

Macroeconomic trends: a brief statistical analysis of economic indicators for Ecuadorian credit unions

Tendências macroeconômicas: uma breve análise estatística dos indicadores econômicos das cooperativas de crédito equatorianas

Tendencias macroeconómicas: un breve análisis estadístico de los indicadores económicos de las cooperativas de crédito ecuatorianas

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University (UCAB), Venezuela.oolucas23@est.ucab.edu.ve (correspondence)**ABSTRACT**

The purpose of this article is to evaluate the financial relevance of the economic sector in the profitability of credit unions. Information from the financial statements of 105 credit unions out of a total of 451 credit unions registered as of 2022 in Ecuador was used. The methodology used involved descriptive and inferential statistical analysis. Normality tests and the Kruskal-Wallis hypothesis test were performed to determine statistical significance in relation to profitability. The results of the descriptive analysis indicated that the financial indicators, such as liquidity, portfolio turnover, indebtedness and profitability, were favorable for the cooperatives. In the inferential analysis, the profitability indicators complied with the assumptions of normality. In addition, it was found that there were no significant differences between these indicators in relation to the economic sectors. In conclusion, the inferential analysis revealed that financial profitability, which is linked to the investments made, is similar among credit unions, regardless of the economic sector to which they belong.

Keywords: Financial Relevance, Economic Sector, Profitability, Credit Unions.**RESUMO**

O objetivo deste artigo é avaliar a relevância financeira do setor econômico na rentabilidade das cooperativas de poupança e crédito. Foram utilizadas informações das demonstrações financeiras de 105 cooperativas de um total de 451 cooperativas registradas em 2022 no Equador. A metodologia utilizada envolveu análises estatísticas descritivas e inferenciais. Foram realizados testes de normalidade e teste de hipótese de Kruskal-Wallis para determinar a significância estatística em relação ao custo-efetividade. Os resultados da análise descritiva indicaram que os indicadores financeiros, como liquidez, rotação de carteira, endividamento e rentabilidade, foram favoráveis para as cooperativas. Na análise inferencial, os indicadores de rentabilidade atenderam aos pressupostos de normalidade. Além disso, constatou-se que não existiam diferenças significativas entre estes indicadores em relação aos setores econômicos. Em conclusão, a análise inferencial revelou que a rentabilidade financeira, que está ligada aos investimentos realizados, é semelhante entre as cooperativas de poupança e de crédito, independentemente do setor econômico a que pertencem.

Palavras-chave: Inteligência artificial, microeconomia, professores universitários.**RESUMEN**

El propósito de este artículo es evaluar la relevancia financiera del sector económico en la rentabilidad de las cooperativas de ahorro y crédito. Se empleó la información de los estados financieros de 105 cooperativas de un total de 451 cooperativas registradas al 2022 en Ecuador. La metodología utilizada involucró análisis estadísticos descriptivos e inferenciales. Se realizaron pruebas de normalidad y la prueba de hipótesis Kruskal-Wallis para determinar la significancia estadística en relación con la rentabilidad. Los resultados del análisis descriptivo señalaron que los indicadores financieros, como la liquidez, rotación de cartera, endeudamiento y rentabilidad, fueron favorables para las cooperativas. En el análisis inferencial, los indicadores de rentabilidad cumplían con los supuestos de normalidad. Además, se encontró que no existían diferencias significativas entre estos indicadores en relación con los sectores económicos. En conclusión, el análisis inferencial reveló que la rentabilidad financiera, la cual está vinculada a las inversiones realizadas, es similar entre las cooperativas de ahorro y crédito, independientemente del sector económico al que pertenezcan.

Palabras clave: Relevancia Financiera, Sector Económico, Rentabilidad, Cooperativas de ahorro y crédito.**ARTICLE HISTORY****Received:** 30-11-2023**Revised Version:** 27-01-2024**Accepted:** 29-01-2024**Published:** 02-02-2024**Copyright:** © 2024 by the author**License:** CC BY-NC-ND 4.0**Manuscript type:** Article**ARTICLE INFORMATION****Science-Metrix Classification (Domain):**

Economic & Social Sciences

Main topic:

Financial analysis of credit unions

Main practical implications:

Understanding credit unions' role informs policy-making for fostering inclusive finance. Governance reforms can enhance member satisfaction, while technology adoption can drive financial inclusion in developing economies.

Originality/value:

The article presents an analysis with original evidence that allows a better understanding of the impact of credit unions in savings and credit environment of the Ecuadorian context.

INTRODUCTION

Savings cooperatives in Ecuador have experienced a remarkable development in the last five years, consolidating their position as key players in the country's financial system. These entities, based on the principles of solidarity, equity and participation, have managed to attract the trust of a growing number of members, offering accessible financial services geared to the benefit of their members.

In the economic and social context of Ecuador, savings cooperatives have gained relevance as viable alternatives to traditional financial institutions, providing services tailored to the needs of their members and promoting a culture of savings and financial responsibility. Their focus on inclusion and the generation of opportunities for communities with less access to conventional banking services has been highlighted by several studies. One of the important pillars of the Ecuadorian Financial System is made up of Savings and Credit Cooperatives, due to their extensive growth obtained in recent years and the large number of clients they have managed to attract (Campoverde, Romero Galarza, & Borenstein, 2018).

This article will provide a detailed analysis of the development of savings cooperatives in Ecuador over the last five years, taking into account economic and social indicators that reflect their growth and contributions to the national financial system. In addition, regulatory policies and their impact on the strengthening and sustainability of these institutions will be examined. Through a multidisciplinary approach, we will seek to understand the role played by savings cooperatives in promoting an inclusive and sustainable economy in the country.

Services in this group of financial institutions are increasingly becoming a competitive factor and are considered an indispensable tool for the income flow of microentrepreneurs in rural areas (Mendiola et al., 2021). According to (Fuentes-Dávila, 2016) in the financial sector, it has been observed that institutions with competitive advantages establish solid relationships with their clients, resulting in favorable levels of client loyalty.

Background

Credit unions have emerged as significant players in the global financial landscape, especially in developing countries, where they play a crucial role in promoting financial inclusion and the economic development of disadvantaged communities. These financial institutions, based on the principles of cooperation, democracy and participation, have gained recognition for their focus on the welfare of their members and their ability to mobilize local resources for the benefit of the community.

Historically, credit unions emerged as a response to the shortcomings of the traditional financial system, especially in rural and low-income areas, where access to banking services was limited or non-existent. Over time, these institutions have evolved and diversified their services, becoming an attractive option for both individuals and small and medium-sized enterprises seeking more inclusive and affordable financial alternatives.

In the last decade, the savings and credit cooperative movement has experienced significant growth in different countries, and Ecuador is no exception. The presence of these cooperatives in the country has grown steadily, expanding their reach and diversifying their product and service offerings. Their ability to meet the financial needs of underserved sectors and provide personalized services has been key to their success.

At the end of April 2022 (see Table 1), the total assets of cooperatives in segments 1 and 2 grew by 1.8% with respect to March. Similarly, liabilities recorded a monthly increase of 1.9%. The balance of assets and liabilities stood at USD 20,037 million and USD 17,511 million, respectively; this meant an annual growth of 24.6% and 26.0% for each of them (ASOBANCA, 2022).

Table 1. Main Cooperative Savings and Credit Union Accounts in Ecuador

Main Accounts						
	Apr 21	Dec 21	Mar 22	Apr 22	Monthly change	Annual variation
Total assets	16.080	18.756	19.675	20.037	1,8%	24,6%
Contingents	278	363	361	368	2,1%	32,2%
Total Liabilities	13.898	16.353	17.187	17.511	1,9%	26,0%
Patrimony	2.155	2.403	2.456	2.481	1,0%	15,2%
Income	662	2.157	617	820	-	23,9%
Expenses	636	2.058	585	776	-	22,1%
Net profit	26,7	99,6	32,4	44,2	-	65,6%

Note: ASOBANCA, December 2022

Despite the progress and achievements made by credit unions, they also face significant challenges. Competition with larger and more established financial institutions, as well as adapting to regulatory changes, are just some of the challenges they face. In this context, scientific research on the functioning and performance of these credit unions becomes essential to understand their impact on the economy and the lives of their members.

The purpose of this article is to analyze the development and evolution of credit unions in Ecuador in recent years, highlighting their contributions to financial inclusion and the country's economic development. Through a multidisciplinary approach, key aspects will be examined, such as their role in employment generation, access to financial services and the promotion of a savings culture in diverse communities. The information obtained from this study can contribute to strengthening and improving the role of these cooperatives in the Ecuadorian financial landscape and their impact on the social and economic well-being of their members.

Framework proposal

This proposal outlines the framework for an in-depth analysis of credit unions, with a specific focus on their role in promoting financial inclusion and sustainable economic development. Credit unions and savings cooperatives have become vital players in the global financial landscape, providing accessible and affordable financial services to underserved communities. This study aims to shed light on key aspects of these institutions, including their governance structures, financial performance, social impact and member participation. By understanding these dimensions, we can gain valuable insights into their potential to foster inclusive growth and improve the well-being of their members.

Evaluate the governance and management practices of credit unions and thrifts: this objective will delve into the decision-making processes, leadership structure and regulatory compliance of these institutions. Understanding their governance practices is crucial to assessing their ability to operate in a transparent and sustainable manner.

Analyze the financial performance and sustainability of credit unions: this objective will focus on key financial indicators such as profitability, liquidity and asset quality. By assessing their financial health, we can determine the stability and resilience of these institutions, ensuring their long-term viability.

Investigate the social impact and community outreach of credit unions and savings cooperatives: this objective aims to measure the extent to which these institutions contribute to poverty alleviation, income generation and social development in the communities they serve. Assessing their social impact will help measure their effectiveness in promoting inclusive economic growth.

Explore member participation and engagement in credit unions and thrifts: This objective will examine the level of member participation in decision-making processes, as well as the extent to which members actively use the various financial products and services offered. Understanding member participation is critical to determining the success of these institutions in meeting the diverse needs of their members.

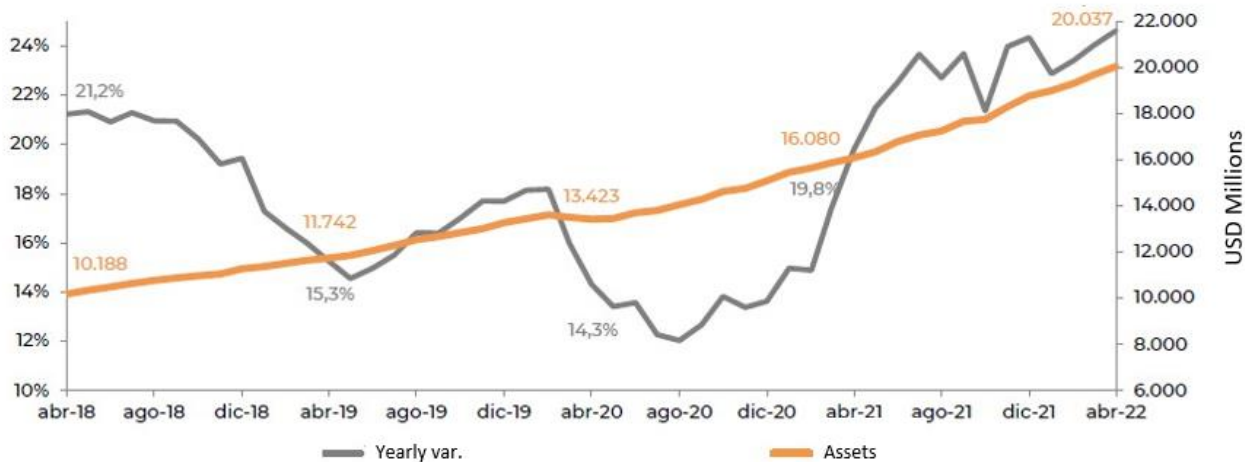
Table 2. Size of the Financial System of Cooperative Assets in Latin America

Countries	Financial System	%	Rank	CAC2	Rank	CAC as % in the		
						SF-LA	SFN	SFC-LA
Brazil	2.106.240,00	60%	1	75.380,00	1	1,78%	3,58%	51,29%
Mexico	550.079,00	16%	2	10.803,00	3	0,26%	1,96%	7,35%
Chile	429.356,00	12%	3	3.548,00	9	0,08%	0,83%	2,41%
Colombia	214.879,00	6%	4	5.631,00	5	0,13%	2,62%	3,83%
Ecuador	80.744,00	2%	8	20.346,00	2	0,48%	25,20%	13,84%
Costa Rica	62.069,00	2%	10	6.667,00	4	0,16%	10,74%	4,54%
Bolivia	45.874,00	1%	11	1.410,00	14	0,03%	3,07%	0,96%
	3.489.241,00	100%		123.785,00		2,92%		84,22%

Note: as of December 31, 2021

Provide policy recommendations and best practices to enhance the role of credit unions and thrifts in promoting financial inclusion and sustainable economic development: this objective will build on the findings of the previous objectives to provide practical recommendations for policymakers, stakeholders and credit unions themselves. The year 2022 proved positive for these financial institutions (see Figure 1), by identifying best practices, we can facilitate the replication and scaling up of successful models for greater social impact.

Figure 1. Total Credit Unions Assets



Note: ASOBANCA, December 2022

At the end of 2021, Credit Unions reached \$14,388 million USD in loan portfolio, equity of \$2,702 million USD, deposits of \$15,961 million USD and the number of members reached 5,149,208 (active members).

METHODS

The Kruskal-Wallis statistical method is a powerful and effective tool for measuring the relationship between credit unions and different sectors of the economy. This nonparametric technique is used to compare three or more independent groups and determine if there are significant differences among them in relation to a numerical variable. In the context of credit unions, this method is particularly relevant, since it allows us to analyze how these financial institutions perform in different economic sectors and whether their profitability varies according to the industry in which they operate.

To carry out the analysis using the Kruskal-Wallis method, financial data are collected from credit unions during a specific period, classifying the entities according to the sector of the economy in which they operate. Statistical tests are then applied to determine whether there are significant differences in profitability between groups. If differences are found, we proceed to analyze in which sectors credit unions perform more favorably and in which they face greater challenges.

The application of the Kruskal-Wallis method in this context provides a comprehensive view of how credit unions interact with different economic sectors and how these factors can affect their profitability and financial sustainability. It also allows us to identify opportunities to improve performance in certain sectors or to implement specific strategies to strengthen the presence of credit unions in areas where they can have a greater positive impact.

It is important to note that the Kruskal-Wallis method is especially useful when data do not meet normality assumptions or when working with small samples. This makes it an appropriate tool for analyzing financial data in the context of credit unions, which often operate in local markets and may have size limitations compared to other larger, multinational financial institutions.

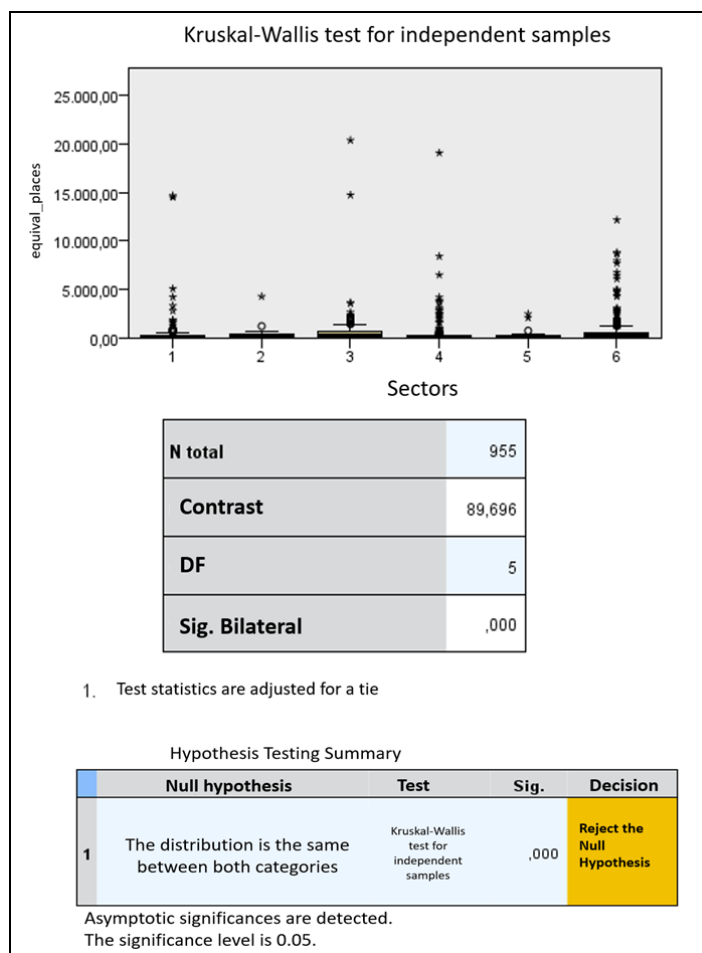
In summary, the Kruskal-Wallis method offers a valuable perspective for understanding the relationship between credit unions and different sectors of the economy. By analyzing how these financial institutions perform in various economic contexts, more informed decisions can be made to strengthen their market position and improve their financial performance for the benefit of their members and communities.

In the first phase, an inferential statistical analysis is carried out based on the hypothesis that there are no significant differences in the financial indicators DDP (distribution of seats) and GPS (group by sector) among credit unions in Ecuador. To perform this analysis, it is considered that there are more than two analysis groups, that the variables are continuous, and that there is a sample of more than 981 study units (clients), with all samples being independent. The normality of the samples will be evaluated using the Kolmogorov-Smirnov test; in case of non-compliance with normality, the one-way ANOVA test will be applied (Flores et al., 2017).

RESULTS

In the comparison of the PDD between the different subsamples, neither the required sample size nor the normality assumptions are met after applying the Kolmogorov-Smirnov test (Figure 2). It is important to note that for group number three, which represents the service sector, the normality hypothesis is rejected at a significance level of less than 0.05. Given this situation, it is necessary to use a non-parametric approach that allows us to make an inference about the differences in the GPS of these subsamples.

Figure 2. Kruskal-Wallis test for independent samples



Note: Own elaboration (2023)

CONCLUSIONS AND FINAL REMARKS

The purpose of this research was to analyze the relationship between credit unions and different sectors of the economy using the Kruskal-Wallis statistical method. The results obtained through descriptive analysis revealed unfavorable financial indicators for credit unions, highlighting a high standard deviation in portfolio turnover and solvency indicators, which could imply significant economic risks for the social capital of these institutions.

Regarding statistical inference, it was hypothesized that there were no significant differences in the financial indicators DDP and GPS between credit unions belonging to different sectors. However, when applying the Kolmogorov-Smirnov test, it was found that the assumptions of normality were not met for the service sector group, which led to the use of a non-parametric approach to make the comparison. This comparison showed that no significant differences were found in the PDDs between the subsamples.

In conclusion, the results of this study suggest that credit unions face challenges in terms of their financial indicators and liquidity, which could have implications for their ability to generate working capital and cover their debts in a timely

manner. However, no significant differences were found in the GPS between credit unions belonging to different economic sectors, suggesting a certain homogeneity in the financial performance of these institutions.

One of the main limitations of the research is the relatively small sample size, comprising only 105 out of 451 registered credit unions in Ecuador, potentially limiting the generalizability of findings. Additionally, the study encountered challenges with the normality assumptions of certain financial indicators, particularly in the service sector, necessitating the use of non-parametric tests, which might affect the robustness of statistical analyses. Furthermore, the research primarily focuses on financial indicators, neglecting other socio-economic and contextual factors that could influence credit union performance, such as government policies, socio-economic changes, and regulatory environments.

It is important to note that this research provides a preliminary and limited view of the relationship between credit unions and the different sectors of the economy, so it is recommended that more extensive and exhaustive studies be conducted in the future to delve deeper into this topic and obtain more solid and representative conclusions. It is also suggested that other variables and factors that may influence the financial performance of these institutions, such as government policies, economic changes and financial regulations, be considered.

In that sense, a research agenda could help to investigate credit unions' influence on financial inclusion, social impact, and member satisfaction. It proposes analyzing the nexus between financial inclusion and technology adoption in developing nations through regression analysis, exploring the impact of regulatory policies on credit unions' societal contributions globally via qualitative case studies, and examining the role of governance structures in enhancing member satisfaction across diverse contexts using surveys and interviews. By addressing these dimensions, researchers seek to enrich understanding of credit unions' role in fostering inclusive financial systems and promoting socioeconomic development worldwide. Table 2 present a suggestion of future research agenda towards the above discussion.

Table 3. Proposed research agenda for futures related studies

Dependent Variable	Independent Variable(s)	Methods	Context
Financial inclusion	Technology adoption	Regression analysis	Developing nations
Social impact	Regulatory policies	Qualitative case studies	Global
Member satisfaction	Governance structures	Survey and interviews	Multiple countries

Note: Own elaboration (2023)

With a more complete understanding of these relationships, strategies and actions could be identified to improve financial management and strengthen the role of credit unions in the country's economic development.

REFERENCES

- ASOBANCA. (2022). Evolución de la Cooperativas Financieras Ecuatorianas. <https://datalab.asobanca.org.ec>.
- Banco Central del Ecuador. (Marzo de 2014). "Dinero electrónico" del título décimo quinto "del dinero electrónico", del libro i "Política Monetaria-Crediticia", de la Codificación de Regulaciones del Banco Central del Ecuador". Guayaquil, Guayas, Ecuador.
- Campoverde Campoverde, J., Romero Galarza, C., & Borenstein, D. (2018). Evaluación de eficiencia de cooperativas de ahorro y crédito en Ecuador: Aplicación del modelo Análisis Envolvente de Datos DEA. Contaduría y Administración.
- Cardozo, E., Velásquez, Y., & Rodríguez, C. (2012). El concepto y clasificación de Pyme en América Latina. Global Conference on Business and Finance Proceedings,. Revista Global de Negocios.
- Fax, X. (2013). Nueva ola del dinero electrónico en América Latina. Portal de microfinanzas.
- Fuentes-Dávila, H. (2016). Determinantes del margen financiero en el sector microfinanciero: El caso peruano. Revista de Estudios Económicos.
- Hernández, R., Fernandez, C., & Baptista, P. (2006). Metodología de la Investigación. En R. Hernández, C. Fernandez, & P. Baptista, Metodología de la Investigación. Mexico: McGraw-Hill.
- Jeftanovic P., P. (2001). El Dinero Electronico y la Politica Monetaria. Pharos, 91.
- Magill, J. (2005). Microempresas y Microfinanzas en Ecuador. USAID, 4. Mendiola, A., Aguirre, C., Aguilar, J., & Chauca, P. (2021). Sostenibilidad y Rentabilidad de las Cajas Municipales de Ahorro y Crédito en el Perú. Ciencias Administrativas, revista digital Universidad Nacional de la Plata.

Muñoz, P. (12 de febrero de 2014). INEC. Obtenido de INEC Ecuador en cifras: <http://www.ecuadorencifras.gob.ec/directorio-de-empresas-un-paso-mas-para-un-futuro-sin-censos/>

Prado, J. (2006). Una mirada a las microempresas del Ecuador. Revista económica del IDE PERSPECTIVA, 2.

Requema, K., & et al. (2006). El dinero electrónico y la desaparición de los medios de pago tradicionales en países subdesarrollados. Caso: Venezuela. Eumed.net.

Rosero, J. (12 de febrero de 2014). INEC. Obtenido de INEC Ecuador en cifras: <http://www.ecuadorencifras.gob.ec/directorio-de-empresas-un-paso-mas-para-un-futuro-sin-censos/>

Sanabria, V., & otros. (2016). Comercio electrónico y nivel de ventas en las MiPyMEs del sector comercio, industria y servicios de Ibagué. Scielo.

Servicio de Rentas Internas. (2016). Obtenido de Servicios de Rentas Internas: <http://www.sri.gob.ec/de/32>

Tello, S. (2014). Importancia de la micro, pequeñas y medianas empresas en el desarrollo del país. Dialnet, 201-2017.

Vázquez, M., & García, R. (2005). Arquitectura de un Billeto Electrónico Anónimo. Medios Electrónicos de Pagos. Scielo.

Vega, M. (2013). Dinero electrónico: Innovación en pagos al por menor para promover la inclusión. Moneda/innovaciones.

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A. theoretical and conceptual foundations and problematization:	A1 100%
B. data research and statistical analysis:	100%
C. elaboration of figures and tables:	100%
D. drafting, reviewing and writing of the text:	100%
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F. Other (please indicate)	-

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