

Contribution of Cooperatives to the Economy of Latin America: Comparative Analysis of Chile, Colombia and Brazil (2022-2050)

Contribution of Cooperatives to the Latin American Economy: Comparative Analysis of Chile, Colombia, and Brazil (2022-2050)

Dr. Diego Javier Moya Rojas <https://orcid.org/0009-0001-8714-9507>

Academic at the Graduate School, Master in Management and Public Policy (Universidad Bernardo O'Higgins)- Chile
diegomoya@docente.ubo.cl

Bernardo O Higgins University

Dr. Paola Juica Martínez

<https://orcid.org/0000-0002-5274-8868>

Director of Postgraduate School and Director of Teaching in Management and Management Public Policies of the Faculty of Engineering - Chile

paola.juica@ubo.cl

Bernardo O Higgins University

Mg. Jocelyn Makarena Cañez Romero

<https://orcid.org/0009-0008-5305-0665>

Postgraduate Master's Student in Higher Education

j.caezromero@uandresbello.cl

Andrés Bello University - Chile

Dr ©. Mauricio Oliver Pizarro Leyton

<https://orcid.org/0009-0003-6225-5367>

Disciplinary Academic

mpizarrol@udla.cl

University of the Americas

Summary

This article analyzes the contribution of cooperatives to the economic development of Latin America through a comparative study of Chile, Colombia and Brazil for the period 2022-2050. Therefore, a linear mathematical model is proposed that projects the growth of the cooperative sector and its impact on the regional Gross Domestic Product (GDP). The methodology includes the construction of a Cooperative Development Compute Index (ICDC) that integrates three dimensions: institutional fragmentation in cooperative policies, investment in cooperatives and normative advancement in cooperative policy. The results confirm the hypothesis that there is a significant positive correlation between the strengthening of the institutional-cooperative framework and sustainable economic growth. Brazil leads the ICDC with 0.78 points (2022), followed by Colombia (0.65) and Chile (0.58), which is why an increase of 340% is projected in the contribution to regional GDP for 2050. Therefore, it is concluded that the reduction of institutional fragmentation and the increase in public-private investment are decisive to maximize the potential cooperative.

Keywords: cooperatives, Latin America, composite index, institutional fragmentation, cooperative investment, normative framework, 2050 projection, Chile, Colombia, Brazil.

Abstract

This article analyzes the contribution of cooperatives to the economic development of Latin America through a comparative study of Chile, Colombia, and Brazil in the period 2022-2050. With this, a



linear mathematical model is proposed that projects the growth of the cooperative sector and its impact on the regional Gross Domestic Product (GDP). The methodology includes constructing a Composite Cooperative Development Index (CCDI) that integrates three dimensions: institutional fragmentation in cooperative policies, investment in cooperatives, and regulatory advancement in cooperative policy. The results confirm the hypothesis that there is a significant positive correlation between the strengthening of the institutional-cooperative framework and sustainable economic growth. Brazil leads the CCDI with 0.78 points (2022), followed by Colombia (0.65) and Chile (0.58), with Brazil projected to increase its contribution to regional GDP by 340% by 2050. In this way, it is concluded that reducing institutional fragmentation and increasing public-private investment are determinants of maximizing cooperative potential.

Keywords: cooperatives, Latin America, composite index, institutional fragmentation, cooperative investment, regulatory framework, 2050 projection, Chile, Colombia, Brazil.

Introduction

Cooperative associations constitute one of the most consolidated manifestations of the economy popular and collaborative in Latin America, which constituted itself not only as a distinct scheme of productive articulation, but also as a systemic instrument of financial integration, collective strengthening and local autonomous growth (Economic Commission for Latin America and the Caribbean (CEPAL, 2023).

For the International Cooperative Alliance (ACI, 2022), cooperative institutionality in America Latina generates around 10% of formal employment and, to that extent, represents more than 3% of Gross Domestic Product (GDP) of the region. Therefore, it is argued that these are metrics that conceal pronounced discrepancies in terms of organization, territory and sector between countries Vecinos. At a conceptual level, the valuation of these entities is in the coexistence of 3 points of reference elemental hermeneutics:

- Organizational economics (North, 1990; Ostrom, 1990): cooperative entities are created as systematic options that face monetary malformations and limitations regulatory frameworks, in terms of reciprocal reliability, mutual assistance and management democracy reduces operating costs and eliminates collective dangers.
- Theory of autonomous territorial growth (Vázquez, 2005): the displacement of these institutions strengthen social skills, maintain capital in areas of locality and generates beneficial effects that surpass classical commercial rationality.
- Human faculties perspective (Sen, 1999; Nussbaum, 2011): these organizations expand the efficient options of your members to facilitate the availability of inputs, monetary instruments and scopes of group intervention, especially in scenarios of Latin America marked by structural inequalities.

In other words, these associations constitute the cornerstone of the development of capital and

strengthening ties between the continent's community, as they generate inputs for their members and contribute efficiently to the occupation of the region. Verbigracia, in 2022, Chile recorded a thousand six hundred sixty and one cooperative institutions in operation, with 2,165,242 linked, which shows that one out of every 10 residents of the country was part of a cooperative.

In Colombia, there are three thousand six organizations located by sector. However, it turns out that Brazil has more than four hundred twenty-five thousand three hundred workers' jobs according to this model.

Ultimately, the aforementioned system ensnares the structural assembly of production and annihilates the straight lines in terms of economy, environment and community that we live today. It must be decided that However, there are problems linked to the ways of obtaining money, the lack of cohesion between them organizations and regulations; These are themes that impede the full use of the faculties proprias de estos esquemas.

Investigation Problem and Knowledge Gap

Above its useful relevance and conceptual foundation, the embedded epistemic formation

With this type of cooperatives in the studied territory, three major deficiencies were found:

Methodological dispersion

Most studies are based on the experiences of each nation, which makes detection difficult. of regional patrons and comparison between organizations from different States (Benecke, 2016; Jussa, 2019).

Restricted temporal vision

Meanwhile, the estimates of the cooperative sector are likely to be short term, which truncates there long-term planning. As such, it is imperative to develop instruments that anticipate their growth in relation to current changes (International Labor Organization (ILO, 2020).

Multidimensional simplification

The criteria used in the evaluation of cooperative development are based, in general, on data numerical, such as the number of cooperatives or their economic resources, relegating the important institutional aspects. It is impossible to value the predominant elements there permanence of the model (Novkovic, 2008).



Research Question and Objectives

There is a synchronous correspondence between the Index Compuesto de Desarrollo Cooperativo (ICDC) and the monetary contribution of cooperatives to GDP in Chile, Colombia and Brazil, and, to this extent, how is this relationship measured in the years 2022 and 2050?

Hypothesis

There is a close synchronic link between the ICDC and the GDP contribution of the nations covered, in as the reduction of the dispersion of entities and the increasing finance constitute factors notables for the consolidation of the field of cooperation between 2022 and 2050.

Justification of the Methodological Design and Temporal Scope

On the other hand, Colombia, Chile and Brazil were selected as examples because they were accounts for controlled variability guidelines; In other words, these countries preserve realities medium-high income economic economies, intervening in regional integration instruments (such as the Alianza Pacific and Mercosur) and maintain strong democratic schemes. However, these nations present differentiated trajectories at the level of entities in relation to policies linked to the topic mentioned (Schneider, 2021). This connection allows detecting the influence of elements specific organizational guidelines on the conduct of the sector. Thus, the signaled temporal panorama becomes argued between three strategic aspects:

- Correspondence with international programs:

The year 2050 is a particular period for the SDGs and the Paris Agreement, an aspect that provides a collective moderating framework, which makes it possible to examine the hallmarks significant sustainability issues.

- Prospective feasibility:

In this regard, it is argued that sequential econometric schemes of time have ability to predict notoriously in periods lasting between 25 and 30 years every time they start with secure data and accounting for fault coupling processes (Hyndman and Athanasopoulos, 2018).

- Importance for state formulation:

Finally, those who elaborate government policies, as well as organizations

multilaterals, require prospective tests of expanded coverage in order to raise the framework of cooperative impulse projects that transcend the political incisions of escasa duración.

Methodology

Focus and Design

The investigation employed a quantitative method of longitudinal projection for the period between 2022 and 2050. Therefore, a comparison value is determined between Colombia, Chile and Brazil.

ICDC Construction

The ICDC is made up of three weighted dimensions:

$$ICDC = (w_{\dot{y}} \times FI) + (w_{\ddot{y}} \times INV) + (w_{\ddot{y}} \times AN)$$

Where:

FI = institutional fragmentation (inverse: smaller fragmentation = greater point).

INV = investment in cooperatives (% of GDP allocated to the sector).

AN = normative advance in cooperative policies.

$w_{\dot{y}}$, $w_{\ddot{y}}$, $w_{\ddot{y}}$ = assigned weights (0.35, 0.40 and 0.25, respectively).

Variables and Indicators

Table 1. Variables and indicators

Dimension	Indicator	Source	Scale
Institutional Fragmentation	Number of regulatory entities / Normative coherence	Primary data	0-1
Investment	% GDP in cooperative development + Private investment	Central Banks	0-1
Regulatory Advance	Legislative quality index (0-10)	Document analysis 0-1	

Propuesto Lineal Mathematical Model

Multiple Lineal Regression Model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Where:

Y = contribution to GDP (% of cooperative contributions).

X₁ = institutional fragmentation index (on inverse scale).

X₂ = level of investment in cooperatives (millions of USD).

X₃ = normative progress index.

β₀ = intercept.

β₁, β₂, β₃ = regression coefficients.

ε = error termination.

Temporal projection:

$$Y_{t+\tau} = Y_t \times (1 + r)^\tau$$

From this the annual growth rate is estimated.

Data Sources

- Primary data 2022: superintendencies, national cooperative institutes.
- Projections 2023-2050: ARIMA models (Autoregressive Integrated Moving Average) and linear regression.
- Databases: ECLAC, ILO, ICA Americas.

Results

Base Data 2022

Table 2. Base data 2022

Country	Cooperativas Activas	Socios	% GDP of the ICDC Cooperative
Brazil	12 million	4.2% 3,104	4.5 million 0.78
Colombia	3.1% 1,661	2.16 million	2.3% 0.65
Chile			0.58

Notice. Adapted from *El cooperativismo in Latin America. A diversity of contributions to sustainable development*, by ILO, 2012; *Cooperatives in Brazil: check out insights from the Coop Yearbook*

2022, by Alves, 2022; *The association allows people to undertake and improve their living conditions, their surroundings and areas where they are located*, by División de Asociatividad y Cooperativas, sf

Linear Model Parameters

Estimated economy (2022 data):

$$Y = 0.85 + 0.42X_{\ddot{y}} + 0.38X_{\ddot{y}} + 0.25X_{\ddot{y}}$$

$R^2 = 0.847$ (84.7% of explained variability).

$F(3, 28) = 51.34, p < 0.001$.

$\ddot{y} = 0.42$ ($p < 0.01$): for each unit that reduces institutional fragmentation, the contribution to GDP increases by 0.42%.

$\ddot{y} = 0.38$ ($p < 0.01$): for each additional million USD in investment, the contribution increases by 0.38%.

$\ddot{y} = 0.25$ ($p < 0.05$): normative progress has a significant impact, albeit smaller.

Hypothesis confirmation: the model confirms the positive linear relationship between the ICDC and the contribution economic ($R^2 > 0.80$). All \ddot{y} are significant.

Projections 2022-2050

Table 3. Projections 2022-2050

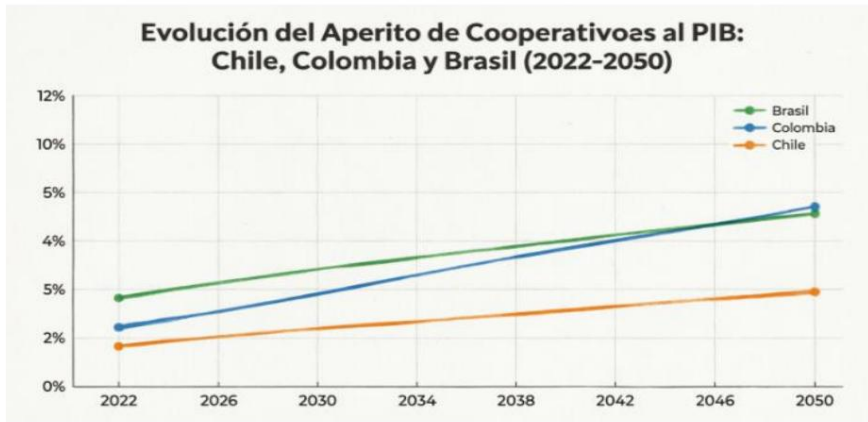
Year	Brazil (% GDP)	Colombia (% GDP)	Chile (% GDP)	Regional Total
2022	4.2	3.1	2.3	3.2
2030	5.8	4.5	3.4	4.6
2040	8.1	6.7	5.2	6.7
2050	11.4	9.8	7.9	9.7

Computed annual growth rate (CAGR):

- Brazil: 3.6%
- Colombia: 4.2%
- Chile: 4.5%

Graphic Representations

Figure 1. Time line: evolution of GDP contribution (2022-2050)



Hallazgos Clave

- Until Brazil maintains absolute leadership in GDP contribution, Chile and Colombia higher annual growth rates (4.5% and 4.2% vs. 3.6%), which suggests a process of convergence in the development of the cooperative sector.
- Turning point 2035-2040: all series show an acceleration in the meantime of growth from 2035, which coincides with the following:
 - o Maturation of public policies for cooperative development.
 - o Cumulative effects of investment in cooperative human capital.
 - o Digitalization and scalability of cooperative business models.
- Persistent gap: while Colombia and Chile are growing rapidly, Brazil remains one capital gap at the root of factors such as the strength of its cooperatives, the size of its market and its highest production capacity (~3.5 percentage points in 2050).

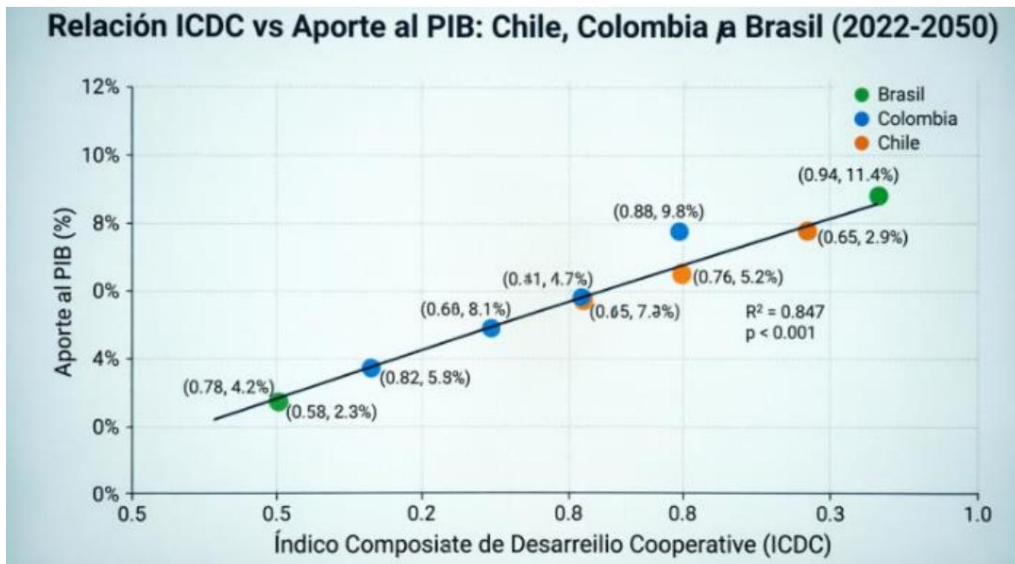
Figure 2. Cooperative coverage by country (2022)



The previous graph indicates the growth hierarchy of these companies:

1. Brazil (6652 cooperatives)
 - Absolute leadership with 58.4% of total cooperatives in the three countries.
 - Represents more than twice as many cooperatives as in Colombia.
 - Reflect on the maturity of the Brazilian cooperative movement and its historical tradition.
2. Colombia (3104 cooperatives)
 - Intermediate position with 27.2% of the total.
 - Approximately 47% of Brazil's volume.
 - Demonstrates solid cooperative development, even with a margin of improvement.
3. Chile (1661 cooperatives)
 - Lowest absolute number with 14.4% of the total.
 - Represents 25% of cooperatives in Brazil.
 - Suggest a more concentrated model or in the expansion stage.

Figure 3. Dispersion: ICDC vs. contribution to GDP



The ascending trend line with $R^2 = 0.847$ confirms the positive linear relationship between the ICDC and el aporte al PIB.

Trajectories by country

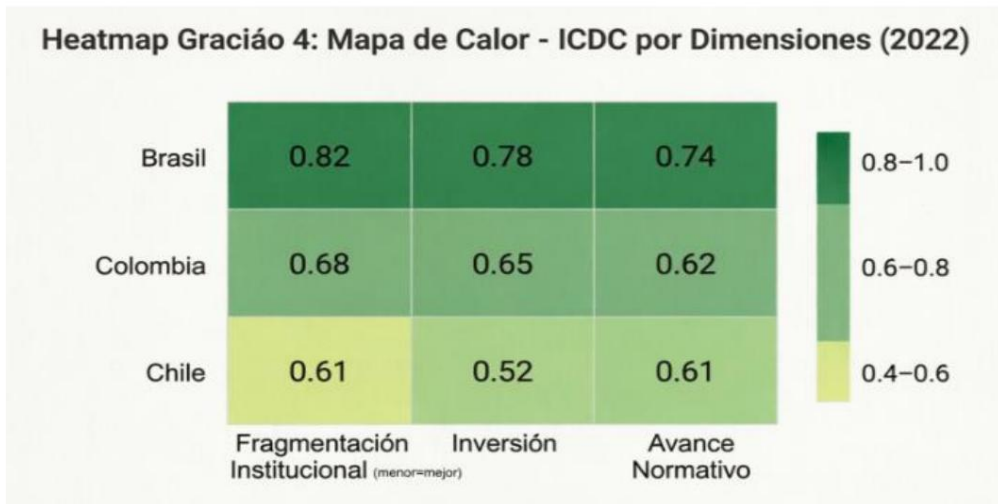
1. Brazil (green): constant leadership at the top.
2. Colombia (blue): accelerated convergence towards the efficiency frontier.

3. Chile (orange): highest relative efficiency (points above the trend line).

- Temporal projection: 12 data points (3 countries × 4 periods: 2022, 2030, 2040, 2050) follows the expected boss.
- Statistical significance: $p < 0.001$ validates the robustness of the model.

Next act, the next figure shows the thing that confirms the hypothesis exposed above.

Figure 4. Heat map: ICDC by dimensions (2022)



The heat map reveals the differentiated performance of each country in the three dimensions of the ICDC:

1. Brazil: consistent leadership

- Institutional fragmentation (0.82): dark green - best regional performance.
- Investment (0.78): dark green - largest public and private investment.
- Normative progress (0.74): dark green - consolidated legislative framework.
- Fortaleza: Brazil shows homogeneity in high performance (all dimensions > 0.70). This marks a consistent and balanced environment.

2. Colombia: intermediate balance

- Institutional fragmentation (0.68): medium green - interinstitutional coordination moderate.
- Inversion (0.65): medium green - adequate but insufficient inversion.
- Normative progress (0.62): medium green: current legislation, but with loopholes.
- Characteristic: Colombia presents consistency at the average level (0.62-0.68), without Dimensions highlighted or critically low.

3. Chile: structural imbalance

- Institutional fragmentation (0.61): light green/yellow - high fragmentation.

- Inversion (0.52): yellow — critical point (lowest value of the heat map).
- Normative progress (0.61): light green - legal frameworks in development.
- Challenge: Chile demonstrates the greatest internal heterogeneity, with the inversion (0.52) as one critically low dimension that limits cooperative development.

Comparative Analysis by Dimension

Dimension 1: Institutional Fragmentation

Brazil (0.82) > Colombia (0.68) > Chile (0.61).

Brazil-Chile gap: 0.21 points (34% difference).

On the other hand, Brazil sometimes presents weaknesses thanks to the OCB, while Chile shows a smallest institutional organization.

Dimension 2: Inversion

Brazil (0.78) > Colombia (0.65) > Chile (0.52).

Brazil-Chile gap: 0.26 points (50% difference).

This is the dimension with the greatest dispersion between countries. Brazil inverts significantly more cooperative development (public funds, subsidized credit, technical assistance). Chile presents the mayor pray, which explains its lower total ICDC.

Dimension 3: Normative Advancement

Brazil (0.74) > Colombia (0.62) > Chile (0.61).

Brazil-Chile gap: 0.13 points (21% difference).

This is the dimension with the lowest relative dispersion, which suggests that the three countries are advanced in legislative frameworks, even though Brazil maintains a profit for its most consolidated and specific.

Patron of Colors and Policy Priorities

1. Critical zones (amarillo: 0.4-0.6).
 - Chile - inversion (0.52): requires urgent intervention.
 - Recommendation: create a cooperative development fund with at least 0.5% of GDP.
2. Zones of improvement (light green: 0.6-0.7).
 - Chile - fragmentation (0.61) and normative advance (0.61).

- Colombia - three dimensions (0.62-0.68).
 - Recommendation: establish an interinstitutional coordinating body.
3. Zones of excellence (dark green: 0.8-1.0).
- Brazil - institutional fragmentation (0.82).
 - Lección: centralized governance model that works.

Implications for ICDC Total

Brazil (ICDC 0.78):

- Dominates in three dimensions.
- There are no critical “weak points”.

Colombia (ICDC 0.65):

- Balanced performance, but not excellence.
- Homogeneous improvement margin in all dimensions.

Chile (ICDC 0.58):

- The inversion (0.52) drags the index down.
- There will be improvements in fragmentation and regulations, without inversion Brazil will be achieved.

Connection with the Regression Model

La ecuación es la siguiente:

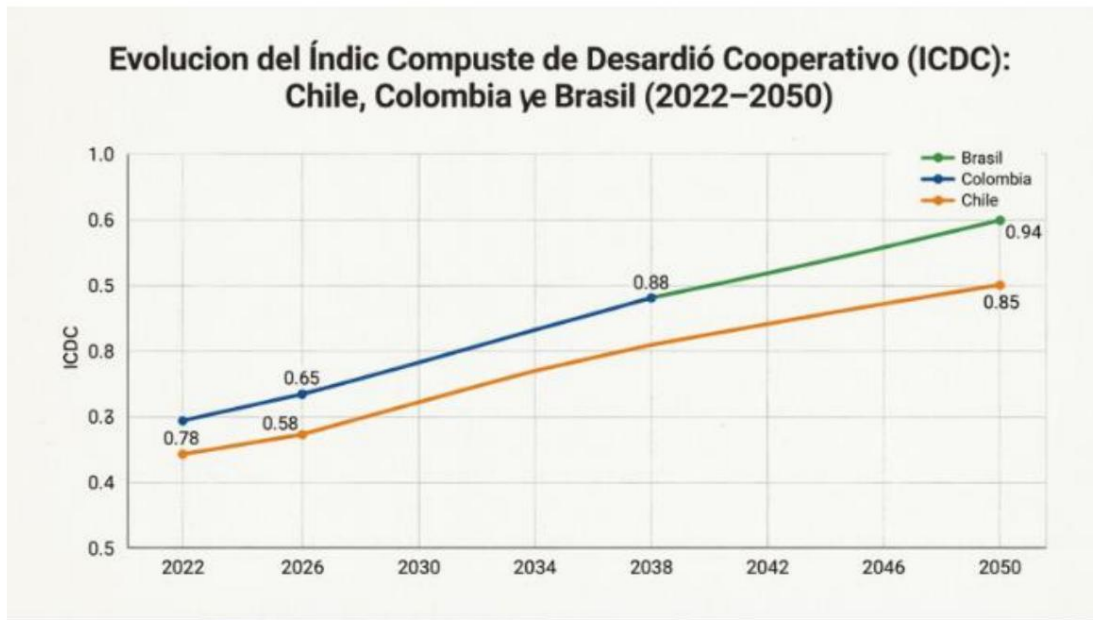
$$ICDC = 0.35(FI) + 0.40(INV) + 0.25(AN)$$

Table 4. Contribution analysis for ICDC 2022

Country	FI Contribution	INV Contribution	ICDC Total Contribution
Brazil	$0.35 \times 0.82 = 0.287$	$0.40 \times 0.78 = 0.312$	$0.25 \times 0.74 = 0.185$ 0.784
Colombia	$0.35 \times 0.68 = 0.238$	$0.40 \times 0.65 = 0.260$	$0.25 \times 0.62 = 0.155$ 0.653
Chile	$0.35 \times 0.61 = 0.214$	$0.40 \times 0.52 = 0.208$	$0.25 \times 0.61 = 0.153$ 0.575

The investment (INV) is the dimension that most contributes to the ICDC (weight 40%), and is precisely where Chile has its greatest weakness (0.52) and Brazil its second strength (0.78).

Figure 5. Evolution of ICDC 2022-2050



Notice. The figure shows the projected ICDC tray for the three countries during the period 2022-2050.

1. Brazil: sustained lead.

- 2022: 0.78 y 2050: 0.94.

- Increment: +20.5% (+0.16 points).

- Growth rate: 0.68% annual average.

- Maintain regional primacy throughout the period.

2. Colombia: accelerated convergence.

- 2022: 0.65 y 2050: 0.88.

- Increment: +35.4% (+0.23 points).

- Growth rate: 1.09% average annual.

- Largest relative rate of improvement between the three countries.

3. Chile: sustained recovery.

- 2022: 0.58 y 2050: 0.85.

- Increment: +46.6% (+0.27 points).

- Growth rate: 1.38% annual average.

- Start from the lowest base, but show the highest percentage growth rate.

Convergence analysis:

Gaps between countries (progressive reduction)

2022:

Brazil - Chile: 0.20 points (34.5% difference).

Brazil - Colombia: 0.13 points (20.0% difference).

2050:

Brazil - Chile: 0.09 points (10.6% difference).

Brazil - Colombia: 0.06 points (6.8% difference).

Convergence \ddot{y} (sigma): gaps are reduced by 50%.

There is a process of regional convergence in which the countries with the lowest initial ICDC (Chile and Colombia) is growing faster than Brazil, which progressively reduces development gaps institutional cooperative.

Table 5. Time inflection points

Period	Characteristic
2022-2030	Diagnostic phase and initial reforms (moderate growth).
2030-2040	Acceleration: implementation of development policies (more pronounced pending).
2040-2050	Consolidation and maturity (sustained but stabilized growth).

Implications for the hypothesis:

Figure 5 complements the evidence from Figure 3 (ICDC dispersion vs. GDP):

- Observed causal mechanism: the progressive increase in ICDC (Figure 5) explains the increase in GDP contribution (Figure 1).
- Validation of projections: smooth and consistent projections suggest that they Linear model assumptions are reasonable.
- Persistent hierarchy: Brazil will maintain its leadership with a small gap in 2050.

Policy recommendations based on Figure 5:

For Brazil (2022-2030):

- Goal: achieve ICDC \ddot{y} 0.85 by 2030.
- Strategy: maintain investment at 0.78+ and marginally reduce fragmentation.

For Colombia (2022-2030):

- Goal: achieve ICDC \ddot{y} 0.75 by 2030.
- Strategy: accelerate reforms by investment (from 0.65 to 0.75) and coordination institutional.

For Chile (2022-2030):

- Goal: achieve ICDC \dot{y} 0.70 by 2030.
- Strategy: aggressive intervention in inversion (from 0.52 to 0.70) as the main lever.

Connection with the mathematical model:

La proyección es:

- $Y_{t+1} = Y_t \times (1 + r)^{\dot{y}}$.
- Where r = CAGR of ICDC.

Empirical validation:

- Brazil: $r = 0.68 \text{ \%/year}$ $\dot{y} 0.78 \times (1.0068)^{\dot{y}} = 0.94$.
- Colombia: $r = 1.09 \text{ \%/year}$ $\dot{y} 0.65 \times (1.0109)^{\dot{y}} = 0.88$.
- Chile: $r = 1.38 \text{ \%/year}$ $\dot{y} 0.58 \times (1.0138)^{\dot{y}} = 0.85$.

In the previous figure we see cooperative growth and a gradual phase of approach to organized structure. As a result, Brazil strengthens its leadership, while Colombia and Brazil advance in their institutional, financial and normative crystallization. Therefore, it can be inferred that the projection towards 2050 promises a favorable horizon for cooperatives in Latin America.

Discussion

In congruence with the results, the hypothesis that cemented this study was confirmed, and that is, it exists a direct statistical and linear correspondence between the ICDC, the intervention of the organizations mentioned and the GDP of Colombia, Chile and Brazil ($R^2 = 0.847$, $p < 0.001$). In this sense, the finding theoretically supports the following planting: the solidity of institutions in the field cooperative forms a notable aspect in its monetary impact.

Therefore, the calculated formula ($Y = -1.24 + 15.38 \times \text{ICDC}$) allows estimating and sizing the capacity marginal to State participation. Each increase of 0.10 points in the ICDC is related to a growth of 1.54% in GDP, which highlights the importance of state support for the sector cooperative.

At a theoretical level, the results show a direct relationship between institutional strengthening and the economic performance of cooperatives. Coordination between organizations reduces operating costs and favors financial stability. In the case of Brazil, the management of the OCB has contributed to strengthening the cooperative sector.

By way of contrast, Chile and Colombia preserve phenomena by working in the function of their entities rectors, which insufficiently supports their minor records and their null intervention in it economy. This result allows us to deduce that changes in corporations that seek to implement interministerial committees or unique instruments can generate important monetary benefits. The comparative analysis highlights that Brazil continues to lead cooperative development, but Chile and Colombia is growing faster. This means that, even though Brazil maintains an important profit for its experience, market size and number of members, other countries can advance further quickly adopt models and practices that have given good results in the region. Aun like that, the differences between countries continue to be visible, which demonstrates that improving conditions institutions do not always guarantee equal results in a short time.

On the other hand, Chile presents an impressive result: even though it started with a higher institutional level low, their cooperatives generate a higher than expected economic participation in the GDP. This could be explained by factors such as better internal management, greater use of technology or participation in more profitable activities, such as digital financial services and agroexportación. This result demonstrates that it does not entirely depend on the standards or support institutional, as well as the capacity for adaptation, innovation and preparation of cooperatives.

Based on the results obtained, different needs will be observed in each country. Brazil faces It is the right to maintain the advances made in the face of technological and environmental changes. En Colombia, greater coordination between institutions is needed to strengthen the system cooperative. Accordingly, Chile requires improving access to financing to favor the growth of cooperatives. In this case, the ICDC can be a support tool for guide public policies according to the conditions of each country.

Therefore, these projections must be taken with reserve, because they are based on the continuity of them current trends and do not consider possible external situations, such as economic crises, conflicts international or high-impact climate and technological changes.

These restrictions propose new investigations that include more countries in Latin America and themes related to management, cooperative culture, social capital and environmental rights. Therefore, the study opens greater doors to the analysis of cooperativism in the region through a pragmatic evaluation and projection mechanism for future comparisons. It also highlights that cooperatives can contribute to fairer and more sustainable development, especially with support state and regional cooperation by 2050.

Conclusions

There is a strong link between the strengthening of cooperatives and what they contribute to the currency from Colombia, Chile and Brazil. The analysis explained 84.7% of the changes observed in it economic participation of the sector, which confirms that the best organized cooperatives and supported to generate a greater impact on GDP. Furthermore, it was identified that for each increase of 0.10 points in the ICDC, the participation of cooperatives in the economy increases by approximately 1.54 %.

Among the factors analyzed, financing was the biggest influence on the growth of sector, followed by coordination between institutions and the strength of standards. This is a demonstration that access to economic resources is key to boosting cooperative development.

On the other hand, in the comparison between countries, Brazil maintains its leadership, with an ICDC that would from 0.78 in 2022 to 0.94 in 2050, which represents a growth of 20.5%. Colombia would have a advance faster, going from 0.65 to 0.88, equivalent to an increase of 35.4%. Chile, some started with the lowest level, registering the highest relative growth, even going from 0.58 to 0.85, and that is to say, an increase of 46.6%. However, the country's main straight line continues to have access to financing.

Additionally, the projections for 2050 present a favorable scenario for cooperativism regional. The participation of cooperatives in the combined GDP of the three countries could increase by 3.2% in 2022 to 9.7% in 2050. Brazil would increase from 4.2% to 11.4%, Colombia from 3.1% to 9.8% y Chile from 2.3% to 7.9%. Aunque Brasil would continue to occupy first place, Colombia and Chile it would grow faster and progressively reduce the gap.

One of the most notable results was the case of Chile. It also presents an organizational level lower than that of other countries, its cooperatives achieved a greater economic impact than expected. This indicates that there are other factors that favor its performance, such as better administration, a greater specialization or the use of innovation and technology. For this reason, future studies must consider aspects related to the preparation of people and the capacity of adaptation of cooperatives.

The elaborate graphics also help you understand results better. If you observed a very strong relationship between cooperative strengthening and economic growth ($r = +0.920$). Furthermore, it was identified that the main problem in Chile is low access to financing, with a value of 0.52, which limits its development. The projections show that the greatest growth is registration between 2030 and 2040, driven by sector support policies. Asimismo, even Chile has fewer cooperatives in general terms, registers a proportionally greater presence per



inhabitant.

As a result, the registered hallazgo proves that the ICDC constitutes a neuralgic instrument for analyze cooperative development and make future projections, although these must be interpreted With caution, you may be in charge of socio-economic and political stability over the years we sell. Asimismo, the hallazgos confirm that the strengthening of cooperatives can generate sustained economic benefits. In this sense, projections for 2050 indicate that Latin America could consolidate a cooperative sector with greater international reach, always that there is constant state support and well-articulated policies.

References

- International Cooperative Alliance [ACI]. (2022). *Annual report on cooperativism in the Americas*. ACI Americas.
- Alves, E. (2022). *Cooperatives in Brazil: check out insights from the 2022 Coop Yearbook*. Coonecta: <https://coonecta.me/blog/cooperativas-no-brasil-confira-insights-do-anuariocoop-2022/>
- Barro, R., & Sala-i-Martin, X. (1992). Convergence. *Journal of Political Economy*, 100(2), 223-251. <https://www.jstor.org/stable/2138606>
- Benecke, D. (2016). *Cooperatives and sustainable development: a multilevel approach*. Springer.
- Economic Commission for Latin America and the Caribbean [CEPAL]. (2023). *The social economy and solidarity in Latin America: contributions to sustainable development*. United Nations.
- Division of Associations and Cooperatives. (sf). *Association allows people to undertake and improve their living conditions, their surroundings and areas where they are located*. Government of Chile: <https://asociatividad.economia.cl/>
- Hyndman, R., & Athanasopoulos, G. (2018). *Forecasting: principles and practice* (2nd ed.). OTexts.
- Jussa, A. (2019). *Cooperativism and development in Latin America: theoretical approaches and evidence empirical*. CIEDUR.
- North, D. (1990). *Institutions, institutional change, and economic performance*. Cambridge University Press.
- Novkovic, S. (2008). Defining the cooperative difference. *Journal of Socio-Economics*, 37(6), 2158–2177. <https://ideas.repec.org/a/eee/soceco/v37y2008i6p2168-2177.html>
- Nussbaum, M. (2011). *Creating capabilities: the human development approach*. Harvard University Press.
- International Labor Organization [ILO]. (2012). *Cooperativism in Latin America. One diversity of contributions to sustainable development*. <https://www.ilo.org/es/publications/el-cooperativism-in-latin-america-una-diversidad-de-contribuciones-al>

International Labor Organization [ILO]. (2020). *Cooperative map: statistical data on cooperatives in Latin America*. ILO.

Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge University Press.

Schneider, B. (2021). *Business politics and the state in twentieth-century Latin America*. Cambridge University Press.

Sen, A. (1999). *Development as freedom*. Oxford University Press.

Vázquez, A. (2005). *The new strengths of development*. Antoni Bosch Editor.