,0914	0,4083	0,2601	0,2238	0,5248	0,2012	0,1718	0,1414	1,2509	0,7921	0,1626	0,18
r	0,2675	0,9672	0,8296	0,8880	0,3116	0,4629	0,0495	0,0690	0,9222	0,9242	0,6914	0,88
r^2	0,0716	0,9355	0,6882	0,7885	0,0971	0,2142	0,0025	0,0048	0,8504	0,8542	0,4780	0,78
Coef. Variación	0,1499	0,3291	0,1143	0,2252	0,2564	0,1428	0,1015	0,1150	0,3622	0,2930	0,1484	0,14

Source: self made.

Likewise, we can see that individually there are CMACs that are classified as normal (orange), satisfactory (light green), marginal (light red) and dissatisfied (red), as shown in Figure 2.

Figure 2. CMAC Average CAMEL Score (2010-2021 Period)



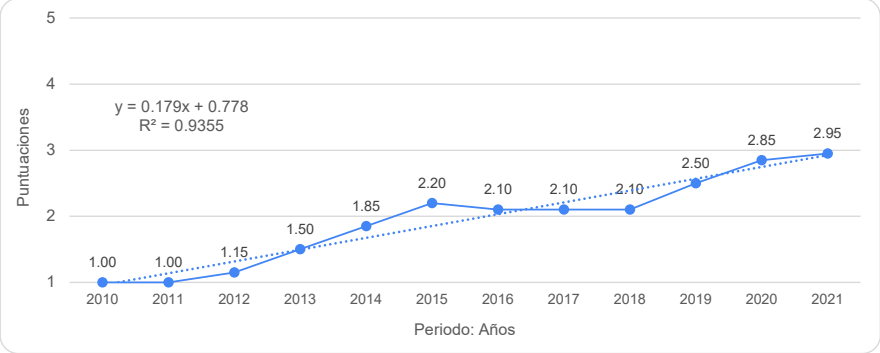
Source: Self made.

CMAC WITH SATISFACTORY LEVEL:

In order to analyze the evolution of the CMACs with a satisfactory level, we have proceeded to review the evolution of the CAMEL scores for

each Municipal Fund during the study period, obtaining the following results:

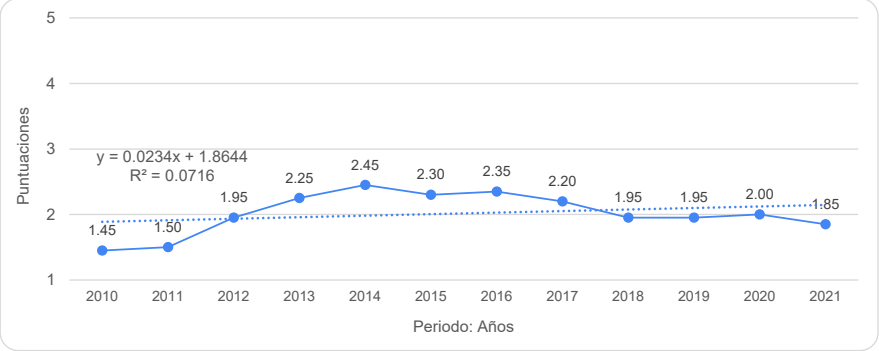
Figure 3. Evolution of the CAMEL Score: CMAC - Cusco (Period 2010-2021)



Source: Self made.

The CMAC Cusco presents, on average, the best financial strength during the entire study period of the 11 CMACs with the lowest score of 1.94 (Figure 2); however, in Figure 3, a clear trend of deterioration can be observed, going from a score of 1 whose level was robust (2010) to a score of 2.95 with a normal level (2021), with a high coefficient of determination of 0.9355.

Figure 4. Evolution of the CAMEL Score: CMAC - Arequipa (Period 2010-2021)

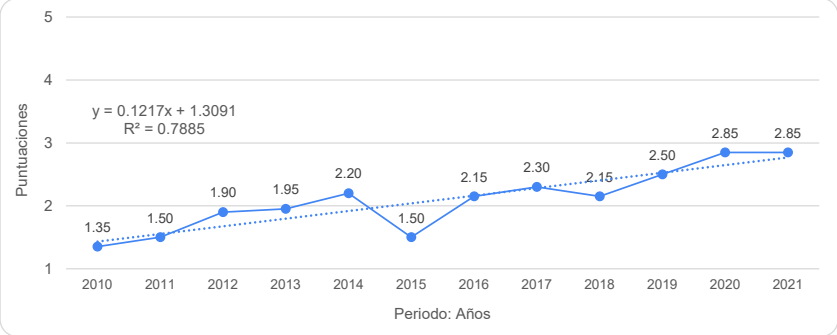


Source: self-made.

The CMAC Arequipa presents, on average, the second CMAC that presents the best financial solidity during the entire study period of the 11 CMACs, obtaining a score of 2.02 (Figure 2). However, when its evolution is analyzed in Figure 4, it can be seen that it does not present a clear trend within the satisfactory level with a high determination coefficient of 0.0716, but it can be observed that it presents 2 sections, the first from 2010-2014 with a clear deterioration going from 1.45 to

2.40, respectively; and the second tranche of 2014-2021 with an improvement in their score from 2.45 to 1.95, respectively.

Figure 5. Evolution of the CAMEL Score: CMAC - Huancayo (Period 2010-2021)



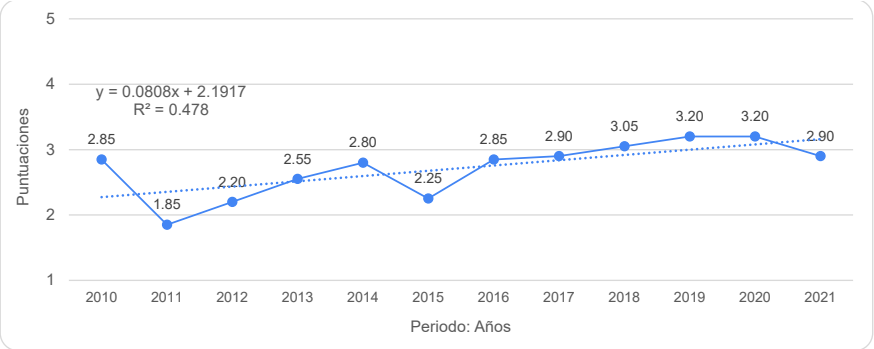
Source: Self-made.

The CMAC Huancayo presents, on average, the third CMAC with the greatest financial solidity in the study period of the 11 CMACs with the lowest score of 2.10 (Figure 2). However, in Figure 5 a deterioration trend can be seen, going from a score of 1.35 whose level was robust (2010) to a score of 2.85 with a normal level (2021), with a high coefficient of determination of 0.7885; but to a lesser degree than CMAC Cusco.

CMAC WITH NORMAL LEVEL:

In Figure 2, 06 CMACs can be identified at a normal level according to the average CAMEL score for each Municipal Fund during the study period. To analyze their evolution, the following is obtained:

Figure 6. Evolution of the CAMEL Score: CMAC - Trujillo (Period 2010-2021)

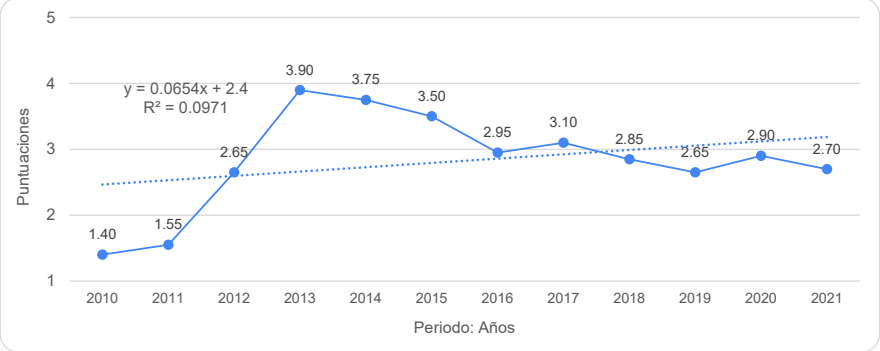


Source: Self-made.

The CMAC Trujillo presents an average score of 2.72 during the entire study period of the 11 CMACs (Figure 2), placing it in the first CMAC at a

normal level. However, when its evolution is analyzed in Figure 6, a slight tendency to deteriorate can be determined with an average determination coefficient of 0.478. Two sections of deterioration can be observed, the first from 2011-2014 with a clear deterioration from 1.85 to 2.80, respectively; and the second tranche of 2015-2020 with another clear deterioration from 2.25 to 3.20, respectively; to obtain a score of 2.90 for the year 2021.

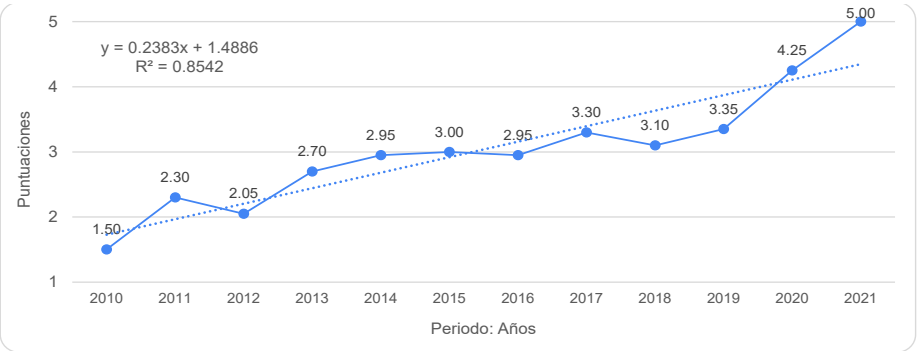
Figure 7. Evolution of the CAMEL Score: CMAC - Ica (Period 2010-2021)



Source: Self-made.

The CMAC Ica presents an average score of 2.83 during the entire study period of the 11 CMACs (Figure 2), placing it in the second CMAC at a normal level. However, when its evolution is analyzed in Figure 7, it can be determined that it does not present a clear trend throughout the study period because its coefficient of determination is low at 0.0971. Two opposite sections can be observed, the first from 2010-2013 with a clear deterioration from 1.40 to 3.90, respectively; and the second tranche of 2013-2021 with a marked improvement from 3.90 to 2.70, respectively.

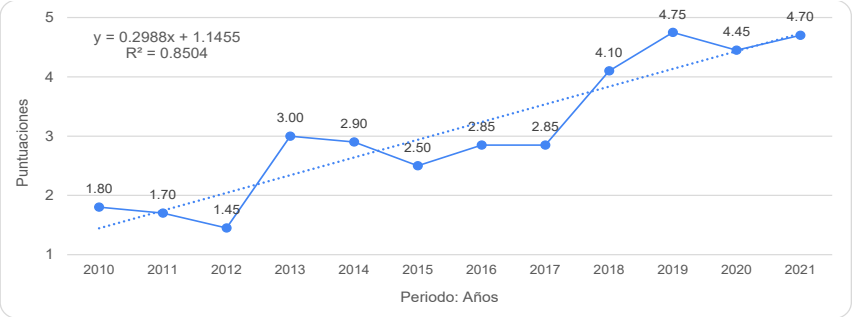
Figure 8. Evolution of the CAMEL Score: CMAC - Tacna (Period 2010-2021)



Source: Self-made.

The CMAC Tacna presents an average score of 3.04 during the entire study period of the 11 CMACs (Figure 2), placing it in the third CMAC at a normal level. However, when its evolution is analyzed in Figure 8, its clear tendency to deteriorate can be seen, its score has gone from a satisfactory level of 1.50 (2010) to a dissatisfied level of 5.00 (2021), with a coefficient of high determination of 0.8542 and high standard deviation of 0.89; less degree than CMAC Cusco.

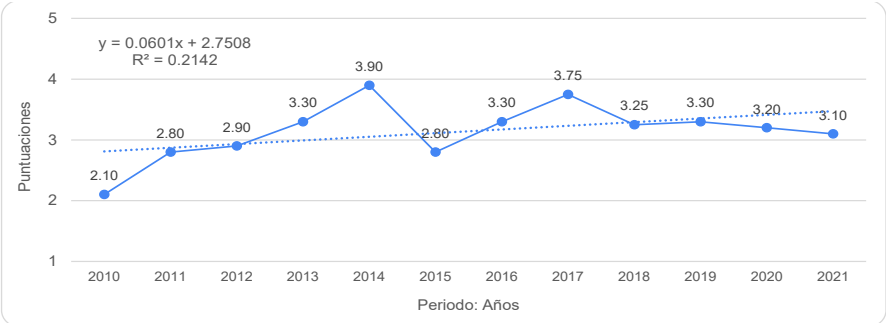
Figure 9. Evolution of the CAMEL Score: CMAC - Sullana (Period 2010-2021)



Source: Self-made.

The CMAC Sullana presents an average score of 3.09 (Figure 2) during the entire study period of the 11 CMACs, placing it in the fourth CMAC at a normal level. However, when its evolution is analyzed in Figure 9, its clear tendency to deteriorate can be seen, its score has gone from a satisfactory level of 1.80 (2010) to a dissatisfied level of 4.70 (2021), with a coefficient of high determination of 0.8504 and with a high standard deviation of 1.1184; similar to CMAC Tacna.

Figure 10. Evolution of the CAMEL Score: CMAC - Maynas (Period 2010-2021)

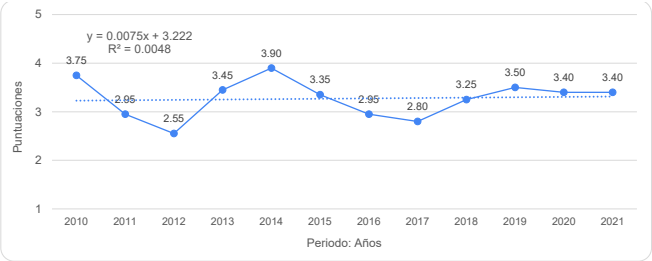


Source: Self-made.

The CMAC Maynas presents an average score of 3.14 during the entire study period of the 11 CMACs (Figure 2), placing it in the fifth CMAC at normal level. When its evolution is analyzed in Figure 10, it does not

present a clear trend, presenting a low determination coefficient of 0.2142.

Figure 11. Evolution of the CAMEL Score: CMAC - Piura (Period 2010-2021)



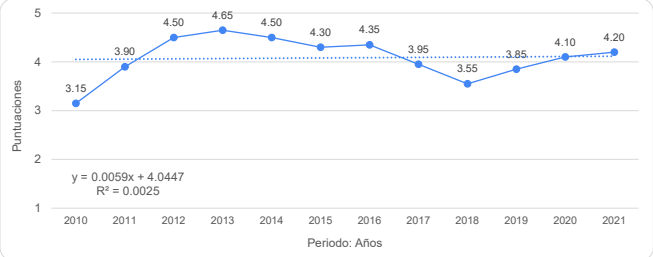
Source: self-made.

The CMAC Piura presents an average score of 3.27 during the entire study period of the 11 CMACs (Figure 2), placing it in the sixth and last CMAC at normal level. When its evolution is analyzed in Figure 11, it does not present a clear trend, presenting a very low coefficient of determination of 0.0048 with a low standard deviation of 0.3761; which tells us that your score will remain stable.

CMAC WITH MARGINAL LEVEL:

In Figure 2, only 02 CMACs can be identified at the marginal level according to the average CAMEL score for each Municipal Fund during the study period. To analyze their evolution, the following is obtained:

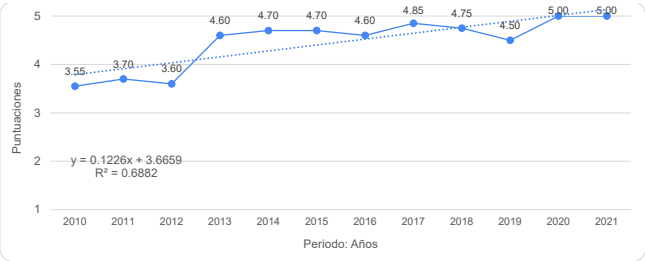
Figure 12. Evolution of the CAMEL Score: CMAC - Paita (Period 2010-2021)



Source: Self-made.

The CMAC Paita presents an average score of 4.08 during the entire study period of the 11 CMACs (Figure 2), placing it in the first CMAC at a marginal level. When its evolution is analyzed in Figure 12, a trend cannot be seen, its score has practically remained at this level, with a very low coefficient of determination of 0.0025. It is likely that it will remain at this level.

Figure 13. Evolution of the CAMEL Score: CMAC - Del Santa (Period 2010-2021)



Source: Self-made.

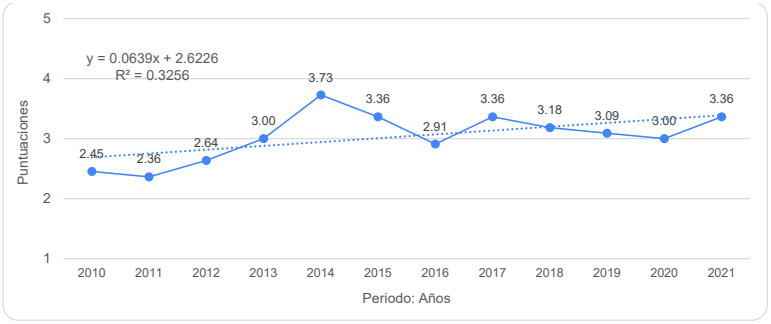
The CMAC of Santa presents an average score of 4.46 during the entire study period of the 11 CMACs (Figure 2), placing it in the second CMAC at the marginal level and the one with the greatest deterioration of all the CMACs in Peru. When its evolution is analyzed in Figure 13, it shows a tendency to continue deteriorating, its score has gone from 3.55 with a marginal level to 5 dissatisfied level, most of its scores have remained in this last classification, its coefficient of determination is high 0.6882. It is very likely that it will remain at this level.

Next, we present the evolutionary analysis of the components of the CAMEL method during the study period, likewise, the CMACs that have had the greatest representativeness in their behavior are identified.

EQUITY (EQUITY)

The Global Capital ratio has been considered, since it considers effective equity as a percentage of total risk-weighted assets and contingencies (credit risk, market risk and operational risk). It is important that financial entities have a high capital ratio, since their business depends on it, having little solvent capital does not allow their survival in the financial market (SBS, 2019).

Figure 14. Evolution of the Average Score of the Global Capital Ratio of CMAC (Period 2010-2021)



Source: Self-made.

Figure 13 shows a slight deterioration in the evolution of the weighted average score of the Global Capital Ratio of the 11 CMACs, going from 2.45 points (satisfactory level) for the year 2010 to 3.36 points (normal level) for the year 2021 with a low coefficient of determination of 0.3256.

Table 6. Average Score of the Global Capital Ratio of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	2	1	4	1	1	3	5	3	2	2	3	2,45
2011	3	1	4	1	1	3	4	3	3	2	1	2,36
2012	4	1	4	2	2	3	5	3	2	2	1	2,64
2013	4	1	5	2	4	2	5	4	3	2	1	3,00
2014	4	3	5	3	4	3	5	5	5	3	1	3,73
2015	4	5	5	2	3	2	4	4	5	2	1	3,36
2016	4	3	4	3	2	2	3	3	5	2	1	2,91
2017	4	3	5	4	3	2	2	4	5	4	1	3,36
2018	4	3	4	4	3	2	1	4	5	4	1	3,18
2019	4	4	3	5	3	2	1	3	5	3	1	3,09
2020	3	4	5	4	3	1	2	2	5	3	1	3,00
2021	2	5	5	4	3	2	3	2	5	5	1	3,36
PROMEDIO	3,50	2,83	4,42	2,92	2,67	2,25	3,33	3,33	4,17	2,83	1,17	3,04
Desv. Stand.	0,7638	1,4625	0,6401	1,2555	0,9428	0,5951	1,4907	0,8498	1,2134	0,9860	0,5528	0,39
Varianza	0,5833	2,1389	0,4097	1,5764	0,8889	0,3542	2,2222	0,7222	1,4722	0,9722	0,3056	0,15
r	0,0000	0,8253	0,1320	0,9133	0,4865	-0,7910	-0,7935	-0,3409	0,8157	0,7590	-0,4804	0,57
r^2	0,0000	0,6811	0,0174	0,8341	0,2367	0,6257	0,6296	0,1162	0,6654	0,5760	0,2308	0,33
Coef. Variación	0,2182	0,5162	0,1449	0,4305	0,3536	0,2645	0,4472	0,2550	0,2912	0,3480	0,4738	0,13

Source: self-made.

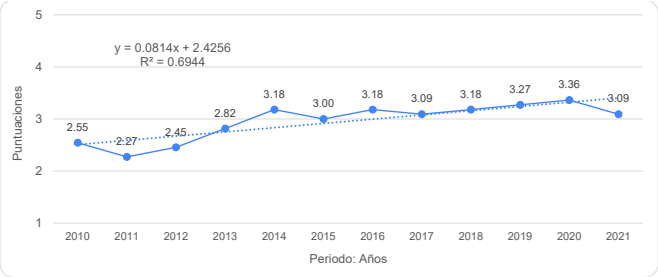
Table 5 shows the evolution of the weighted average scores of the Global Capital Ratio of the 11 CMACs for the study period. The ones with the best performance have been identified as CMAC Trujillo with 1.17 points (robust level) and CMAC Maynas with 2.25 (satisfactory level), both with a low level of standard deviation and variance. On the other hand, those that have presented the worst average performance are: CMAC del Santa with 4.42, CMAC Sullana with 4.17 and CMAC Arequipa with 3.50, the 3 entities being at a marginal level; however, it can be seen that those that present a strong deterioration are CMAC Huancayo and CMAC Cusco with a coefficient of determination of 0.9133 and 0.8253, respectively.

The coefficient of variation of 0.13 in the average of the CMACs shows little dispersion in the data set (homogeneous), that is, the data is very close to the average. In the case of the Cusco, Huancayo, Ica, Paita, Tacna and Trujillo CMACs, there is slight heterogeneity in the data. that is, the data are slightly away from their averages.

ASSETS

The Delinquency Index has been considered, since it considers debtor default, its calculation is obtained by dividing delinquency over direct loans, in accordance with the guidelines of the Superintendence of Banking and Insurance (SBS). It is important that financial entities have a low delinquency rate, since it reflects the quality of their placements, the main component of their assets.

Figure 15. Evolution of the Average Score of the CMAC Delinquency Index (2010-2021 Period)



Source: Self-made.

Figure 14 shows the evolution of the weighted average score of the Delinquency Index of the 11 CMACs, it can be seen that despite being at the normal level, it presents a high deterioration, going from 2.55 points for the year 2010 to 3.09 points for the year 2021 with a high coefficient of determination of 0.6944.

Table 7. Average Score of the Delinquency Index of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	2	1	4	2	3	2	2	4	3	1	4	2,55
2011	1	1	4	1	3	2	4	3	2	1	3	2,27
2012	2	1	4	1	3	2	4	3	2	1	4	2,45
2013	2	2	5	1	4	3	4	2	3	2	3	2,82
2014	3	2	5	1	4	4	4	3	2	4	3	3,18
2015	3	2	5	1	4	2	5	3	1	4	3	3,00
2016	2	2	5	1	4	3	5	3	2	4	4	3,18
2017	2	2	5	1	3	4	5	3	2	4	3	3,09
2018	2	2	5	1	3	3	5	3	5	3	3	3,18
2019	2	2	5	1	2	3	5	4	5	4	3	3,27
2020	2	1	5	1	3	3	5	4	5	5	3	3,36
2021	1	1	5	1	2	2	5	4	5	5	3	3,09

PROMEDIO	2,00	1,58	4,75	1,08	3,17	2,75	4,42	3,25	3,08	3,17	3,25	2,95
Desv. Stand.	0,5774	0,4930	0,4330	0,2764	0,6872	0,7217	0,8620	0,5951	1,4410	1,4625	0,4330	0,34
Varianza	0,3333	0,2431	0,1875	0,0764	0,4722	0,5208	0,7431	0,3542	2,0764	2,1389	0,1875	0,11
r	-0,1254	0,1714	0,7526	-0,4804	-0,4567	0,2843	0,7981	0,4259	0,6785	0,8748	-0,4739	0,83
r^2	0,0157	0,0294	0,5664	0,2308	0,2086	0,0808	0,6370	0,1814	0,4603	0,7653	0,2246	0,69
Coef. Variación	0,2887	0,3114	0,0912	0,2551	0,2170	0,2624	0,1952	0,1831	0,4673	0,4618	0,1332	0,11

Source: self-made.

Table 6 shows the evolution of the weighted average scores of the Delinquency Index of the 11 CMACs for the study period, it is observed that the best performance has been CMAC Huancayo with 1.08 points (robust level) showing sustainability in its behavior with a standard deviation of 0.2764; Then, in a lower range, we have CMAC Cusco with 1.58 points and CMAC Arequipa with 2 points, both at a satisfactory level but do not have a clear trend because their coefficient of determination amounted to 0.0294 and 0.0157, respectively. On the other hand, the one that has presented the worst average performance was CMAC del Santa with 4.75 (dissatisfied level) with less standard deviation (0.4330) and variance (0.1875) implying that its behavior is stable. In a lower range is CMAC Paita with 4.

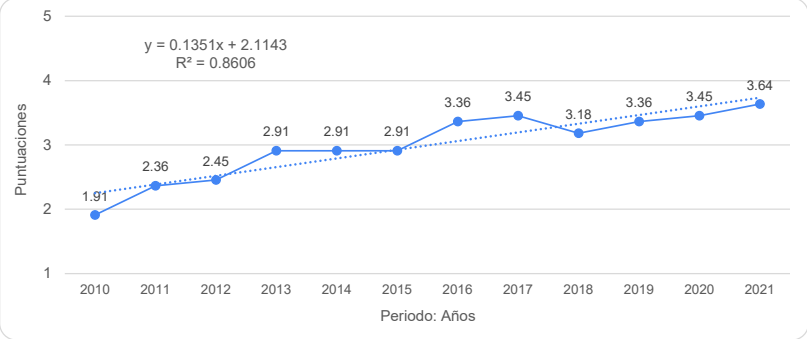
The coefficient of variation of 0.11 in the average of the CMACs shows little dispersion in the data set (homogeneous), that is, the data is very close to the average. In the case of the Cusco, Sullana and Tacna CMACs,

there is slight heterogeneity in the data, that is, the data is slightly away from their averages.

MANAGEMENT (MANAGEMENT)

The Efficiency Ratio has been considered, since it considers the participation of the Operating Expenses in the Total Financial Margin, this indicator measures the percentage of the financial margin that is allocated to expenses in personnel, board of directors, services received from third parties, taxes and contributions, depreciation and amortization. It is essential that financial entities have a low ratio of operating expenses with respect to the financial margin, this reflects greater efficiency in the use of their resources.

Figure 16. Evolution of the Average Score of the CMAC Efficiency Ratio (2010-2021 Period)



Source: Self-made.

Figure 15 shows the evolution of the weighted average score of the Efficiency Ratio of the 11 CMACs, showing a clear trend of high deterioration going from 1.91 points (satisfactory level) to 3.64 points (marginal level) with a very high coefficient of determination of 0.8606.

Table 8. Average Score of the Efficiency Ratio of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	1	1	4	1	1	2	3	4	1	2	1	1,91
2011	1	1	4	3	1	3	3	4	1	4	1	2,36
2012	1	1	3	3	2	4	5	3	1	3	1	2,45
2013	1	1	4	2	3	4	5	4	3	3	2	2,91
2014	1	1	5	2	3	4	5	4	2	2	3	2,91
2015	1	1	5	2	3	4	5	4	3	2	2	2,91
2016	2	2	5	3	3	4	5	4	3	3	3	3,36
2017	2	2	5	2	4	5	5	3	3	3	4	3,45
2018	1	2	5	2	3	5	5	3	2	3	4	3,18
2019	1	2	5	3	3	4	5	3	4	3	4	3,36
2020	1	3	5	3	2	4	5	3	4	4	4	3,45
2021	1	3	5	3	2	4	5	3	5	5	4	3,64

PROMEDIO	1,17	1,67	4,58	2,42	2,50	3,92	4,67	3,50	2,67	3,08	2,75	2,99
Desv. Stand.	0,3727	0,7454	0,6401	0,6401	0,8660	0,7592	0,7454	0,5000	1,2472	0,8620	1,2332	0,50
Varianza	0,1389	0,5556	0,4097	0,4097	0,7500	0,5764	0,5556	0,2500	1,5556	0,7431	1,5208	0,25
r	0,1296	0,9069	0,7354	0,4337	0,4181	0,6200	0,6478	0,6759	0,8710	0,5181	0,9298	0,93
r^2	0,0168	0,8224	0,5408	0,1881	0,1748	0,3844	0,4196	0,4569	0,7586	0,2684	0,8645	0,86
Coef. Variación	0,3194	0,4472	0,1397	0,2649	0,3464	0,1938	0,1597	0,1429	0,4677	0,2796	0,4484	0,17

Source: Self-made.

Table 7 shows the evolution of the weighted average scores of the Efficiency Ratio of the 11 CMACs for the study period, it is observed that the best performance has been CMAC Arequipa with 1.17 points (robust

level) showing sustainability in its behavior with minors. levels of standard deviation (0.0.3727), variance (0.1389) and coefficient of determination (0.0158). In a lower range are CMAC Cusco with 1.67 points and CMAC Huancayo with 2.42 points, both at a satisfactory level; It is observed that CMAC Cusco presents a marked tendency to deteriorate, going from 1 point at a robust level (2010-2015), 2 points at a satisfactory level (2016-2019) and 3 points at a normal level (2020-2021), with a high coefficient of determination: 0.8224. On the other hand, those that have presented the worst average performance were CMAC Paita with 4. 67 points and CMAC del Santa with 4.58 points, both at an unsatisfied level; On the other hand, it is important to mention that although it is true that CMAC Trujillo and CMAC Sullana are both at a normal level, with 2.75 points and 2.67 points, respectively; both present a high instability, with a standard deviation of 1.2332 and 1.2472, respectively; and with a marked tendency to deteriorate because they present a high coefficient of determination of 0.8645 and 0.7585, respectively.

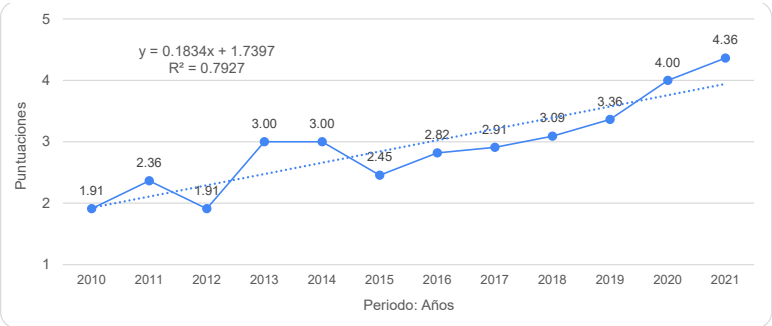
The coefficient of variation of 0.17 in the average of the CMACs shows little dispersion in the data set (homogeneous), that is, the data is very close to the average. In the case of the Arequipa, Cusco, Ica, Sullana and Trujillo CMACs, there is slight heterogeneity in the data, that is, the data is slightly away from their averages.

PROFITABILITY (EARNINGS)

02 financial indicators have been considered as Profitability Ratio:

Equity Return Ratio- Return on Equity (ROE), which measures the profitability obtained for shareholders, it being important that financial entities have a high ratio of net profit with respect to equity.

Figure 17. Evolution of the Average Score of the Equity Return Ratio - ROE of CMAC (Period 2010-2021)



Source: Self-made.

Figure 16 shows the evolution of the weighted average score of the Equity Profitability Ratio - ROE of the 11 CMACs, a clear trend of high deterioration can be seen, going from 1.91 points (satisfactory level) to

4.36 points (marginal level) with high coefficient of determination of 0.7927.

Table 9. Average Score of the Equity Return Ratio - ROE of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	1	1	4	1	1	1	3	4	1	1	3	1,91
2011	1	1	5	1	2	2	5	3	1	3	2	2,36
2012	1	1	4	1	2	2	5	1	1	2	1	1,91
2013	1	2	5	1	4	3	5	3	3	3	3	3,00
2014	1	2	4	1	3	4	5	3	3	4	3	3,00
2015	1	1	4	1	3	3	4	2	1	4	3	2,45
2016	1	2	5	1	2	4	5	2	2	4	3	2,82
2017	1	2	5	1	3	4	4	2	2	4	4	2,91
2018	1	2	5	1	3	4	4	2	5	3	4	3,09
2019	1	2	5	1	3	4	5	3	5	4	4	3,36
2020	3	4	5	3	3	4	5	4	4	5	4	4,00
2021	4	4	5	4	4	4	5	4	5	5	4	4,36
PROMEDIO	1,42	2,00	4,67	1,42	2,75	3,25	4,58	2,75	2,75	3,50	3,17	2,93
Desv. Stand.	0,9538	1,0000	0,4714	0,9538	0,8292	1,0104	0,6401	0,9242	1,5877	1,1180	0,8975	0,71
Varianza	0,9097	1,0000	0,2222	0,9097	0,6875	1,0208	0,4097	0,8542	2,5208	1,2500	0,8056	0,51
r	0,6454	0,8208	0,5633	0,6454	0,6260	0,8482	0,2829	0,1959	0,8134	0,8205	0,7800	0,89
r^2	0,4165	0,6737	0,3173	0,4165	0,3918	0,7194	0,0800	0,0384	0,6617	0,6732	0,6084	0,79
Coef. Variación	0,6733	0,5000	0,1010	0,6733	0,3015	0,3109	0,1397	0,3361	0,5774	0,3194	0,2834	0,24

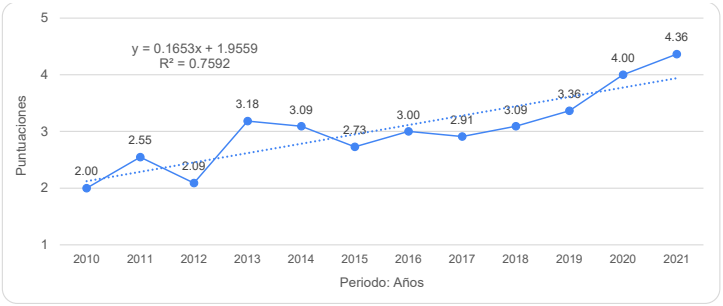
Source: Self-made.

Table 8 shows the evolution of the weighted average scores of the Equity Profitability Ratio - ROE of the 11 CMACs for the study period, it is observed that they have had the best performance were: CMAC Arequipa and CMAC Huancayo both with 1.42 points (robust level); however, it can be seen that for the years 2020-2021 both deteriorated from a normal level (2020) to a marginal level (2021), as a result of the COVID-19 pandemic. On the other hand, those with the worst average performance were CMAC del Santa with 4.67 points and CMAC Paita with 4.58 points, both at the same dissatisfied level. However, it can be seen that CMAC Maynas has already been presenting a deterioration since before the start of the pandemic (2020) with a clear tendency to deteriorate with a coefficient of determination of 0.7194.

The coefficient of variation of 0.24 in the average of the CMAC shows moderate dispersion in the data set (homogeneous), that is, the data is close to the average. In the case of the Arequipa, Cusco, Huancayo, Ica, Maynas, Piura, Sullana and Tacna CMACs, there is slight heterogeneity in the data, that is, the data is slightly away from their averages.

Asset Return Ratio- Return on Asset (ROA), which measures the profitability of the assets held by the financial entity, it being important that financial entities have a high ratio of net profit with respect to assets.

Figure 18. Evolution of the Average Score of the Return on Assets Ratio - ROA of CMAC (Period 2010-2021)



Source: Self-made.

Figure 17 shows the evolution of the weighted average score of the Return on Assets Ratio - ROA of the 11 CMACs, a clear trend of high deterioration can be seen, going from 2 points (satisfactory level) to 4.36 points (marginal level) with high coefficient of determination of 0.7592.

Table 10. Average Score of the Return on Assets Ratio - ROA of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	1	1	4	1	1	1	4	4	1	1	3	2,00
2011	1	1	5	1	2	2	5	4	2	3	2	2,55
2012	1	1	4	1	2	2	5	2	2	2	1	2,09
2013	2	1	5	1	4	4	5	4	4	3	2	3,18
2014	2	1	4	1	4	4	5	3	3	4	3	3,09
2015	2	1	4	1	3	3	5	3	2	4	2	2,73
2016	2	2	5	1	2	4	5	3	3	4	2	3,00
2017	2	1	5	1	2	4	4	3	3	4	3	2,91
2018	2	1	5	1	2	4	4	3	5	4	3	3,09
2019	2	2	5	2	2	3	5	4	5	4	3	3,36
2020	3	4	5	3	3	4	5	4	4	5	4	4,00
2021	4	4	5	4	4	4	5	4	5	5	4	4,36

PROMEDIO	2,00	1,67	4,67	1,50	2,58	3,25	4,75	3,42	3,25	3,58	2,67	3,03
Desv. Stand.	0,8165	1,1055	0,4714	0,9574	0,9538	1,0104	0,4330	0,6401	1,2990	1,1149	0,8498	0,65
Varianza	0,6667	1,2222	0,2222	0,9167	0,9097	1,0208	0,1875	0,4097	1,6875	1,2431	0,7222	0,43
r	0,8574	0,7424	0,5633	0,7312	0,3164	0,7048	0,0836	0,1697	0,8270	0,8769	0,6817	0,87
r^2	0,7351	0,5512	0,3173	0,5346	0,1001	0,4968	0,0070	0,0288	0,6838	0,7690	0,4648	0,76
Coef. Variación	0,4082	0,6633	0,1010	0,6383	0,3692	0,3109	0,0912	0,1873	0,3997	0,3111	0,3187	0,22

Source: Self-made.

Table 9 shows the evolution of the weighted average scores of the Asset Profitability Ratio - ROA of the 11 CMACs for the study period, it is observed that they have had the best performance: CMAC Huancayo, CMAC Cusco and CMAC Arequipa with 1.50 points , 1.67 points and 2 points all at a satisfactory level; however, it can be observed that CMAC Arequipa deteriorates long before the start of the pandemic (2020), with a tendency to deteriorate, presenting a high coefficient of determination of 0.7351. On the other hand, those that have presented the worst average performance were CMAC del Santa with 4.67 points and CMAC Paita with 4.75 points, both at the same dissatisfied level; where CMAC Paita presents a very low coefficient of determination of 0.0070, indicating greater stability in its deterioration.

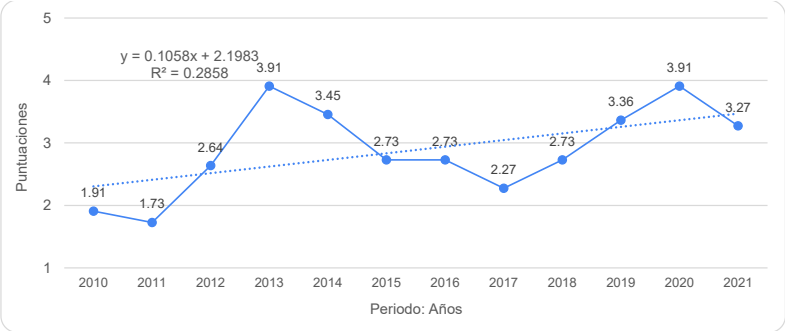
The coefficient of variation of 0.22 in the average of the CMACs shows moderate dispersion in the data set (homogeneous), that is, the data is close to the average. In the case of the Arequipa, Cusco, Huancayo, Ica,

Maynas, Sullana, Tacna and Trujillo CMACs, there is slight heterogeneity in the data, that is, the data is slightly away from their averages.

LIQUIDITY (MANAGEMENT)

The Liquidity Ratio has been considered, due to the fact that it is the availability that financial entities have in cash to face their daily operations and some prevention of liquidity problems, due to the fact that financial entities must place customer deposits, this liquidity ratio it must be lower but exceed the minimum limits required by the Superintendency of Banking and Insurance (SBS). Therefore, financial entities must have a low liquidity ratio, complying with the legal limits established by the SBS; If you have too much liquidity, it would affect your degree of profitability.

Figure 19. Evolution of the Average Score of the Liquidity Ratio in MN of CMAC (Period 2010-2021)



Source: Self-made.

Figure 18 shows the evolution of the weighted average score of the Liquidity Ratio in MN of the 11 CMACs, a low deterioration trend can be seen, going from 1.91 points (satisfactory level) to 3.27 points (normal level) with a low coefficient of determination of 0.2858.

Table 11. Average Score of the Liquidity Ratio in MN of the CMACs

CMAC	Arequipa	Cusco	Del Santa	Huancayo	Ica	Maynas	Paita	Piura	Sullana	Tacna	Trujillo	Prom. CMAC
2010	1	1	1	2	1	2	2	4	2	1	4	1,91
2011	1	1	1	1	1	4	4	1	1	1	3	1,73
2012	1	2	3	2	5	3	3	2	1	2	5	2,64
2013	3	2	4	4	5	5	4	4	3	4	5	3,91
2014	3	1	4	4	5	5	3	4	2	2	5	3,45
2015	2	1	4	1	5	3	3	3	1	4	3	2,73
2016	2	1	4	2	4	4	4	2	1	2	4	2,73
2017	1	1	4	3	2	4	4	1	1	1	3	2,27
2018	1	1	5	2	2	2	3	4	4	2	4	2,73
2019	1	2	5	1	2	4	4	5	5	3	5	3,36
2020	1	2	5	3	4	5	4	5	4	5	5	3,91
2021	2	1	5	2	3	4	3	5	3	5	3	3,27
PROMEDIO	1,58	1,33	3,75	2,25	3,25	3,75	3,42	3,33	2,33	2,67	4,08	2,89
Desv. Stand.	0,7592	0,4714	1,3617	1,0104	1,5343	1,0104	0,6401	1,4337	1,3744	1,4337	0,8620	0,68
Varianza	0,5764	0,2222	1,8542	1,0208	2,3542	1,0208	0,4097	2,0556	1,8889	2,0556	0,7431	0,47
r	-0,0795	0,1024	0,8776	-0,0119	0,0236	0,2509	0,3206	0,4883	0,5972	0,6061	-0,0420	0,53
r^2	0,0063	0,0105	0,7701	0,0001	0,0006	0,0629	0,1028	0,2384	0,3566	0,3674	0,0018	0,29
Coef. Variación	0,4795	0,3536	0,3631	0,4491	0,4721	0,2694	0,1873	0,4301	0,5890	0,5376	0,2111	0,24

Source: Self-made.

Table 10 shows the evolution of the weighted average scores of the Liquidity Ratio in MN of the 11 CMACs for the study period. It is

observed that CMAC Cusco has had the best performance with 1.33 points (robust level) with low dispersion with a lower standard deviation (0.4714) and variance (0.2222). On the other hand, those that have presented the worst average performance were CMAC del Santa with CMAC Maynas, both with 3.75 points, and CMAC Trujillo with 4.08 points, all at the same marginal level; where CMAC del Santa presents a high coefficient of determination of 0.7701, indicating a clear trend of greater liquidity that would imply greater deterioration due to not making the available money profitable.

The coefficient of variation of 0.24 in the average of the CMAC shows moderate dispersion in the data set (homogeneous), that is, the data is close to the average. In the case of the Maynas and Paita CMACs, they are the ones that show greater homogeneity in the data compared to the others.

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