RURAL CREDIT REGIONAL INDEX FOR THE BRAZILIAN STATES (1999-2015)

Edileuza Vital Galeano[1] e Amilcar José Carvalho[2]

[1]Doutora em economia, pesquisadora no Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural, Incaper, Rua Afonso Sarlo, 160, Bento Ferreira, Vitória - ES, 29052-010 ES, email: edileuzagaleano@gmail.com. [2]Mestre em economia, Consultor do Tesouro Estadual, na Sefaz-ES, email: amiljoc@yahoo.com.br

ABSTRACT- This article presents the Regional Rural Credit Index (IRCR) for Brazilian states. As expected, the distribution of rural credit among the regions and municipalities of the state in most cases does not track their relative share in the value added of farming. The study provides indicators so that managers can make decisions in order to foster agricultural activities, as well as evaluate the efficiency of rural credit in each locality over the years.
KEY WORDS: Inequality. Added value. Regional development.

RESUMO- Este artigo apresenta o Índice Regional de Crédito Rural - IRCR para os estados brasileiros, mostrando a distribuição regional do crédito rural comparativamente à produção agropecuária. Como era esperado, a distribuição do crédito rural entre os estado na maioria dos casos não acompanha sua participação relativa no valor adicionado da agropecuária. O estudo fornece indicadores para que os gestores possam tomar decisões no sentido de fomentar as atividades agropecuárias, bem como avaliar a eficiência do crédito rural em cada localidade ao longo dos anos.
PALAVRAS-CHAVE: Desigualdade. Valor adicionado. Desenvolvimento regional.

1 INTRODUCTION

Rural credit presents itself as a powerful agricultural policy instrument that promotes the development of Brazilian municipalities. This support mechanism for the sector, which in Brazil dates back to the mid-1960s, has historically been one of the most impacting policies and a more immediate response to rural production, especially in the modality of investment, while recognizing also the importance of the modality Costing

The Central Bank data show that the volume of resources invested in rural credit in the 1970s increased, reaching a maximum financial volume in 1979, which represents a volume 27% higher than the one practiced in 2015. From the 1980s the volume Of rural credit fell, falling to a low point in 1996, corresponding to only 18.7% of the volume practiced in 2015 (BRAZILIAN CENTRAL BANK, 2016a e 2016b).

Until the mid-1990s, this important instrument of rural development established a discriminatory and exclusionary agricultural model, favoring a select group of medium and large farmers, export crops (commodities), prioritizing the Central South Macroregion, although policy Does not formally exclude any segment. Credit concessions favored commodities linked to the nascent agroindustrial complex and the agro-export sector, the transactions of greater volume and lower administrative cost, with the centrality in the modern agriculture of the South Center. The credit also favored domestic market crops such as wheat, Poultry and milk (BITTENCOURT, 2003). With this, in addition to the small producer disputing the credit with the other producers, he was forced to follow the same banking routine to obtain a loan that had the profile aimed at the medium and large producer (BELIK, 2000).

The 1990s were marked by changes in the Brazilian economic strategy with worsening problems with rural credit due to the disarticulation between interest rates on rural credit and the evolution of agricultural prices. During this period credit began to focus on costing operations. In this scenario a new institutional arrangement is established. Social organizations

moved to pressure the Federal Government to resume the expansion of resources for rural credit, but also to create a differentiated policy for family agriculture, an expression that was already used in the 1990s, which was only formally Instituted in 2006 (DE CONTI; ROITMAN, 2001), with the creation of the Family Agriculture Strengthening Program (Pronaf). Pronaf gained government program status as of mid-1996. The volume of credit rose again from the second half of the 1990s. Even so, the volume of resources has remained well below that of the 1970s and 1980s.

Governments are currently struggling to intensify their efforts to democratize and expand access to and use of rural credit, with the growing insertion of family farmers who have historically been left out of the benefits of this government policy.

Rural credit contributes directly to the development of agricultural activities. The present article presents the Regional Rural Credit Index for the Brazilian states, showing the regional distribution of rural credit compared to agricultural production.

2 THEORETICAL FRAMEWORK

2.1 RURAL CREDIT AND REGIONAL DEVELOPMENT

In Keynes's (1971, 1936) perspective, banks play a key role through the ability to expand liquidity and bank credit so that the entrepreneur has an appropriate amount of money for use in productive capital. As for the influence of money on regional development, for Myrdal (1968) and Kaldor (1970) the financial system could affect regional development by promoting the development of the country as a whole. Additionally, Myrdal (1968) in discussing the causes of unequal economic growth between countries and regions in the theory of cumulative circular causation, admitted that banks have crucial importance in the development of regions. He considered that banks can act by improving or undermining inequalities between regions by transferring financial resources from the richest to the poorest regions or vice versa.

De Paula and Alves, Jr. (2003) argued that the expansion of credit by banks is not a result of preconceived changes in their portfolio composition preferences, as a reflection of their lesser risk aversion. They also emphasize that under uncertain conditions, banks seek to guide their behavior based on the evaluation of the history of the relationship between bank and client and in monitoring the strategies adopted by the average behavior of other banks. So in times of growth, they increase their exposure to risk, even in times of crisis, tend to increase their preference for liquidity, regardless of the expected returns of investment projects.

Studart (2005) introduces the idea of functionality of the financial system, that is, its degree of development is measured by its functional role in providing finance and funding to productive sectors. The information asymmetry between lenders and borrowers identified by Stiglitz and Weiss (1981) shows itself to be another financial market failure. They argue that the combination of adverse selection and moral hazard makes a financial sector that, left to the principles of market laws, may bring an imperfect result, imposing credit restrictions, thus hampering access to the resources necessary for new Investment projects. Dymski (2007) shows that the emphasis on bank efficiency should be reduced, since the function of the banking firm should take into account its capacity to generate social welfare through the generation of resources destined to productive investments. Ferreira Jr.et al. (2012) advocate public policy strategies for financial inclusion for less developed regions via the Local Development Promotion and Financing System and also by development agencies as a complement to the supply of resources destined for production.

The interdependence between regional credit supply and demand is a key point in post-Keynesian theory to defend the development of regional financial systems. The supply of credit

is influenced by both liquidity preference and the stage of bank development (CAVALCANTE et al., 2007, p.92). The financial aspect is an important input for the enrichment of the discussion about productive spatial agglomerations (CAVALCANTE, 2006). Minsky (1982, 1986), supported by the theories of Keynes (1936), in turn, recognized the importance of the financial sector in explaining the unstable nature of market economies. Most studies of the post-Keynesian (CHICK, 1996; DOW, 1982, 1990; RODRÍGUEZ FUENTES, 1996; CROCCO, 2010) model admit that under imperfect capital mobility local banks influence regional development by affecting local availability credit. Thus, it is considered that the structure of the financial system can affect regional development.

The activity of financial intermediation and credit creation makes the financial system indispensable in the drive for regional economic development. Thus, the availability of credit and its effect on economic growth are directly related, and the more developed the financial system, the greater the explanatory potential of credit in growth (Amado, 1997, p. Castro (2002) observed the concentration of financial activity in the areas of greater economic development and concluded that the greater the economic dynamism and average labor productivity of the region, the greater its capacity to retain deposits and the lower its preference for liquidity.

The concentration of banking and financial services in more developed regions of the country leads to a worsening of credit distribution in the poorest regions of the country (FREITAS; PAULA, 2010). These authors show that the bank restructuring occurred in the country worsened inequalities in the supply of credit. Nogueira et al. (2014) verified that the highly concentrated character of the Brazilian banking system produces a trend of concentration of banking branches in the more developed region. The authors conclude that, although this pattern could be efficient from the banks' point of view, it is not so in relation to regional development, increasing its economic disparities compared to other more developed regions. Romero and Jayme (2009) show that although credit increased in all macro-regions, the increase was considerably higher in the more developed ones, such as the South and Southeast Regions between 2001-2006. Vasconcelos et al. (2004), based on the evidence regarding the high concentration of regional credit, concludes that the discussion about the low banking credit / GDP ratio in Brazil should also involve regional issues. For Alexandre, Biderman and Lima (2008) a more equitable regional credit distribution can improve the regional distribution of income in Brazil.

In this context, the agricultural sector is of fundamental importance for the reduction of social and regional inequalities. This can be verified, for example, when one observes the Gini index of the gross value added distribution of agriculture and livestock compared to the other sectors of activity. The Gini Index is a measure of the degree of concentration of a distribution whose value ranges from 0 (zero) - the perfect equality, to 1 (one) - the maximum inequality. In Brazil as a whole, the agricultural Gini index in 2014 was 0.60 and for industry 0.90 (GRAPH 1) (IBGE-PIB municipal, 2015). This indicator shows that the agricultural sector, for the better distribution of activities directly linked to land and other natural resources, is a key sector that contributes to a better distribution of productive activities in the municipalities and, therefore, to the Reduction of population and income concentration in the capital and large urban centers. It also shows that the federal government should make efforts to develop industrial activities along the country.

Graph 1: Sector Gini Index Brazil

Graph 2: Agricultural Gini index in the regions of Brazil

Source: Own elaboration based on IBGE data
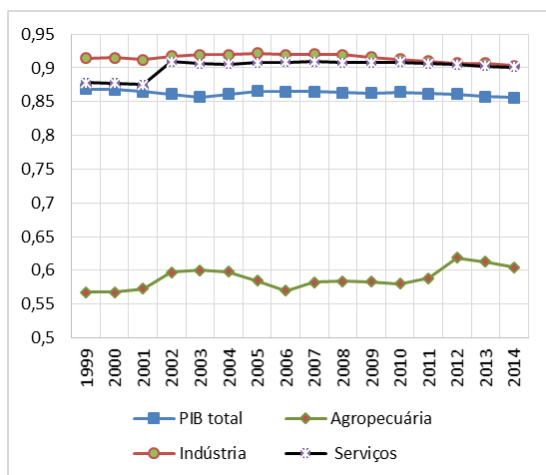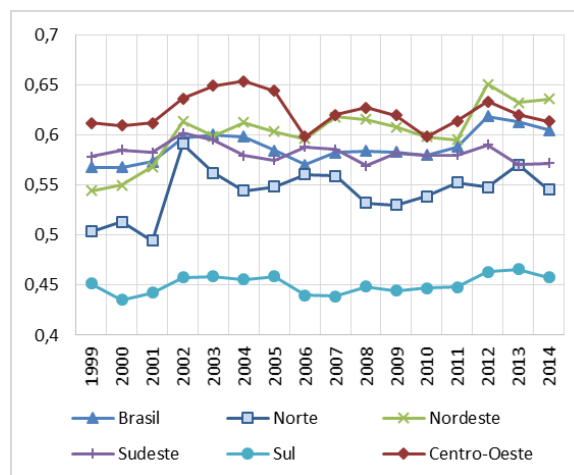
Source: Own elaboration based on IBGE data

Graph 2- shows the Gini index of agriculture for the regions of Brazil. The South region is the one with the best index, while the Midwest presents the worst. The state of Rondônia is the one with the lowest index, followed by Acre and Roraima. The state of Piauí is the one with the worst index (IBGE-PIB municipal, 2015).

Despite the importance of rural credit for economic development, the percentage share of rural credit in total credit has been falling in recent years, and credit to Pronaf has been falling even further (BCB, 2016a e 2016b). In addition, Mattei (2014) showed that between 2000-2010 the credit for family agriculture was concentrated in the South of the Country, where family agriculture is more integrated to the process of agroindustrial production, besides privileging some segments of the family and Exclude others. As for the regional question, Sorgato and Ferreira Jr. (2014) corroborated the transfer of deposits from the less developed region - Northeast, to the more developed, Southeast, between 2001-2010.

3 METHODOLOGY

An indicator of the inequality in the distribution of credit in the country is the regional credit index (RCI). This index compares the participation of a region in the total credit granted in the country with its participation in the national GDP. When the RCI is equal to unity, the proportion of credit applied in the locality is identical to the proportion of GDP in that locality. When it is larger than unity, the region has a share in the distribution of credit higher than its share in the distribution of GDP, and when the RCI is smaller than the unit, the region has a smaller share of the credit distribution than its share in the distribution of the GDP. The RCI calculation can be done as described in the equation below:

$$RCIi = (CREDi / CREDbr) / (GDPi / GDPbr) \qquad (1)$$

In Equation (1), the credit for state "i" (CREDi), the credit of Brazil (CREDbr), the GDPi of the state "i" (GDPi) and the GDP of Brazil (GDPbr) is presented. From the above

equation, Crocco (2010) and Crocco et al (2011) presented the concept of regional credit gap as the volume of credit needed to match the locality's share of total credit granted in the country to its share in GDP national. According to Crocco (2010), in order to reach this value one must first calculate the amount of credit necessary for a given region to receive a credit volume exactly proportional to the weight of its GDP in relation to Brazil. This variable was called CRÊDi. The volume of the regional credit gap can be defined as:

$$Gap = CREDi - CRÊDi \qquad (2)$$

Following the same RCI idea, a regional credit gap indicator - RCGI can be defined as:

$$RCGI = 1 - [(GDPi / GDPbr) - (CREDi / CREDbr)] \qquad (3)$$

An RCGI indicator less than unity reveals that the region receives less credit than its relative share of GDP. An indicator superior to unity reveals that the region receives more credit than its relative share of GDP.

4 RESULTS AND DISCUSSION

Following the methodology presented, the RRCI of the rural credit of the Brazilian regions was calculated (GRAPH 3). The South region presents the highest RRCI between the regions. The indicator shows that this region had relative participation in the credit over its participation in the value added in agriculture and livestock during the whole period evaluated. The Southeastern region in 1999 presented RRCI of 0.91 and this indicator increased and from 2006 onwards it surpassed the unit, reaching 1.20 in 2015. The North and Northeast regions had relative participation of rural credit inferior to the participation in the distribution of the Added value in agriculture.

Graph 3: Regional Rural Credit Index - RRCI, 1999-2015
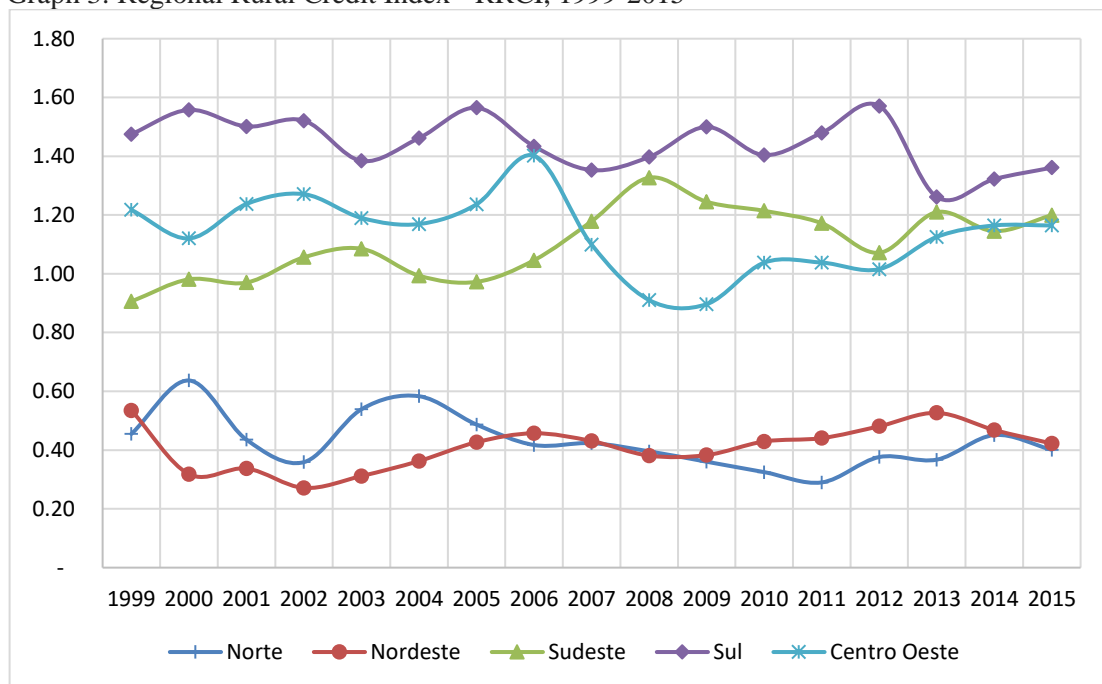
Source: Prepared by the authors based on data from the Central Bank and IBGE's Regional Accounts.

Table 1 presents the average RRCI for the period from 1999 to 2015. For the South region, the RRCI average was 1.44, the highest average among the regions, and Paraná state presented the highest index average (1.49) between states. Table 1 also presents the RRCI of the federative units in the year 2015. The North region presents the lowest RRCI among the regions of Brazil (0.40). In the North region is also the state with lower RRCI, the Amazon with 0.04. The Northeast region also presents IRR less than unity (0.42), with the highest RRCI being in the state of Piauí (0.88) and the lowest in Alagoas (0.13). In the Midwest and South regions, RRCI is not as unequal among states. The highest RRCI among the states is in Paraná in the South region (1.57). In the Southeast, the state of Minas Gerais has the highest RRCI (1.32) and Rio de Janeiro the lowest (0.21).

Table 1 also presents data on participation in rural credit and participation in the value added of agriculture and livestock in each Brazilian region. In Brazil, the rural credit value added value of agriculture and livestock was 0.43 in average between 1999 and 2015, and specifically in 2015 this ratio was 0.60. In the northern and northeastern states this ratio is much lower. In the Southern and Southeastern states, this ratio was 0.81 and 0.72, indicating a greater availability of credit.

TABLE 1: Rural Credit and Value Added Data and IRCR 1999 to 2015

State / Region	Average 1999 - 2015				2015			
	Ratio rural credit Added value of agriculture	Contribution in the Added Value of Agriculture %	Credit participation %	RRCI	Ratio rural credit Added value of agriculture	Contribution in the Added Value of Agriculture %	Credit participation %	RRCI
Acre	0,16	0,43	0,16	0,38	0,18	0,52	0,15	0,29
Amapá	0,08	0,11	0,02	0,16	0,10	0,10	0,02	0,17
Amazonas	0,06	1,39	0,19	0,14	0,02	2,23	0,09	0,04
Pará	0,11	4,46	1,20	0,27	0,11	5,59	1,05	0,19
Rondônia	0,28	1,41	0,89	0,63	0,47	1,68	1,31	0,78
Roraima	0,22	0,14	0,06	0,39	0,18	0,24	0,07	0,29
Tocantins	0,56	1,07	1,29	1,21	0,90	1,32	1,99	1,51
Norte	**0,18**	**9,01**	**3,82**	**0,42**	**0,24**	**11,69**	**4,69**	**0,40**
Alagoas	0,08	1,94	0,37	0,19	0,08	1,88	0,24	0,13
Bahia	0,22	6,83	3,21	0,47	0,31	6,89	3,64	0,53
Ceará	0,14	2,39	0,79	0,33	0,16	1,99	0,52	0,26
Maranhão	0,19	2,82	1,15	0,41	0,28	2,80	1,30	0,47
Paraíba	0,21	0,96	0,50	0,52	0,23	0,74	0,29	0,39
Pernambuco	0,12	2,19	0,63	0,29	0,15	2,01	0,51	0,25
Piauí	0,35	0,90	0,68	0,76	0,52	1,06	0,93	0,88
Rio Grande do Norte	0,20	0,68	0,33	0,48	0,18	0,63	0,19	0,30
Sergipe	0,17	0,77	0,30	0,40	0,24	0,67	0,27	0,40
Nordeste	**0,18**	**19,49**	**7,96**	**0,41**	**0,25**	**18,66**	**7,88**	**0,42**
Espírito Santo	0,48	1,84	1,57	0,85	0,61	1,46	1,50	1,03
Minas Gerais	0,52	11,22	12,60	1,12	0,79	9,44	12,48	1,32
Rio de Janeiro	0,10	1,12	0,27	0,24	0,12	1,16	0,24	0,21

São Paulo	0,51	13,41	15,82	1,18	0,73	10,16	12,42	1,22
Sudeste	**0,49**	**27,59**	**30,26**	**1,10**	**0,72**	**22,22**	**26,65**	**1,20**
Paraná	0,63	10,73	15,93	1,49	0,93	11,35	17,79	1,57
Rio Grande do Sul	0,63	10,90	15,94	1,46	0,73	12,07	14,76	1,22
Santa Catarina	0,56	5,43	7,09	1,31	0,73	4,82	5,90	1,22
Sul	**0,62**	**27,06**	**38,96**	**1,44**	**0,81**	**28,24**	**38,44**	**1,36**
Distrito Federal	0,43	0,23	0,24	1,02	0,36	0,24	0,14	0,60
Goiás	0,55	5,78	7,46	1,29	0,82	6,22	8,60	1,38
Mato Grosso	0,45	6,58	6,88	1,05	0,68	7,46	8,55	1,15
Mato Grosso do Sul	0,45	4,26	4,43	1,04	0,57	5,27	5,05	0,96
Centro Oeste	**0,48**	**16,85**	**19,00**	**1,13**	**0,69**	**19,19**	**22,35**	**1,16**
Brasil	**0,43**	**100,00**	**100,00**	**1,00**	**0,60**	**100,00**	**100,00**	**1,00**

Source: Prepared by the authors based on data from the BC and IBGE's Regional Accounts.

As for the participation in the total value added of agriculture, the Southeast and South regions are the most representative, and the Southeast has a downward trend. The South, Southeast and Central West regions have a share in the total volume of rural credit that exceeds their share in the total value added of agriculture and livestock. This evidence corroborates the regional concentration of credit, as discussed in the literature review. The IRCR below the unit in the North and Northeast regions shows that these regions have the potential to increase their productive investments in agriculture, as well as to increase the use of credit for production in this sector.

5 FINAL CONSIDERATIONS

The agricultural sector, for the better distribution of activities directly linked to land and other natural resources, is a key sector for the reduction of the concentration of population in the big cities. The sector contributes to a better distribution of the activities in the municipalities and, therefore, to the reduction of the concentration of income in the capital and large urban centers. Rural credit as a driver of rural development allows many municipalities to exploit their productive potential generating economic value. As expected, the distribution of rural credit among the regions and municipalities of the state in most cases does not track their relative share in the value added of agriculture and livestock. The South, Southeast and Central West regions have a share of rural credit higher than their share of the value added of agriculture and cattle raising. In the case of the North and Northeast regions, their participation in rural credit is much lower than their value-added participation, which shows that these regions can increase their productive investments in rural areas using credit. Thus, the present study presented a comparison of the participation of the states and regions in rural credit, comparing their participation in gross value added, showing that they could increase their investments in rural areas using this public policy, which is rural credit, to promote the expansion of agricultural production and generate greater dynamism.

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