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Impact of Financial Products from the Cooperative Sector of the Popular and Solidarity Economy on Economic Growth, 2015–2024

Incidencia de los Productos Financieros del Sector Cooperativista de la Economía Popular y Solidaria en el Crecimiento Económico, 2015 – 2024

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Resumen

La presente investigación analiza la incidencia de los productos crediticios otorgados por las Cooperativas de Ahorro y Crédito (COACS), parte del sector cooperativista de la Economía Popular y Solidaria (EPS), en el crecimiento económico trimestral del Ecuador durante el período 2015-2024. La importancia del estudio radica en la ausencia de evidencia empírica que relacione el volumen de créditos del sector cooperativo con indicadores macroeconómicos. Bajo un enfoque cuantitativo, se aplicó un modelo econométrico de Regresión Lineal Múltiple, relacionando la variable Producto Interno Bruto (dependiente) con las variables crediticias de consumo, microcrédito, vivienda y producción. Los resultados evidenciaron un impacto positivo y significativo del crédito de consumo en el crecimiento económico, totalmente contrario al efecto detectado del crédito productivo, el cual es negativo y pone en juicio el panorama productivo que atraviesa el país. En contraste, los microcréditos, aunque significantes, se encuentran muy correlacionados a los créditos de consumo, evidenciando que se destinaron mayoritariamente a financiar gasto inmediato antes que ser destinados a proyectos comerciales, mientras que los créditos de vivienda no presentaron una incidencia real en el PIB. Esto en particular, refuerza la necesidad de una mejora y fortalecimiento de la gestión interna y supervisión de las COACS, además de un rediseño de las condiciones de los créditos más adaptadas al entorno económico actual, logrando de esta forma que los mismos sean destinados a actividades realmente productivas y no solo de consumo, logrando que de manera conjunta generen un impacto positivo en el crecimiento económico ecuatoriano.

Palabras claves: Economía Popular y Solidaria, créditos financieros, crecimiento económico.

Abstract

This research analyzes the impact of credit products provided by Savings and Credit Cooperatives (COACS), part of the cooperative sector of the Popular and Solidarity Economy (EPS), on Ecuador's quarterly economic growth during the 2015-2024 period. The importance of this study lies in the absence of empirical evidence linking the volume of credit in the cooperative sector with macroeconomic indicators. Using a quantitative approach, a Multiple Linear Regression econometric model was applied, relating the dependent variable Gross Domestic Product with the credit variables of consumption, microcredit, housing, and production. The results showed a positive and significant impact of consumer credit on economic growth, completely contrary to the negative effect detected by productive credit, which calls into question the country's productive outlook. In contrast, microcredits, although significant, are highly correlated with consumer loans, demonstrating that they were mostly used to finance immediate expenses rather than commercial projects, while housing loans had no real impact on GDP. This, in particular, reinforces the need to improve and strengthen the internal management and supervision of the COACS (Council of Agricultural and Social Development) and to redesign loan terms more adapted to the current economic environment. This ensures that loans are allocated to truly productive activities rather than just consumption, thereby generating a positive impact on Ecuadorian economic growth.

Keywords: Popular and Solidarity Economy, financial credits, economic growth.

Introduction

As a starting point, it is worth mentioning that the Popular and Solidarity Economy (PSE) has taken on a significant role in the national financial system, establishing a credit model based on solidarity and cooperation, channeled through institutions such as Savings and Credit Cooperatives (COACS), Mutual Societies, Community Banks, and Savings Banks.

Highlighting contextual background, the Popular and Solidarity Economy (PSE) emerged with the 2008 Constitution and consolidated its importance in 2011 through the Organic Law of Popular and Solidarity Economy (LOEPS), which defines it as a form of economic organization oriented towards the production, financing, marketing, and consumption of goods and services, prioritizing the human being as the central focus of economic activity. Subsequently, in 2012, the Superintendency of Popular and Solidarity Economy (SEPS) was created, the entity responsible for supervising and regulating financial institutions in the sector. (Castro, Chima, Orbe, and Ordóñez, 2022).

Given the context discussed above, these entities, and especially the COACs (Credit and Service Cooperatives), have played a key role in distributing financial resources to sectors historically excluded by the traditional banking system, such as entrepreneurs, informal merchants, and low- and middle-income households (León, Aguilar, & Ordoñez, 2023). Their purpose is inclusive rather than profit-driven (León, Bustos, & Pardo, 2022).

It is also important to clarify that the cooperative sector is exclusively composed of COACs, while the SFPS (Social and Solidarity Economy System) encompasses other institutions, including COACs themselves, associative and solidarity institutions (mutual societies), savings banks, and community banks (Mayorga, Masabanda, Garcés, & Toaza, 2019). This clarification is necessary to avoid future confusion.

Savings and credit cooperatives offer financial products such as consumer loans, production loans, microloans, and housing loans, with greater accessibility compared to traditional banks. However, despite their growth, their true impact on the country's economic growth has not yet been empirically proven.

Based on a brief literature review, academic interest has been identified regarding the contributions of the Social and Solidarity Economy (SSE) to reducing socioeconomic inequalities and promoting human development, a topic addressed by Malla et al. (2021). However, no empirical analysis has been conducted on how the individual effect of credit products has quantitatively impacted Ecuador's economic growth.

Given this, the identified problem is the lack of information on the quantitative impact of cooperative sector loans on Ecuador's economic growth. This hinders the measurement of the effectiveness of solidarity-based financing policies and limits the development of public strategies to promote financial inclusion.

Once the problem was identified, the study was deemed relevant on two levels: economically, because it will allow for the statistical measurement of the real effect of financial products on the dynamics of the economy; and academically, because it will provide a methodological guide for applying and interpreting linear estimation models, in addition to enriching the literature on the EPS (Economic and Social Production).

Recognizing the research relevance, the objective was to analyze the quarterly evolution of loans granted by Savings and Credit Cooperatives between 2015 and 2024, in order to calculate their impact on the country's economic growth using a Multiple Linear Regression econometric model.

The central hypothesis of this study is to determine whether the individual impact of these credit products has been positive for economic growth (H1) or, conversely, negative (H0).

In closing, this research is justified in two ways: academically, because it provides concrete data on a topic that has received little attention; and practically, because it offers useful information for public policy by evaluating the impact of popular and solidarity-based financing on the national economy.

Theoretical Framework

Popular and Solidarity Financial Institutions: Structure and Evolution

As noted in the introductory section, the Popular and Solidarity Financial System (SFPS) is composed of credit unions, mutual societies, savings banks, and community banks. Table 1 presents a definition of each of these institutions:

Table 1

Definition of Financial Institutions of the SFPS

Institution	Definition
Savings and Credit Cooperatives	Credit unions (COACs) are financial entities democratically managed by their own members, who own the organization. Unlike other institutions, these cooperatives obtain the resources for their loans primarily through the savings and deposits of their members, rather than relying on external capital (Luque & Peñaherrera, 2021).
Mutual Societies	Mutual societies function as credit institutions that receive savings from individuals and then channel them into loans for home purchases, construction projects, and family support programs. Their focus is on benefiting their members by providing them with financial solutions tailored to thei r needs (Superintendency of Banks and Insurance of Ecuador, 2012).
Savings Banks	According to the definition by Proaño et al. (2024), these institutions are dedicated to providing savings and credit products, aimed especially at their members, who typically belong to the same organization or community.
Community Banks	These entities have the possibility of acquiring legal personality, and their scope of action is limited to the specific areas where they are established, such as neighborhoods, communities, precincts, or localities. Their operation is focused on meeting the financial needs of these nearby environments (National Assembly of Ecuador, 2018).

Note: This is my own work, based on information from other authors.

The entities mentioned are classified by segments that are classified according to the balance of their assets. Table 2 refers to their classification:

Tabla 2

Classification of the Segments of the Institutions of the SFPS

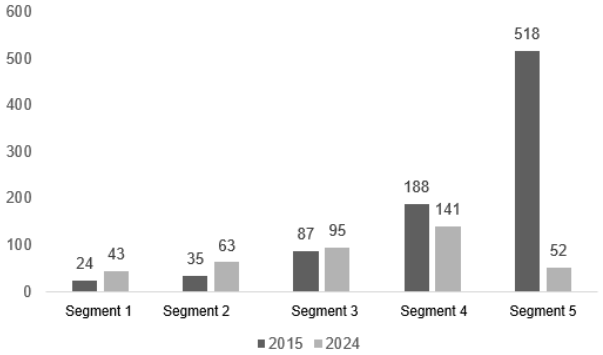
Segment	Assets
1	Over US$80 million.
2	Over US$20 million up to US$80 million.
3	Over US$5 million up to US$20 million.
4	Over US$1 million up to US$5 million.
5	Up to US$1 million (Savings Banks, Community Banks, and Savings Funds).

Note: Prepared with information from SEPS (2025).

Referring to the evolution of each of the institutions that make up these segments, Figure 1 is highlighted.

Figure 1

Evolution of the number of entities per Segment



Note: Prepared by: SEPS information (2025b).

As detailed in Figure 1, segments 1, 2, and 3 have experienced progressive growth over the 10-year period. Segment 1 saw a 79.17% increase, while segments 2 and 3 experienced 80% and 9.20% growth, respectively. In contrast, segments 4 and 5 experienced a reduction in

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the number of entities, contracting by 25% and 89.96%, respectively.

Exploring other statistical data, within the 2015-2024 period, there was a notable increase in the assets, members, coverage, and credit products of the SFPS entities. For example, information from SEPS (2025c; 2025g) revealed that between February 28, 2015, and December 31, 2024, the assets of institutions in the SFPS increased from US$7,427.5 million to US$27,780.71 million, representing a 274.03% growth. The number of members in the cooperative sector grew by 12% between 2015 and 2024, from 111,914 to 124,057 (SEPS, 2025a). Finally, the loan volume increased from US$313.4 million in February 2015 to US$646.10 million in December 2024 (SEPS, 2025f).

Financial Inclusion as a Driver of Economic Growth

As indicated by Altamirano et al. (2019), financial inclusion aims to ensure that the entire population has access to adequate financial services, improving their well-being, promoting entrepreneurship, generating opportunities, and reducing inequality, thereby strengthening economic development.

Research conducted by Góngora et al. (2023) in Mexico demonstrated a positive relationship between financial inclusion and economic growth, as the increase in ATMs, points of sale, and mobile banking boosts economic activity and highlights the need to promote policies that expand access to these services.

The study carried out by Khan et al. (2024) in Bangladesh, Malaysia, and Pakistan confirmed that financial inclusion has a positive and significant effect on economic growth, therefore recommending the promotion of policies that expand access to financial services to strengthen development.

According to the results of Ugwuanyi et al. (2022), financial inclusion, both traditional and digital, has a different impact depending on a country's income level. In middle-income nations, both types of inclusion have a positive and significant effect.

However, in lower-income countries, only digital financial inclusion demonstrates a significant impact. Highlighting the figures related to financial inclusion promoted by the SFPS, it is noteworthy that in 2024 there were, for every 10,000 people: 1.9 ATMs; 1.3 branches; 1.5 solidarity correspondents; 0.2 branches; and 0.3 headquarters. Globally, there were 5.2 service points linked to the SFPS per 10,000 people, exceeding the previous year's figure of 4.8 service points (SEPS, 2025e).

Relationship between Credit and Economic Growth

Credit allows individuals and businesses to obtain funds for investment or consumption, boosting economic activity by fostering the creation and expansion of businesses, and thus contributing to overall economic growth (Villarreal, 2024).

As Vallejo and Ochoa (2019) state, access to readily available credit, such as microloans, stimulates the economy by facilitating entrepreneurship and business expansion, improving family income, promoting education, and reducing poverty.

The correlational study by Izquierdo et al. (2018) indicated that between 2005 and 2015, the financial sector showed sustained growth in all its areas. During this period, credit volume and GDP maintained a direct relationship, as both registered parallel increases, reflecting a clear positive correlation between the both variables.

According to the research by Pulido and Hernández (2018), credit is a key factor in boosting the economy, as it directly influences variables such as production, consumption, and job creation. This reinforces the idea that aggregate demand conditions aggregate supply, both in the short and long term, by defining the levels of economic activity and employment.

Popular and Solidarity Economy (PSE): Foundations and Principles

Exploring the origins of the PSE, the literature review conducted by Hidalgo et al. (2024) indicates that it emerged in the late 20th century to address structural unemployment and social needs not met by the market or the State, reaching its peak in Ecuador after the 2008 Constitution and subsequent economic and financial reforms.

In their study, Albán et al. (2025) define the Social and Solidarity Economy (SSE) as a collaborative economic system that promotes collective organization, the equitable distribution of resources, and the development of marginalized areas, based on reciprocity, social justice, and community well-being.

According to Moran and Burgo (2024), the SSE is based on an alternative social model that promotes so-

lidarity, harmony with nature, community organization, collaboration, and diversified production systems to improve living conditions.

According to Mendoza et al. (2021), the SSE is based on ethical values and the common good, promoting integral development through the efficient use of resources, innovation, and collective knowledge, while avoiding ideological stances and authoritarian structures that limit its progress.

In the article developed by Sánchez et al. (2022), the Social and Solidarity Economy (SSE) in Ecuador is guided by the principles of Article 4 of the Organic Law of SSE and the Social and Solidarity Economy (SFPS), which prioritize human and collective development over individual profit.

1. The promotion of good living and the common good as central objectives.
2. The primacy of labor over capital, as well as the preference for community interests over private ones.
3. The practice of fair trade, along with ethical and conscious consumption.
4. The commitment to gender equality and respect for cultural diversity.
5. Self-management as a mechanism for economic empowerment.
6. The adoption of socially and environmentally responsible practices, accompanied by transparency and solidarity.
7. The fair and cooperative distribution of generated surpluses.

Financial Products Offered by the Popular and Solidarity Financial System

As previously indicated, the most prominent credit products of the SFPS are consumer and production loans.

Microcredits and housing. To gain a more precise understanding of these products, their definition is explored in Table 3.

Table 3
Definition of credit products

Types of credit	Definition
Consumer loans	Consumer loans have become one of the most sought-after financial options in Ecuador, as their approval is usually quick and accessible. These loans allow people to cover unexpected expenses or immediate needs, thus contributing to the economic well-being of individuals and their families (Paredes, 2023).
Microloans	Microcredit is aimed at individuals or businesses with annual sales not exceeding $100,000, as well as groups of beneficiaries who are jointly responsible for the loan. These resources are used to support small-scale productive or commercial projects, where repayment capacity depends primarily on the income generated by the financed activity (Carvajal & Espinoza, 2020).
Productive loans	At least 90% of these funds must be allocated to productive purposes such as the acquisition of machinery, purchase of real estate, construction of infrastructure, or other investments in fixed assets (León, Aguilar, & Ordoñez, 2023).
Housing loans	They are intended to finance the acquisition, remodeling and construction of real estate (Arciniegas & Pantoja, 2020).

Note: Prepared by the author using information from other sources.

To gain a more informed understanding of its demand, Figure 2 shows its annual evolution with respect to the amounts granted by the cooperative sector between 2015 and 2024.

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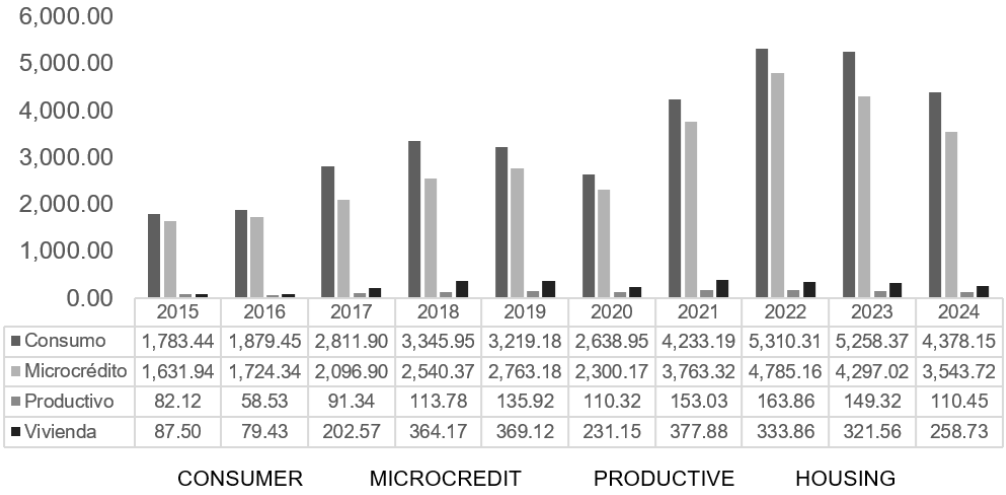
Figure 2

Evolution of credit amounts granted by the cooperative sector



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Consumo	1,783.44	1,879.45	2,811.90	3,345.95	3,219.18	2,638.95	4,233.19	5,310.31	5,258.37	4,378.15
Microcrédito	1,631.94	1,724.34	2,096.90	2,540.37	2,763.18	2,300.17	3,763.32	4,785.16	4,297.02	3,543.72
Productivo	82.12	58.53	91.34	113.78	135.92	110.32	153.03	163.86	149.32	110.45
Vivienda	87.50	79.43	202.57	364.17	369.12	231.15	377.88	333.86	321.56	258.73

Note: Prepared using SEPS data (2025d).

As can be seen, consumer and microcredit loans are the most dynamic, showing the greatest relative growth during the period, although with recent setbacks. In contrast, productive and housing loans have exhibited more volatile and limited behavior, which could indicate a lesser focus by the financial system on long-term or productive financing.

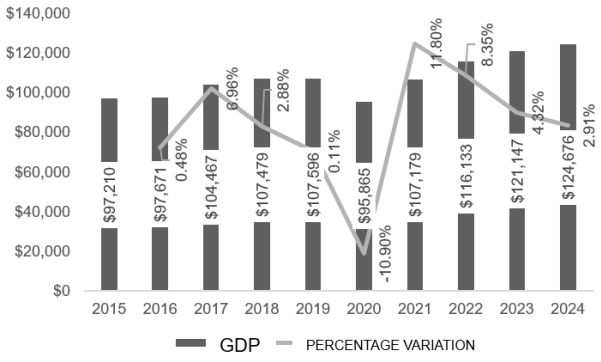
As Loor et al. (2023) argue, in recent years, savings and credit cooperatives have adopted a more comprehensive approach, driving not only economic growth but also social and cultural progress. These organizations have prioritized microfinance as a key tool for promoting genuine financial inclusion, even for groups historically marginalized by traditional banking. Today, cooperatives not only facilitate access to credit but also support the creation and strengthening of productive initiatives, contributing to local development.

Economic Contribution of the EPS to Ecuador's Economic Growth

Economic growth can be understood as the increase in a country's Gross Domestic Product (GDP) over a specific period compared to the previous year. According to Márquez et al. (2020), "economic growth" refers to the increase in the production of goods and services, as well as the increase in income generated by a country or society. Essentially, it reflects the expansion of productive capacity and the greater value generated by an economy.

Figure 3

Evolution of nominal GDP, 2015-2024



Note: Prepared by: Central Bank of Ecuador.

Figure 3 illustrates the volatility of Ecuadorian economic growth, with its period of greatest contraction occurring in 2020 due to the economic downturn caused by the pandemic, resulting in a 10.90% decrease. However, in 2021 the country recovered, growing by 11.80% in both absolute and relative terms, and continuing on a more plausible growth path in subsequent periods.

The results of the estimation by León et al. (2022) confirm that social welfare programs (SWP) have a significant impact on the country's economic growth, measured by real GDP. This relationship is evident in job creation, increased production, and the reduction of unemployment and poverty. Overall, they emphasize that the progress of SWP largely explains Ecuador's favorable position in the Human Development Index (HDI) globally.

The findings of León et al. (2020) indicate that the EPS (Social and Solidarity Economy) fosters entrepre-

neurship, family well-being, and fair trade, linking its economic activities with the principles of Buen Vivir (Good Living).

Methodology

The approach was quantitative, based on the positivist paradigm, which allowed for the collection, organization, and analysis of numerical data to explain social phenomena. Castañeda (2022) highlights that the quantitative approach enables the validation of hypotheses through statistical tools, which is fundamental to this study. According to Miranda and Ortiz (2020), the positivist paradigm considers valid knowledge to be that which can be measured, which aligns with the explanatory purpose of the analysis.

This research is explanatory in nature, as its objective is to establish how the study variables are related. According to Guevara et al. (2020), descriptive research avoids making inferences about the object of study, presenting truthful and concise information. This approach is relevant to the study, as it describes the main credit products offered by the cooperative sector, providing a better understanding of their function and purpose. It also characterizes the country's economic growth over the last 10 years.

The deductive method was used, which starts from a general premise (the positive relationship between credit and economic growth) to verify its applicability to the Ecuadorian case. Palmett (2020) argues that the deductive method is useful for validating general theories in specific contexts, making it suitable for research that seeks to quantify economic impacts based on established theory.

The study employed an explanatory approach, aiming not only to describe the behavior of the variables but also to establish how different types of loans quantifiably impact the country's economic growth. According to Guevara et al. (2020), explanatory research goes beyond mere description, focusing instead on identifying causal relationships.

The data collection technique involved a review of secondary sources. The statistical software used was STATA v.14, which allowed for the execution of the regression model and the performance of significance, multicollinearity, and residual normality tests to validate the robustness of the results.

The quantitative research technique employed a Multiple Linear Regression (MLR) model using the Ordinary Least Squares (OLS) method. According to Madroñero et al. (2021), this method allows for the estimation of linear relationships. A non-experimental correlational design was adopted, as variables were not deliberately manipulated. According to Sousa et al. (2007), this type of design analyzes phenomena in their natural context, allowing for the study of existing relationships without intervention. In this case, credit and economic growth data were observed as they occurred between 2015 and 2024.

Between explanatory variables and a dependent variable, minimizing the sum of squared errors. The selected functional form was logarithmic-logarithmic, in which a percentage change in the independent variables produces a percentage change in the dependent variable.

The database comprises a total of 40 data points, the sources of which are detailed below:

- Superintendency of Popular and Solidarity Economy (SEPS, 2025d), for financial product data.
- Central Bank of Ecuador (BCE, 2025), for GDP data.

The variables used to construct the model were:

Ln (GDP) = B0 + B1 ln (Consumption) + B2 ln (microcredits) + B3 ln (housing) + + B4 ln (productive)

The variables considered for constructing the model were transformed logarithmically because econometric models require fixed values.

The log-log regression model was chosen because this specification allows the coefficients to be interpreted as elasticities, facilitating the economic analysis of the credit-GDP relationship.

The logarithmic transformation reduces heteroscedasticity, stabilizes variance, and linearizes the nonlinear relationships characteristic of macroeconomic data, in addition to placing all variables on comparable scales. Furthermore, the log-log approach is widely used in studies of economic growth and credit, and in this case, it allowed for better agreement with the model assumptions, such as normality and the correct specification of the residual, as verified by the Jarque-Bera and Ramsey tests.

- Dependent variable (Y): Natural logarithm of economic growth (Ecuador's real quarterly GDP).
- Independent variables (X):
  - o Natural logarithm of consumer credit
  - o Natural logarithm of microloans

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o Natural logarithm of housing credit
o Natural logarithm of productive credit

Results

Before constructing the model, previous statistics were explored to understand the evolution of the variables of interest over the 40 quarters analyzed.

Table 4

Descriptive statistics of the study variables.

Descriptive statistics	GDP	Consumption	Microcredit	Housing	Productive
Mean	$ 26.985,60	$ 909,93	$ 773,66	$ 94,53	$ 48,31
Standard deviation	$ 2.501,89	$ 337,90	$ 290,85	$ 46,94	$ 19,57
Range	$ 10.255,75	$ 1.202,38	$ 1.072,59	$ 149,45	$ 66,10
Minimum	$ 21.328,69	$ 345,90	$ 304,53	$ 14,50	$ 13,30
Maximum	$ 31.584,43	$ 1.548,28	$ 1.377,12	$ 163,95	$ 79,40
Count	$1.079.424,07	$36.397,30	$ 30.946,53	$ 3.781,02	$1.932,57

Note: Table 4 was generated using STATA v.14 software.

Performing an analysis of the descriptive statistics of the proposed variables, it is observed that GDP has had a quarterly average of 26,985.60 million dollars, reaching a minimum of 21,328.69 million and a maximum of 31,584.43 million dollars respectively.

Regarding credit variables, it is observed that consumer credit has been the most in-demand type of credit, with an average quarterly volume of US$909.93 million, reaching a minimum of US$345.90 million and a maximum of US$1,548.28 million. Microloans rank second, with an average disbursement of US$773.66 million and a minimum of US$304.53 million and a maximum of US$1,377.12 million. Housing and productive loans occupy third and fourth place, with average disbursement volumes of US$94.53 million and US$48.31 million, respectively. These results reveal a low level of credit allocation to productive projects, indicating that over these 40 quarters, a larger percentage of loans have been used to finance borrowers' consumer spending rather than investment projects. However, it is worth noting the strong interest of borrowers in acquiring microloans to finance small-scale business projects.

Figure 4

Initial regression model

Source	SS	df	MS	Number of obs	=	40
				F(4, 35)	=	36.21
Model	.270590319	4	.06764758	Prob > F	=	0.0000
Residual	.065384675	35	.001868134	R-squared	=	0.8054
				Adj R-squared	=	0.7831
Total	.335974994	39	.008614743	Root MSE	=	.04322

lnPIB	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
lnCreditoConsumo	.4467425	.0984164	4.54	0.000	.2469465	.6465385
lnMicrocrédito	-.2003665	.0849105	-2.36	0.024	-.3727441	-.027989
lnCréditoProductivo	-.093523	.0421206	-2.22	0.033	-.1790323	-.0080137
lnCréditoVivienda	.0147856	.0442111	0.33	0.740	-.0749678	.104539
_cons	8.794966	.2314179	38.00	0.000	8.325163	9.26477

Note: Author's own elaboration.

A preliminary inspection of the general model reveals that the effect of housing loans is not significant, as its p-value > |t| is greater than 0.05. This implies that the null hypothesis (H0) that its coefficient is equal to 0 cannot be rejected; that is, it does not have a real effect on the model. In response to this problem, a new model will be developed that eliminates its impact.

Figure 5

Regression model with 3 independent variables

Source	SS	df	MS	Number of obs	=	40
				F(3, 36)	=	49.46
Model	.270381378	3	.090127126	Prob > F	=	0.0000
Residual	.065593616	36	.001822045	R-squared	=	0.8048
				Adj R-squared	=	0.7885
Total	.335974994	39	.008614743	Root MSE	=	.04269

lnPIB	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
lnCreditoConsumo	.4607051	.0880156	5.23	0.000	.2822012	.6392091
lnMicrocrédito	-.2021309	.0836945	-2.42	0.021	-.3718713	-.0323905
lnCréditoProductivo	-.081251	.0204221	-3.98	0.000	-.122669	-.039833
_cons	8.730434	.1261661	69.20	0.000	8.474558	8.986311

Note: Author's own elaboration.

In this new model of 3 independent variables, all meet the assumption of significance; however, when performing the post-estimation tests (linearity, normality, homoscedasticity and multicollinearity) it was revealed that the consumer credit variables and microcredits are highly correlated, meaning that the increase in microcredits is linked to the increase in consumer credits and vice versa, which in practical terms affects the quality of the estimates.

Figure 6

Multicollinearity test

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
lnCreditoC~o |     29.59    0.033793
lnMicrocré~o |     25.41    0.039355
lnCréditoP~o |      2.72    0.367370
-------------+----------------------
    Mean VIF |     19.24
```

Note: Figure 6 was generated using STATA v.14 software with the log-log model estimated under OLS

Figure 6 shows that the VIF values for consumer loans and microloans are greater than 10, confirming the aforementioned multicollinearity problem. Given this new issue, its impact on the new model will be disregarded.

Figure 7

Regression model with 2 independent variables

Source	SS	df	MS	Number of obs	=	40
				F(2, 37)	=	63.05
Model	.259753899	2	.129876949	Prob > F	=	0.0000
Residual	.076221095	37	.00206003	R-squared	=	0.7731
				Adj R-squared	=	0.7609
Total	.335974994	39	.008614743	Root MSE	=	.04539

lnPIB	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
lnCreditoConsumo	.2577464	.0278188	9.27	0.000	.2013801	.3141128
lnCréditoProductivo	-.0714558	.0212824	-3.36	0.002	-.1145779	-.0283336
_cons	8.731615	.1341518	65.09	0.000	8.459798	9.003432

Note: Figure 7 was generated using STATA v.14 software with the log-log model estimated under OLS

In this new regression model, the coefficients are significant, and the coefficient of determination is considerably high at 77.31%, meaning that 77.31% of the GDP variations are explained by variations in consumer and productive credit. Furthermore, the p-value of the model is less than 0.05, thus confirming that the model is generally significant with the integrated variables. Based on this validity, the following interpretations can be made from the coefficients:

- For every 1% increase in consumer credit, GDP will increase by 0.25%, thus establishing a direct linear relationship. This result helps to recognize the strong influence that this credit has had on the reactivation of consumption in Ecuador, providing economic resources to various families to cover their regular consumption expenses.
- For every 1% increase in productive loans, GDP will decrease by 0.07%, this denotes an inverse relationship which, in the context of the study addressed, would reveal a problem in relation to the use that has been given to the loans intended for production.

Figure 8

Ramsey test of model specification

```
. estat ovtest

Ramsey RESET test for omitted variables
Omitted: Powers of fitted values of lnPIB

H0: Model has no omitted variables

F(3, 34) =    1.22
Prob > F = 0.3174
```

Note: Figure 8 was generated using STATA v.14 software with the log-log model estimated under OLS

The Ramsey test allows us to determine if the model is correctly specified and if there are no omissions of independent variables that could affect the validity of the explanatory model. To accept this, the p-value must be greater than 5%, and as can be seen, this condition is fully met (0.32 > 0.05), indicating that the log-log model is adequate to explain the variations in GDP, and that there are no omissions of variables..

Figure 9

Jarque Bera Test of Residue Normality

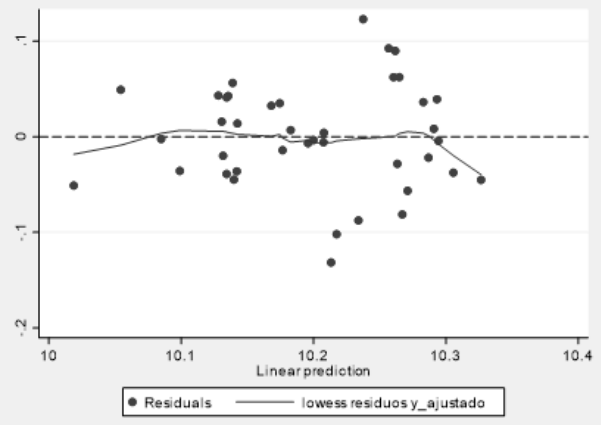
```
. jb residuos
Jarque-Bera normality test:  .8258 Chi(2)  .6617
Jarque-Bera test for Ho: normality:
```

Note: Figure 9 was generated using STATA v.14 software with the log-log model estimated under OLS

The Jarque-Bera test allows us to determine whether the residuals or estimation errors follow a normal distribution, thus conforming to the Gaussian bell curve, which is essential for valid estimates. To accept this assumption, the p-value must be greater than 0.05, which is also the case here (0.6617 > 0.05), indicating that the residuals are normally distributed.

Figure 10

Homoscedasticity and Linearity Test



Note: Figure 10 was generated using STATA v.14 software with the log-log model estimated under OLS

Visually, the assumptions of homoscedasticity and linearity can be accepted. The residuals within the plane are uniformly distributed; that is, they do not show a clear trend or concentration at a specific point, thus reinforcing the constant variance of the residuals, or homoscedasticity. Finally, it can be seen that the red estimation line does not fit the residuals, which helps to corroborate that the model exhibits linearity.

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Figure 11
Multicollinearity test

Variable	VIF	1/VIF
lnCreditoC~o	2.61	0.382454
lnCréditoP~o	2.61	0.382454
Mean VIF	2.61	

Note: Figure 11 was generated using STATA v.14 software with the log-log model estimated under OLS

To finalize the model validation, it is observed that the VIF values for each variable are less than 10, indicating that they are not correlated and that their values are independent of each other. This improves the quality of the estimates, given that the coefficients for the consumer credit variable will not be influenced by changes in the productive credit variable, having their own effect on the explanatory variable.

Discussion

The results obtained in this study conclude that consumer loans granted by credit unions have a positive and significant effect on Ecuador's GDP by increasing purchasing power, stimulating aggregate demand, and promoting capital circulation. This contributes to economic recovery by allowing families to cover expenses and maintain consumption levels that, in turn, sustain production and employment.

However, although consumer loans have a positive impact, they predominate over productive loans, indicating a distortion in the credit unions' loan portfolios. In this regard, authors such as Luque and Peñaherrera (2021) suggest that the cooperative sector often mimics the logic of private banks, prioritizing low-risk, quick-return operations instead of financing long-term productive projects, confirming that productive loans represent the smallest volume.

The results show that productive loans have an inverse relationship with GDP, reflecting shortcomings in their allocation. According to Quintanilla et al. (2024), this is due to the weakness of the productive sector and the inability of many borrowers to transform financing into profitable investments. The Development Finance Institutions Network (2024) points out that factors such as high interest rates, risk costs, and poor planning limit the practical impact of these loans.

On the other hand, the study found that microloans, despite their high demand, exhibit multicollinearity problems with consumer credit, indicating that, in several cases, their uses are correlated. This aligns with the findings of Lodoño et al. (2021) in Colombia, who warn that microcredit can have counterproductive effects if it becomes a financial burden for vulnerable households. In the Ecuadorian context, evidence suggests that these funds are mostly allocated to immediate consumption rather than investment, which limits their independent impact on the economy.

Regarding housing credit, the model determined that its effect on economic growth is not significant. This finding aligns with positions such as that of Díaz (cited in Abad and Morocho, 2023), who argues that mortgage credit, despite its undeniable social value in improving access to housing, does not have a direct effect on GDP dynamics, its economic impact being more indirect.

Although cooperatives seek to promote inclusion and social development, their focus on consumer credit limits their capacity to generate structural changes. Flor and Rivera (2024) indicate that, while credit stimulates demand, its limited productive impact highlights the need to focus strategies on production and the common good, in accordance with the principles of the Social and Solidarity Economy (SSE).

The research partially confirms the hypothesis: consumer credit drives growth, while productive and housing credit have a limited impact. It is necessary to reorient cooperatives toward more competitive and accessible productive loans so that they can act as engines of investment and sustainable development, aligned with the SSE.

Conclusions

The purpose of this study was to analyze the impact of the main credit products offered by Savings and Credit Cooperatives (COACS) on Ecuador's economic growth during the period 2015–2024. A multiple linear regression model, in its logarithmic-logarithmic form, was applied to quantitatively estimate the relationship between consumer credit, microcredit, housing, and productive credit with respect to Gross Domestic Product.

The econometric results demonstrate that consumer credit has a positive and statistically significant effect on economic growth. This finding confirms that consumer financing is an immediate driver of aggregate demand growth, aligning with the literature that links it to economic reactivation and the enhancement of household purchasing power.

In contrast, productive credit showed a negative relationship with GDP, highlighting inefficiencies in the allocation of these resources to activities with the potential to generate added value. This finding reinforces the argument that productive loans have not fully fulfilled their role in boosting national production due to barriers such as high financial costs, default risks, and weaknesses in the planning of these investment projects.

Microloans, while significant in terms of volume, showed a high correlation with consumer loans, without an independent effect on GDP. This suggests that, in practice, they have been more geared toward financing immediate household needs than sustainable productive projects, thus limiting their contribution to economic growth. Housing credit did not show a significant impact on GDP, indicating that, although it provides social benefits to households in terms of access to housing, its macroeconomic impact is more indirect.

In summary, the study hypothesis was partially confirmed. While consumer credit showed a positive impact on economic growth, productive and housing credit did not demonstrate significant effects or even showed a negative relationship, which calls into question the current orientation of the cooperative loan portfolio.

The study provides econometric evidence on how different types of cooperative credit affect growth, guiding the management of cooperative credit unions and public policies toward a more balanced portfolio that generates sustainable development. It is recommended that future studies consider social effects, financial inclusion, and well-being, and evaluate subsequent periods to detect changes in the economic impact of loans.

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