Cooperativism and the Democratization of Capitalism: Performance of the Business Segments Credit Unions and Banks in Brazil

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Abstract

This article presents the results of an empirical research investigating economic and financial information of the business segments *Credit Cooperatives* and *Banks* in Brazil's financial industry, from 2014 to 2018, with the purpose of assessing which of the two segments has more productivity and performance and enables a contribution to the democratization of capitalism, based on specific indicators. Credit unions are anchors for social economy, they operate a hybrid business model that simultaneously fulfills the requirements of the secondary and tertiary sectors of the economy. Banks are institutions characterized as belonging to the secondary sector of the economy. The research methodology is positivist and non-parametric, supported by linear equations for calculating the productivity and performance indicators. The sample is made up of the 50 largest credit unions and the 50 largest banks, classified according to the criterion of each institution's asset value, which represents 28.5% and 89.2% of the aggregate asset of each segment, respectively. The results obtained present robust evidence that the business segment *Banks* operates at a higher level of productivity, and the business sector *Credit Cooperatives* operates at a higher level of performance and contributes to the democratization of capitalism. The contributions made by this paper are relevant to the literature, and can aid in future investigations, with applications in segments with more diversity.

Keywords: democratization of capitalism, performance and productivity, sharing economy, shared management of business

1. Introduction

This article presents an empirical investigation result on the productivity and performance of the business segments *Credit Cooperatives* and *Banks*, part of the Brazilian financial industry, in the timeframe from 2014 to 2018, based on the answers to the indicator model introduced by the research, as motivation to assess the contribution to the democratization of capitalism. With this motivation, the article is not aligned with *platform cooperativism* as seen by Duda (2016) and Scholz (2016) because the motto of cooperativism is bringing people together in a democratic and egalitarian manner for exercising shared management and economy, thus being susceptible to engage with Sustainable Development Goal (SDG) 11 out of the 17 proposed by the United Nations in the Paris Agreement for Environmental, Social and Governance, UN (2015). The terms cooperatives and unions were used with the same meaning in this article.

The cooperativist system is based on seven principles, of which three are relevant for the development of the research that guides this article, namely: **first**. Free and voluntary adhesion; **second**. Democratic management; **third**. Economic participation of the union's members. Although the other principles apply to credit unions, the aforementioned three sustain the article's motivation to relate *Cooperativism* with one of the instruments for the democratization of capitalism (MundoCoop, 2017).

Credit cooperatives promote people's access to the financial system and relate to production, distribution, and

consumption, as in agribusiness and services, where small producers leverage consumption and income for lower credit cost. It is within this context that cooperativism is one of the pillars of social economy, because it simultaneously operates a hybrid business segment, the secondary and tertiary sectors of the economy, with union and non-union actions, as studied by Cace, Arpinte, Scoican, Theotokatos, and Moumalatsou (2010). On the other hand, the segment *Banks* is integrally immersed in market economy, or the secondary sector, with the explicit purpose of generating profit.

In exercising a shared management of business, Cooperativism, aimed at production, consumption, and credit, presents itself as one of the movements for the integration of people with common goals, and as one of the instruments the mitigates the speculative effects of the capitalist system through cost reduction and the sharing of economic residuals.

The first unions began to be established in the 18th and 19th centuries, in Scotland (1761), in Rochdale, England (1844), and in Minas Gerais, Brazil (1889), as present in the literature in ICA (2020), Polônio (2004), and Sistema OCB (2020). The democratization of capitalism converges from a participative or shared business management in which profits, socially, belong to all members of the union, proportionally to the transactions they conduct. Thus, Cooperativism is an integral part of the capitalist system, and is not dissociated from it, and can contribute for welfare to be more collective in the distribution of benefits, and it is in this sense that the argument is made for the democratization of capitalism.

In terms of corporate law, Credit Cooperatives and Banks are segments of the economy driven by different interests. Generally, Credit Cooperatives are societies of people who gather in a democratic and egalitarian manner, be them members or clients, for a shared management in which each member has only one vote and the results are socialized, as reported in IAC (2020). Banks are societies, as defined in the literature, in which management is carried out by majority shareholders, to whom the residual economic excess belong. In *Credit Cooperatives*, the account holder is a member or partner, with a right to vote, and participates in management, as well as exerting influence over decision-making. In the segment *Banks*, the account holder is another individual or company limited to being a receiver/provider of funds, as argued by Ferreira, Gonçalves, and Braga (2007), Pina (2012), and Escher (2013).

The differences between *Credit Cooperatives* and *Banks* go beyond conceptual semantics, being relevant in the way direct taxation was done and in the distribution of economic excess or results. In direct taxation, the Brazilian state grants *Cooperativism*, which includes *Credit Cooperatives*, the benefit of exemption from taxes over the excess, in the form of tax waivers, for the business conducted in the context of union actions, and normal taxation, equivalent to that of secondary sector or market institutions, for business with non-union actions. Banks, part of the secondary sector, are imposed nominal direct taxation over profits or earnings, one of the highest in Brazil. In the distribution of profits or economic excess, unions are imposed the restriction of not carrying it out, under penalty of losing the economic and financial benefits of tax exemption, with only the distribution of interest being allowed. For banks, the distribution of earnings follows the legal and corporate rules of the market.

The proposal of *Cooperativism* is to gather people for the exchange of goods and services and produce mutual assistance. From this perspective, business between union members and unions may be constituted to explore several sectors of the economy, in the social context, among which can be found financial business, represented by credit, which is part of the object of this study. This business proposal grants them a competitive edge, because union members benefit from access to credit at a lower cost and with the business's performance, in the form of a benefit, as mentioned by De Souza and Schmidt (2019).

Credit Cooperatives have been expanding since the midpoint of the second decade of this 21st century. In 2018, in relation to 2017, the growth in the number of union members has been in the order of 9%, overcoming the 10-million milestone and showing a growing insertion of people into the financial system, followed by the growth of the total assets, higher than 17%; funding has grown more than 18%, overtaking the growth of the entire financial system, which was around 3% (BACEN, 2018). In regional geography, in relation to the amount of municipalities that benefit from credit unions, the largest percentages of representation are in the South Region, with 92% of the total of municipalities; the Southeast Region, with 58%; and the Central-West Region, with 56%. Out of the total Brazilian population, on average, 4.2% benefit from credit unions, especially in the South Region, where the amount is 15.6% of the local population, and the Central-West Region, with 4.8% of its population, as shown by the SNCC (Note 1) report (BACEN-SNCC, 2018).

The business volume in the segment *Banks*, due to the diversity of its operations and conglomerates, is larger than that of the *Credit Cooperatives*, but they become similar in the guided productive microcredit (MPO)

portfolio, because 59.9% of the total of this portfolio were destined for rural credit, and, of that value, 7.6% were directed to working capital (BACEN, 2019), which is also the destination of credit offered by *Credit Cooperatives*.

Due to the entire context, the proposal that is the object of this article is to assess and identify which of the two business segments, *Credit Cooperatives* and *Banks*, presents a higher productivity and a higher performance as a contribution to the democratization of capitalism, based on a sample made up of the 50 largest credit unions and the 50 largest banks, classified by the criterion of total asset value, which represent, respectively, 28.5% and 89.2% of the aggregate asset of each business segment.

It is expected that the results of the research are relevant to the literature for showing the productivity and performance of each of those business segments, *Credit Cooperatives* and *Banks*, showing the way for the democratization of capitalism, and thus standing above previous studies.

As well as this introductory section, the article is structured into five other sections, namely (2) Characteristics and evolution of cooperativism; (3) Regulatory context and performance of financial institutions in Brazil, in which the main regulators are presented and the relevant contributions in literature are discussed; (4) Cooperativism in the context of the democratization of capitalism; (5) Methodology; (6) Result analysis; (7) Conclusions; References and Appendix.

2. Characteristics and Evolution of Cooperativism

The literature is not unanimous in recognizing the beginnings of cooperativism. Rochdale, Manchester, 1844, is credited with establishing the first union of weavers, but another part of literature credits this pioneering development to Fenwich, Scotland, 1761 (ICA, 2020 Our History). A century later, in 1948, the Prague Congress characterized cooperativism as an association of people with the purpose of improving the economic and social activities of its members, as written by Polônio (2004).

The contemporary cooperativist ideals are like those disseminated by the *International Cooperative Alliance - ICA*, founded in 1895 (London), whose main motivation, as a civil society organization, are to disseminate information, defend principles, and promote integration, autonomy, and the development of global cooperativism (ICA, 2020 MundoCoop). These ideas characterize cooperativism as an economic and social movement, social economy, in which the interaction between the economic agents aspires to the democratization of capitalism.

Social economy is one of the terms characterized by types of economic activities in which the benefits are socially divided, as occurs in the so-called non-profit entities, identified as civil society or tertiary sector organizations, which react to the concentration of profit that is characteristic to the development of industrial capitalism of the 18th century onwards (Cace, Arpinte, Scoican, Theotokatos, & Moumalatsou, 2010).

In Brazil, the cooperativist system was instituted and regulated by Federal Law no. 5,764, of 1971 (Brazil, 1971), widely encompassing sectors of the economy, with special highlight, among its main characteristics, political neutrality, and religious, racial, and social non-discrimination. But, well before this regulation, documents show this activity occurring in the colonial period, from 1889 onwards, with the Economic Cooperative of the Public Servants of Ouro Preto, state of Minas Gerais, which had as its main purpose the trade and consumption of agrarian products, followed by the first credit union of Nova Petrópolis/state of Rio Grande do Sul, in 1902, and others (Sistema OCB, 2020).

With the growth of the economy, credit unions expand in Brazil with the offer of financial services for its associates, as argued by Pinheiro (2008, p. 7). Credit unions present a singular, hybrid character, due to being part of the financial system and, simultaneously, being civil society organizations, of the tertiary sector, committed to social economy, organized into 5 systems named SICOOB, SICREDI, UNICRED, CECRED, and CONFESOL (Bancos Cooperativos, 2021).

The cooperativist movement in the credit segment is inspired in European ideas, such as the 1865 Luzzatti model, in Italy, and later the Canadian experience of 1900, as discussed by Meinen and Port (2014).

Production and credit cooperativism, and not the platform cooperativism, leverages the local economy with the offer of formal jobs and income distribution, because the members are partners, share management, and benefit from the economic excess, and this set of attributes contributes to the growth of the Human Development Index (HDI), as highlighted by institutional sources EasyCoop (2007) and AgroLink (2009), in which the municipalities with a more developed cooperativism present a higher Human Development Index than those without it.

3. Regulatory Context and Performance of the Financial Institutions in Brazil

The regulatory environment of financial institutions in Brazil, for credit unions and banks, is the responsibility of the Central Bank (BACEN), and, in marker practices, where applicable, of the Securities and Exchange Commission (CVM). The typology for credit unions follows the purpose of credit, but, for banks, it is assumed as commercial bank, investment bank, and multipurpose bank. Credit unions, in the context of social economy, assist their members, while the banks cater to the general public.

Banks, as the main components of the financial system, have for decades operated with dynamism and volume, promoted processes of mergers or acquisitions, and offered credit. Being institutions with smaller structures, less complex than banks, unions are focused on their public, their members.

The regulatory environment, with the permission of tax legislation, differentiates benefits granted and restrictions to credit unions in relation to banks. A relevant benefit granted to unions, and not to banks, is the exemption of direct tax over economic excess or earnings stemming from union actions. A restriction to unions, and not to banks, is not distributing earnings or economic excess to members. The earnings or economic excess accrued by a credit union belongs to all members (retained earnings), while the earnings of a bank are usually made available to shareholder as per established criteria.

Another difference is the relationship with account holders. The account holders of a credit union, differently from those of a bank, are its own members. Thus, the cost of money in a credit union is generally lower than in a bank.

The difference in the relationship with account holders is relevant for the performance of these two business segments. Credit unions seek to maximize efficiency in the delivery of services, because the member is simultaneously a receiver and provider of funds, as well as beneficiary of institutional performance, as addressed by De Souza and Schmidt (2019), because the member is the owner of the earnings.

Ferreira, Gonçalves & Braga (2007) analyzed the performance of the credit unions in the state of Minas Gerais through the optimization of resources, using data envelopment analysis (DEA). The result of the analysis indicated that the most significant impact in the performance of credit unions is income generation, because, the higher the capacity of the union for generating income in financial mediation, the higher the performance as a process for operational leverage.

Pina (2012) developed a study comparing banks to credit unions using return indicators. He states that the results of the study indicate that credit unions have shown to be more resilient than banks because they generate direct and indirect employment with impacts on gross domestic product, developing rural areas through agrarian credit, a study that is echoed by the research developed by Cordeiro, Bressan, Lamounier, and Barros (2018). The results obtained by the author are explained by a correlation and cause and effect model using an econometric model.

The map of cooperativism in Brazil, with data from 2017 and 2018, divulges 13 strongly structured business branches totaling 6,828 unions, 14,618,832 members or partners, and 425,318 direct jobs. Out of those totals, credit unions occupy fourth place in number of unions, with 13.31%, third place in number of jobs, with 15.82%, and first place in number of members, with 67.32% (Sistema OCB, 2019).

The focus of this article is different from those of previous ones because it is centered in the comparison of productivity and performance between the segments *Credit Cooperatives* and *Banks* to identify their contributions to the democratization of capitalism.

4. Cooperativism in the Context of the Democratization of Capitalism

In addressing the relationship between cooperativism and democracy, Ratner (2009) sustains that cooperativism, in the process of collective division, implies democracy, and that cooperativism is the basis for democracy more than democracy is the basis for cooperativism, this because cooperativism is a political platform that achieves stronger results than democracy does.

Zygmuntowski (2018) analyzes cooperativism and democracy under the viewpoint of technology. He comments that the theory of cognitive capitalism and its arguments are exploited to produce a holistic understanding and understand the value of the technological apparatuses, but are not uniform, while platform cooperativism is the proposal for an egalitarian and sustainable long-term counterattack because it aims at designing new tools in line with the paradigm of common goods.

The ideas of *platform cooperativism*, as well as *sharing economy*, disseminated by Duda (2016) and Scholz (2016), suggest a movement in opposition to the democratization of capitalism because they discuss exploitation

of labor, suppression of rights, and offense to the dignity of the worker, as a consequence of the authoritarianism the aforementioned authors have dubbed *platform cooperativism* supported by technology. Given that the argument of the research that originates the present article does not align with those ideals, but only with the insertion into the financial market of associated individuals with access to low-cost credit, the sharing of economic profits through shared business management, the object proposed assesses the contribution of cooperativism to the democratization of capitalism, because each member is only one vote, and simultaneously a partner, as well as receiver and provider of funds. In this genre of cooperativism, there is no concentration of wealth, because the economic excess stemming from productivity and performance equally belong to all members.

Paranque and Willmott (2014) assess a case study of the government structure for a retail company in the context of cooperativism in the United Kingdom. In that study, they highlight the interest of a group of employees that wishes to reclaim capitalism, and of another group that intends to transform it. They conclude that they were urged to examine the elements of cooperativism with respect to the democratic control exerted by its members, economic participation, autonomy, and independence as a form of high performance.

Other studies that address cooperativism as an alternative for the democratization of capitalism make comparisons with Marxist socialist ideals, such as the interpretation made by Gasper (2021) of other authors' essays. The research approach of the present article is not aligned with the aforementioned ideas. The construction of the idea of Credit Cooperatives as one of the alternatives for the democratization of capitalism is focused on the distribution of the benefits of the activities between their own members, which are partners, clients, providers and receivers of funds, who can have access to consumer goods, services, and credit at lower prices that still maximize benefits. In the context of this discussion, credit unions are an integral part of capitalism, not dissociated from it, and thus adhere to the democratic ideals of the sharing of benefits.

The design of cooperativism, from the conception of its seven principles (MundoCoop, 2017) and the definition of bringing people together in a democratic and egalitarian manner, be them members or clients, for a shared management in which each member is only one vote, with socialized profits (IAC, 2020), indicates a different form of capitalism that converges to sustainability as defined by Sustainable Development Goal (SDG) 11 of the 17 proposed by the United Nations in the Paris Agreement (UN, 2015).

5. Methodology

The methodology proposal now introduced and used in this article is positivistic and non-parametric, defined by equations that measure productivity and performance in financial institutions (FI), divided into two segments: *Credit Cooperatives* (S_1) and *Banks* (S_2), which are part of Brazil's financial system, focused on transactions by account holder or client, by operation, and by sector.

The equations of the model measure productivity by client (PC), productivity by operation (PO), sector productivity (SP), sector performance (SPE), and cross-sector performance (CP).

The variables used to specify the equations are: financial mediation income (MI), total amount of clients (AC), total amount of operations (AO), net earnings (NE), and total asset (TA). Subscripts *i, s*, and *t* represent, respectively, the number of institutions, the number of segments, and the units of time by quarter, such that $i \in (1,..,I)$; $s \in (1,...,S)$ e $t \in (1,...,T)$.

5.1 Productivity by Client (PC)

PC is the quotient measuring the contribution of each client to the total financial mediation income. On average, the higher the quotient, the more productive the client is to the FI.

$$PC_{sit} = \frac{MI_{sit}}{AC_{sit}} > 0 \tag{1}$$

5.2 Productivity by Operation (PO)

The **PO** quotient indicates the contribution of each operation to the total financial mediation income. Each operation represents a transaction that will be more productive the higher the quotient.

$$PO_{sit} = \frac{MI_{sit}}{AO_{sit}} > 0 \tag{2}$$

5.3 Sector Productivity (SP)

SP is a number that measures the relation between productivity by client and productivity by operation, in each *s* segment of the financial system. This relation, in comparative terms, indicates the transaction that contributes the

most to the productivity of the FI, whether by client or by operation.

$$\text{SP}_{si} = \sum_{t=1}^{T} \frac{PC_{sit}}{PO_{sit}} = \sum_{t=1}^{T} \frac{MI_{sit}}{AC_{sit}} * \frac{AO_{sit}}{MI_{sit}} = \sum_{t=1}^{T} \frac{AO_{sit}}{AC_{sit}}; \ \text{AC}_{si\,t} > 0 \tag{3}$$

Metrics of the SP model

$$\text{SP} = \begin{cases} < 1 \Rightarrow \text{productivity by client is less representative} \\ 1 \Rightarrow \text{productivity by client and by operation are equivalent} \\ > 1 \Rightarrow \text{productivity by client is higher than by operation} \end{cases}$$

Additionally, the *quantum* of the SP shows the direction of the FI's policy in investing more/less in client/transaction or the contrary, more/less in transaction/client. The magnitude of the aforementioned *quantum* indicates which of the business lines enables more productivity and higher performance for the FI. Thus, for a SP higher than 1, the PC is necessarily larger than the PO, and the AO is higher than the AC. If not, the PS is either equal to or less than 1.

5.4 Sector Performance (SPE)

The SPE coefficient measures the average return on total investment by segment (S_i) for each unit of the time frame.

$$SPE_{st} = \frac{1}{I} \sum_{i=1}^{I} NE_{sit} * \frac{1}{TA_{sit}} \tag{4}$$

The answers of the equation segregate the *quanta* of the SPE coefficient by *s* business segment (1 or 2), in the time frame, for the following cross-sector performance.

5.5 Cross-Sector Performance (CP)

CP is the coefficient that compares performance between the *s* segments of the financial industry, establishing the reference segment in the numerator and varying the others in the denominator, in the same time frame. Thus, CP is the product of the multiplication of the SPE of the reference sector by the inverse of the SPE of the other sector.

$$CP_t = \frac{1}{I} \left(\sum_{t=1}^{T} \left(\sum_{i=1}^{I} \left(\frac{NE_{s1it}}{TA_{s1it}} \right) * \sum_{i=1}^{I} \left(\frac{NE_{s2it}}{TA_{s2it}} \right)^{-1} \right) \right) = \frac{1}{I} \left(\sum_{t=1}^{T} \left(\sum_{i=1}^{I} \frac{NE_{s1it}}{NE_{s2it}} * \sum_{i=1}^{I} \frac{TA_{s2it}}{TA_{siit}} \right) \right) \tag{5}$$

Metrics of the CP model

$$\text{CP} = \begin{cases} < 1 \Rightarrow \text{segment 1 shows less performance than segment 2} \\ 1 \Rightarrow \text{segments 1 and 2 have equivalent performance} \\ > 1 \Rightarrow \text{segment 1 shows higher performance than segment 2} \end{cases}$$

5.6 Statistical Significance of the Cross-Sector Performance (CP)

The model is specified to evaluate CP as an independent variable, in function of the amounts of clients in the segments *Credit Cooperatives* and *Banks* in the sample's time frame.

$$CP = \beta_0 + \beta_1 AC_{s1t} + \beta_2 AC_{s2t} + \mu_t$$

In which β_0 is the intercept; AC_{s1t} is the amount of clients of the segment *Credit Cooperatives* for each quarter of each year; AC_{s2t} is the amount of clients of the segment *Banks* in each quarter of each year; μ_t is the error term in each quarter of each year; β_1 and β_2 are the coefficients.

5.7 Conclusions of the Model

The metrics of the model, *coeteris paribus*, reflect the sector combination of productivity (5.1; 5.2 e 5.3), as well as the sector combination of performance (5.4; 5.5 e 5.6). With such metrics, the indication of the model is that, for CP > 1, there is a robust indication that the reference segment shares benefits and contributes to the democratization of capitalism.

6. Result Analysis

The results presented in this session have been obtained with the use of the model specified in the section on methodology. The sample's primary data were extracted from standardized financial statements, available at the Brazilian Central Bank's website (www3.bcb.gov.br/ifdata/index.html), of the 50 largest credit unions (FI. Data TI equals 9), out of a total of 951, and of the 50 largest banks (FI. Data TI from 1 to 8), out of a total of 170, according to the criterion of largest total asset value, in the time frame of 2014 to 2018, by quarter. The amount

of credit unions and banks retrieved from other databases reveals itself to be different, such as in the statistic yearbook that shows 909 credit unions. The choice made for the research was to use the data divulged by the Brazilian Central Bank, because it is the monetary authority.

The sample's five-year time frame was a research choice, and the year of 2018 was the last available year when the data was gathered. The basis for classification, by decreasing order of total asset value, is based on the last quarter of 2018. The 50 largest credit unions represent 5.25% of the total of these financial institutions and 28.5% of the segment's assets, while the 50 largest banks represent 29.41% of the banking institutions and 89.2% of the segment's assets. The aggregate assets of the 170 banking institutions totaled, in the last quarter of 2018, R$ 8.5 billion, equivalent to US$ 2.2 billion, while the aggregate assets of the 951 credit unions totaled only R$ 25.3 billion, which is equivalent to approximately US$ 564.5 million.

A preliminary reading of the sample data already indicates how concentrated the banking segment in Brazil is, in which little less than 30% of the banking institutions represent nearly 90% of the segment's aggregate assets. On the other hand, credit unions are less concentrated, with the 5.25% represented by the 50 largest credit unions total less than 30% of the segment's aggregate assets.

6.1 Analysis of the Sector Productivity (SP)

Sector productivity, as shown in the model (Eq. 3), is a combination of productivity by client with productivity by operation. Table 1 shows the estimators of the descriptive statistics for the financial institutions distributed in both segments, *Credit Cooperatives* (S_1) and *Banks* (S_2), within the time frame. The statistical estimators were produced with the aid of the *Gretl* open-source statistical package.

The analysis of the model's answers is based on the first statistical moments, mean, and variance, with the analysis of the variance being represented by the Coefficient of Variation (CV).

Business segment *Credit Cooperatives*. As shown in Table 1 part (a), the productivity of credit unions (S_1) shows three relevant characteristics. The first of these is predominantly that productivity by operation is, on average, smaller than the productivity by client, throughout the entire time frame (Min > 1), which shows the amount of operations as being larger than the amount of clients: more than one operation by client.   The second characteristic is the proximity of the first moment (mean) to the median, in which the mean is in the second half of the distribution. The third characteristic is the dispersion (representation of the second moment) measured by the coefficient of variation (CV) orbiting below 0.5 standard deviations of the mean as a consequence of the proximity of the mean and median, and of the reduced amplitude between the *Min* and *Max* limits. This magnitude of the CV indicated that the distribution of productivity, in average terms, with 95% reliability, tends to the pattern in the sense of equalizing costs and gains.

Business segment *Banks*. Part **(b)** of Table 1 shows the estimators of sector productivity for banks. Differently from the estimators in part **(a)**, the banks do not show a pattern in sector productivity, and exhibit significant variations in the CV *quantum* over the time frame, as a consequence of the larger amplitude between *Min* and *Max* and distance between mean and median. The estimators also reveal that, with 95% reliability, the largest productivity of the segment *Banks* is concentrated in the volume of clients.

In summary, the distribution of Table 1 indicates that business sectors *Credit Cooperatives* and *Banks* are more productive in transactions by client, because the quanta of the SP productivity indicator are above 1 throughout the entire time frame. The model's responses also reveal that productivity in the business segment *Banks* is higher than productivity in the business segment *Credit Cooperatives*, and this characteristic may be explained by the largest spread charged by banks, which makes credit more expensive. Both segments diverge in the average dispersion of productivity, with the *Cooperativist* segment being more concentrated, close to the standardized distribution, orbiting below ½ standard deviation of the mean, while the segment *Banks* is dispersed, evidence of a significant heterogeneity. But this heterogeneity is expected due to the diversity of the business conducted by banks, seeing that the business portfolios explored are larger than those of Credit Unions. This is explained by the fact that banks serve the general public while the public of credit unions are the cooperative members themselves.

Table 1. Statistical estimators of the sector productivity (SP) coefficient of the Brazilian financial institutions: Credit Cooperatives (S1) and Banks (S2) – 2014:1 to 2018:4

Time frame		(a) SP Credit Cooperatives (S1)						(b) SP multipurpose Banks (S2)					
		Mean	Median	CV	Min	Max	C	Mean	Median	CV	Min	Max	Obs
2014	Q1	3.87	3.47	0.48	1.58	13.58	50	8.60	3.32	3.94	1.32	242.69	50
	Q2	3.81	3.34	0.52	1.56	14.75	50	8.22	3.14	3.90	1.29	229.41	50
	Q3	3.93	3.51	0.47	1.61	13.18	50	8.19	3.35	3.83	1.29	224.94	50
	Q4	3.83	3.40	0.48	1.56	13.13	50	8.13	3.07	3.85	1.33	223.95	50
2015	Q1	3.65	3.22	0.46	1.57	10.36	50	8.16	3.07	3.94	0	229.90	50
	Q2	3.74	3.28	0.46	1.60	10.93	50	6.97	3.05	3.37	0.39	167.88	50
	Q3	3.88	3.33	0.47	1.65	12.07	50	7.22	3.31	3.22	1.35	166.77	50
	Q4	3.64	3.15	0.45	1.57	10.50	50	7.85	3.20	3.57	1.32	200.49	50
2016	Q1	3.71	3.29	0.41	1.62	10.73	50	5.74	3.25	2.00	1.35	78.91	50
	Q2	3.68	3.24	0.43	1.64	10.35	50	6.66	2.84	2.31	1.36	102.76	50
	Q3	3.72	3.28	0.46	1.68	11.04	50	8.85	3.20	3.33	1.37	207.47	50
	Q4	3.60	3.16	0.45	1.61	10.68	50	10.37	3.16	3.66	1.36	267.20	50
2017	Q1	3.54	3.18	0.38	1.62	9.28	50	11.91	2.96	4.26	1.37	359.25	50
	Q2	3.00	2.55	0.45	1.58	9.42	50	13.47	2.71	4.81	1.20	459.15	50
	Q3	3.08	2.64	0.46	1.59	10.61	50	13.25	2.56	4.58	1.20	426.51	50
	Q4	3.03	2.62	0.45	1.59	9.91	50	17.54	2.41	4.83	1.20	596.08	50
2018	Q1	2.99	2.66	0.38	1.59	8.76	50	15.07	2.37	5.01	1.20	532.41	50
	Q2	2.94	2.62	0.37	1.60	8.32	50	15.47	2.40	5.07	1.21	554.72	50
	Q3	2.93	2.58	0.40	1.60	9.41	50	5.87	2.13	2.70	0.03	90.33	50
	Q4	2.87	2.57	0.36	1.57	7.78	50	19.59	2.60	5.29	1.19	732.57	50

Source: the authors. Q=quarter; CV=Coefficient of Variation.

6.2 Analysis of the Cross-Sector Performance of the Segments Credit Cooperatives and Banks

Tables 2 and 3 show the *quanta*, the descriptive statistics, the coefficients, and the statistical significance of the estimation, by fixed effects with robust standard errors, of the cross-sector performance (CP) indicators for the 50 largest *Credit Cooperatives* and the 50 largest *Banks* of the Brazilian financial industry, from 2014 to 2018, with observations grouped by quarter, organized into a balanced panel.

Table 2, part (a), contains the *quanta* for each CP calculated according to the model specified in Equation 5 in (5.5), and part (b) contains the estimators for the descriptive statistics, all grouped by quarter. In each quarter of part (a), the *quanta* are higher than 1, indicating that the performance of the segment *Credit Cooperatives* is superior to that of the segment *Banks*, even if one observes a reduction in that superiority when comparing the *quantum* of the first quarter of 2014 to the *quantum* of the fourth quarter of 2018. This reduction in the superiority of performance may be related to the political and institutional crisis that took place in Brazil during that time, which resulted in the fall of the occupant of the Presidency of the Republic, however, the research did not quantify that effect. The statistical estimators of the CP *quanta*, part **(b)**, reveal a reduced dispersion, and shown by the *quanta* of the CV, varying in the interval from 0.173 to 0.333 standard deviations of the mean, indicating a proximity between the mean and the median, and suggest that the results are consistent with the statistical significance of 95%.

Table 2. *Quanta* and statistical estimators of the Cross-sector Performance (CP) of the segments *Credit Cooperatives* and *Banks* of the Brazilian financial industry - 2014 to 2018

Year/Quarter	Q1	Q2	Q3	Q4	Estimators/Quarter	Q1	Q2	Q3	Q4
(a)_The quanta of each for the CP quarter					**(b)** Estimators of the descriptive statistics of the CP				
2014	11.696	5.075	7.993	4.609	Mean	7.615	5.497	6.632	4.204
2015	6.010	7.159	3.747	3.236	Median	6.746	5.079	6.870	4.066
2016	5.331	5.381	6.870	4.066	C.V.	0.333	0.173	0.326	0.278
2017	8.291	5.079	9.232	5.990	Min	5.331	4.790	3.747	3.121
2018	6.746	4.790	5.316	3.121	Max	11.696	7.159	9.232	5.990
No. Cooperatives	50	50	50	50	No. Cooperatives	50	50	50	50
No. Banks	50	50	50	50	No. Banks	50	50	50	50

Source: The Authors. Q=quarter.

Table 3 (according to data produced by the model in 5.6) contains the coefficients and statistical significance of the estimation of the econometric model produced by fixed effects, with robust standard errors, whose data are organized into a balanced panel. The answers of the estimation show that the coefficients of the variable AC (Credit Cooperatives and Banks) are significant, with 95% reliability. Both coefficients exert little impact on the CP indicator, with the impact of the coefficient for the Credit Cooperatives being inversed, *coeteris paribus*. The estimation also reveals that the model is adequately specified, because the Durbin-Watson autocorrelation test indicates an inexistence of serial autocorrelation, and the Wald test indicates an inexistence of heteroskedasticity. The inexistence of serial autocorrelation and of heteroskedasticity ensures that the results are robust, because it mitigates the existence of specification bias for the model.

Table 3: Estimation of the cross-sector performance of the segments *Credit Cooperatives* and *Banks* by fixed effects with robust standard errors – independent variable CP – 2014:1 to 2018:4 – 50 largest credit unions and 50 largest banks, totaling 100 aggregate observations – Brazil

Variables	Coefficient	Est-t	p-value	Sig
Const	7.85917	8.405	<0.0001	***
AC_Credit cooperatives	−1.54298e-05	−2.147	0.0475	**
AC_Banks	1.15098e-07	2.168	0.0456	**
Durbin-Watson test (autocorrelation)	2.596453			
Wald test (heteroskedasticity)	0.898254		0.638185	

6.4 Summary of the Analysis of the Results

The means of the *quanta* of the sector productivity indicator in Table 1 show that the productivity in the segment *Banks* is higher than that in the segment *Credit Cooperatives*, which could be expected due to the larger volumes of income and spread by operation. The means of the *quanta* of the cross-sector performance indicator presented in Table 2 are robust as evidence that the performance of the business segment *Credit Cooperatives* is superior to the performance of the business segment *Banks*.

As the motto of Credit Cooperatives is to allow members access to credit and to the benefits associated to it at a lower cost than that offered by Banks, it is natural that productivity is also lower, which corroborates Ferreira, Gonçalves, and Braga (2007) and Pina (2012).

But the counterpoint that is the fact that the performance of the sector *Credit Cooperatives* is higher than that of the segment *Banks* is relevant because it suggests there is a synergy of the combination of a smaller operation structure with participative management, indicating that a smaller financial cost implies a higher performance. This binomial is significant for the discussion that Cooperativism is an alternative to be evaluated as democratization of capitalism, because a smaller shared cost implies larger socialized benefits, which fulfills SDG 11 of the 17 proposed by the United Nations in the Paris Agreement as Environmental, Social and Governance (ESG).

7. Conclusions

The investigation presented in this article used a positivistic, non-parametric methodology to assess the productivity and the performance in the business sectors *Credit Cooperatives* and *Banks*, of the Brazilian financial industry, in the time frame from 2014 to 2018, based on a sample of the 50 largest credit unions and the 50 largest banks, following the criterion of asset value, which represent, respectively, 28.5% and 89.2% of the aggregate assets of each segment, with the purpose of identifying which of the two segments is more productive and which has a higher performance, as well as their contribution to the democratization of capitalism.

The results indicate that, in both business segments, a higher productivity comes from the volume of clients, and not the volume of operations, and that the productivity of the sector *Banks* is higher than the productivity of the segment *Credit Cooperatives*, since banks operate with larger volumes and spreads.

On the other hand, the results also provide robust evidence that the performance of the segment *Credit Cooperatives* is higher than that of the segment *Banks*. This can be explained due to the smaller operational structure of the credit unions when compared to banks, which produces the inverse relation paradox (productivity vs. performance) in both segments. This paradox suggests that Cooperativism can be one of the alternatives for the democratization of capitalism, because the synergy between shared management and lower productivity produces a higher performance, which results in a sharing of economic excess and converges to SDG 11 of the 17 proposed by the United Nations in the Paris Agreement as ESG.

Despite the small representativeness of the sample of the segment *Credit Cooperatives* (28.5% of the aggregate assets), this limitation does not harm the research results, because the geography encompassed by the Credit Cooperatives is significantly larger than the one encompassed by Banks, and this mitigates the effects of the difference between the percentages of representativeness. However, the diversity in the portfolios of banks in relation to credit unions may influence the results.

Lastly, due to the importance of the financial industry for the development of the economy, and due to the diversity of segments in which it operates, it is hoped that more encompassing research can exploit the model introduced in this article, which contributes to the literature in evidencing the importance of *Credit Cooperatives* and the inversion paradox between productivity and performance, as well as the alternative to the democratization of capitalism.

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Note

Note 1. SNCC (national cooperative credit system).

Appendix

Table A1. 50 largest credit unions by asset size in Brazil—Basis 2018

Co-op	Credit Union's Company Name	Co-op	Credit Union's Company Name
C1	Cooperativa de Credito Credicitrus	C26	Cooperativa de Crédito, Poupança e Investimento das Regiões Centro do RS e MG – Sicredi Região Centro RS/MG
C2	Cooperativa de Credito Vale do Itajai - Viacredi	C27	Cooperativa de Crédito de Livre Admissão do Sudoeste Goiano
C3	Cooperativa de Crédito, Poupança e Investimento União Paraná/São Paulo - Sicredi União PR/SP	C28	Cooperativa de Crédito, Poupança e Investimento União Dos Estados de Mato Grosso do Sul, Tocantins e Oeste da Bahia - Sicredi União MS/TO
C4	Sicoob Credicom - Cooperativa de Economia e Crédito Mútuo dos Médicos e Profissionais da Área de Saúde de Minas Gerais Ltda.	C29	Cooperativa de Crédito de Livre Admissão do Sudoeste da Amazônia Ltda. - Sicoob Credisul
C5	Cooperativa de Crédito, Poupança e Investimento Vanguarda da Região Das Cataratas do Iguaçu e Vale do Paraíba - Sicredi Vanguarda Pr/Sp/Rj	C30	Cooperativa de Crédito Sicredi João Pessoa
C6	Cooperativa de Crédito, Poupança e Investimento Sicredi Pioneira RS - Sicredi Pioneira RS	C31	Cooperativa de Economia e Credito Mutuo dos Médicos de Porto Alegre Ltda-Unicred Porto Alegre
C7	Uniprime Norte do Paraná - Cooperativa de Crédito Ltda	C32	Cooperativa de Crédito de Livre Admissão de Associados São Miguel do Oeste-Sicoob São Miguel SC
C8	Credicoamo Credito Rural Cooperativa	C33	Cooperativa de Crédito de Livre Admissão Sul do Espírito Santo - Sicoob Sul
C9	Cooperforte - Cooperativa de Economia e Crédito Mútuo dos Funcionários de Instituições Financeiras Públicas Federais Ltda.	C34	Cooperativa de Crédito, Poupança e Investimento Pampa Gaúcho - Sicredi Pampa Gaúcho
C10	Cooperativa de Crédito, Poupança e Investimento Ouro Verde do Mato Grosso - Sicredi Ouro Verde MT	C35	Cooperativa de Crédito de Livre Admissão da Região de Guariba
C11	Cooperativa de Crédito, Poupança e Investimento Vale do Piquiri Abcd - Sicredi Vale do Piquiri ABCD PR/SP	C36	Cooperativa de Crédito, Poupança e Investimento Ouro Branco – Sicredi Ouro Branco RS
C12	Cooperativa de Crédito Maxi Alfa de Livre Admissão de Associados - Sicoob Maxicrédito	C37	Cooperativa de Crédito, Poupança e Investimento Alto Uruguai - Sicredi Alto Uruguai RS/SC/MG
C13	Cooperativa de Crédito, Poupança e Investimento de Carlos Barbosa - Sicredi Serrana RS	C38	Cooperativa de Crédito de Livre Admissão do Centro Sul Rondoniense - Sicoob Credip
C14	Cooperativa de Crédito de Livre Admissão de Associados Serro Azul - Sicredi União RS	C39	Cooperativa de Crédito de Livre Admissão do Sudoeste de Minas Gerais e Nordeste de São Paulo Ltda - Sicoob Agrocredi
C15	Cooperativa de Crédito, Poupança e Investimento Campos Gerais - Sicredi Campos Gerais PR/SP	C40	Cooperativa de Crédito, Poupança e Investimento do Norte Mato-Grossense – Sicredi Norte MT/PA
C16	Cooperativa de Crédito, Poupança E Investimento da Região dos Vales - Sicredi Região dos Vales RS	C41	Cooperativa de Crédito, Poupança e Investimento Vale do Cerrado - Sicredi Vale do Cerrado
C17	Cooperativa de Crédito, Poupança E Investimento Sorriso - Sicredi Celeiro do MT	C42	Cooperativa de Crédito de Livre Admissão de Associados Altos da Serra - Sicredi Altos da Serra RS/SC
C18	Cooperativa de Crédito, Poupança e Investimento do Centro Sul do Mato Grosso do Sul – Sicredi Centro-Sul MS	C43	Cooperativa de Crédito, Poupança e Investimento de Ibiraiaras – Sicredi Ibiraiaras RS/MG
C19	Cooperativa de Crédito Unicred da Grande Florianópolis Ltda - Unicred Florianópolis	C44	Cooperativa de Crédito de Livre Admissão Norte do Espírito Santo - Sicoob Norte
C20	Cooperativa de Crédito, Poupança e Investimento União de Estados Rio Grande do Sul, Santa Catarina e Minas Gerais - Sicredi Uniestados	C45	Cooperativa de Crédito, Poupança e Investimento Celeiro Centro Oeste – Sicredi Celeiro Centro Oeste
C21	Cooperativa de Crédito de Livre Admissão Leste Capixaba - Sicoob Leste Capixaba	C46	Cooperativa de Crédito e Investimento de Livre Admissão Agroempresarial - Sicredi Agroempresarial PR/SP
C22	Cooperativa de Poupança e Crédito de Livre Admissão da Região de Maringá - Sicoob Metropolitano	C47	Cooperativa de Crédito de Livre Admissão - Sicoob Credicoonai
C23	Cooperativa de Crédito, Poupança e Investimento do Sudoeste MT/PA - Sicredi Sudoeste MT/PA	C48	Cooperativa de Crédito, Poupança e Investimento Noroeste RS – Sicredi Noroeste RS
C24	Cooperativa de Crédito, Poupança e Investimento do Araguaia e Xingu - Sicredi Araxingu	C49	Cooperativa de Crédito, Poupança e Investimento Regiões das Culturas – Sicredi Das Culturas RS/MG
C25	Cooperativa de Crédito de Livre Admissão Sul-Serrana do Espírito Santo	C50	Cooperativa de Crédito, Poupança E Investimento de Lajeado - Sicredi Integração RS/MG

Table A2.50 largest Credit Banks by asset size in Brazil – Basis 2018

Bank	Bank's Company Name	Bank	Bank's Company Name
B1	Banco do Brasil S.A.	B26	Banco Pan S.A.
B2	Caixa Econômica Federal	B27	Banco Mufg Brasil S.A.
B3	Banco Bradesco S.A.	B28	Banco Alvorada S.A.
B4	Itaú Unibanco S.A.	B29	Banco J. Safra S.A.
B5	Banco Nacional de Desenvolvimento Econômico e Social	B30	Banco da Amazonia S.A.
B6	Banco Santander (Brasil) S.A.	B31	China Construction Bank (Brasil) Banco Múltiplo S/A
B7	Itaú Unibanco Holding S.A.	B32	Banco BMG S.A.
B8	Banco Safra S.A.	B33	Hipercard Banco Múltiplo S.A.
B9	Banco BTG Pactual S.A.	B34	Bank of America Merrill Lynch Banco Múltiplo S.A.
B10	Banco Itaucard S.A.	B35	Banco Regional de Desenvolvimento do Extremo Sul
B11	Banco Votorantim S.A.	B36	Banco Volkswagen S.A.
B12	Banco do Estado do Rio Grande do Sul S.A.	B37	Banco Morgan Stanley S.A.
B13	Banco Citibank S.A.	B38	Banco Bradesco Bbi S.A.
B14	Banco do Nordeste do Brasil S.A.	B39	BRB - Banco de Brasilia S.A.
B15	Banco J.P. Morgan S.A.	B40	Banco Gmac S.A.
B16	Banco Bradesco Financiamentos S.A.	B41	Goldman Sachs do Brasil Banco Multiplo S.A.
B17	Banco BNP Paribas Brasil S.A.	B42	Banco Olé Bonsucesso Consignado S.A.
B18	Banco Bradesco Cartões S.A.	B43	Banco Itauleasing S.A.
B19	Banco ABC Brasil S.A.	B44	Banco RCI Brasil S.A.
B20	Banco Societe Generale Brasil S.A.	B45	Banco Cetelem S.A.
B21	Banco Crédit Agricole Brasil S.A.	B46	Banco Original S.A.
B22	Banco Daycoval S.A.	B47	Banco Mercedes-Benz do Brasil S.A.
B23	Banco Rabobank International Brasil S.A.	B48	Deutsche Bank S.A. - Banco Alemao
B24	Banco Itaú Consignado S.A.	B49	Banco Clássico S.A.
B25	Banestes S.A. Banco do Estado do Espirito Santo	B50	Banco Mercantil do Brasil S.A.

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