FUNDAÇÃO GETULIO VARGAS
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

CREDIT UNION CORRESPONDENTS AND FINANCIAL INCLUSION IN BRAZIL

An Exploratory Study

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SÃO PAULO
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Dissertation presented to Escola de Administração de Empresas de São Paulo of Fundação Getulio Vargas, as a requirement to obtain the title of Master in International Management (MPGI).

Knowledge Field: Financial Inclusion

Adviser: Prof. Dr. Lauro Emilio Gonzalez Farias

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Abstract

The Brazilian banking correspondent network has been a topic of study for already a decade, due to its well-documented success in improving access to financial services in remote areas. The marginal but growing role of credit unions in the usage of correspondents has not received much attention from academics, despite the appraised importance of credit unions in finance of proximity. This thesis takes a multi-method approach to perform an exploratory research of credit union correspondents in Brazil. The research objective is two-fold, aiming, from one side, at understanding the incentives of credit unions for contracting correspondents and, from the other, at evaluating whether credit union correspondents improve financial inclusion. The research consists of a case study and quantitative analysis of correspondent registration data and credit union financials. The results indicate that generally the largest and most profitable credit unions use banking correspondents in order to improve efficiency and decrease waiting lines, while promoting financial inclusion only in one restricted dimension – bill payment. Nevertheless, in 2014, credit union correspondents had an important role in providing access to payments in 690 municipalities, of which 200 had low financial depth. Despite the scope limitation of credit union correspondents, the results give reasons to believe that these actors could increase their importance in the promotion of financial inclusion in the future.

Keywords: *financial inclusion, agent banking, banking correspondents, credit union correspondents, credit unions*

Resumo

A rede de correspondentes bancários do Brasil tem sido estudada há mais de uma década, em particular por causa da sua importância no aumento do alcance de serviços financeiros para regiões distantes dos maiores centros urbanos. O uso de correspondentes por cooperativas de crédito não tem recebido destaque, apesar do papel importante das cooperativas na inclusão financeira. Esta dissertação adota uma abordagem "multimétodo" para efetuar uma pesquisa exploratória dos correspondentes de cooperativas de crédito no Brasil. A pesquisa visa, por um lado, alargar a compreensão dos incentivos que levam cooperativas a usarem correspondentes, e por outro, avaliar se esses correspondentes merlhoram a inclusão financeira. A pesquisa é formada por um estudo de caso assim como por análise de dados relativos ao registro de correspondentes bancários e de dados financeiros das cooperativas. Os resultados apontam que o uso de correspondentes bancários por cooperativas está relacionado à busca de maior eficiência e redução de filas nas agências. A melhoria da inclusão financeira por esses correspondentes limita-se a um serviço único – o recebimento de pagamentos. Não obstante, em 2014, cooperativas de correspondentes de crédito tinham um papel importante no fornecimento de serviços de recebimento de contas em 690 municípios brasileiros, dos quais 200 tinham baixos níveis de inclusão financeira. Apesar da escassa disponibilidade de serviços dos correspondentes das cooperativas, os resultados sugerem que esses atores poderiam adquirir uma importância maior na promoção de inclusão financeira no futuro.

Palavras-chave: *inclusão financeira, correspondentes bancários, agentes credenciados, cooperativas de crédito*

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List of Acronyms and Terms

ADH: Atlas do Desenvolvimento Humano

AML/CFT: Anti-Money Laundering / Combating the Finance of Terrorism

BC: Banking Correspondent

BF/ PBF: Programa Bolsa Família

BCB: Central Bank of Brazil

BRL/R$: Brazilian Real

CEF: Caixa Econômica Federal or Caixa [Brazilian bank]

CAGR: Compound Annual Growth Rate

CNPJ: National Registry of Natural Persons [Brazil]

CU: Credit Union

G2P: Government-to-Public

HDI: Human Development Index

IBGE: Brazilian Institute of Geography and Statistics

ICT: Information and Communications Technology

IFI: Index of Financial Inclusion

IMF: International Monetary Fund

Inc. III: Bill payment service [for banking correspondents]

Inc. V: Credit proposal service [for banking correspondents]

MFI: Microfinance Institution

PAA: Advanced Point of Access (see Appendix 2)

PAB: Bank Point of Access (see Appendix 2)

PAE: Electronic Point of Access (see Appendix 2)

POA: Point of Access [to financial services], listed in Appendix 2

ROA/ROE: Return on Assets / Return on Equity

SME/MSME: Small and Medium-sized Enterprise / Micro, Small & Medium Enterprise

UNDP: United Nations Development Program

WOCCU: World Council of Credit Unions

1. Introduction to Credit Union Correspondents

1.1. **Introduction and Objectives**

Financial inclusion refers to the delivery of financial services to disadvantaged groups of a society. It is seen as an important element of both economic and personal development, and has been receiving an increasing amount of attention from academics in the last decade. Several international organizations and forums, such as the G20 and the World Bank, have acknowledged the importance of financial inclusion to economic development, and international cooperation has been strengthened to fight against financial exclusion.

There is a large consensus on the importance of financial inclusion in developing a stable economy, and several countries have placed the issue at the core of their public policies for economic development. Brazil, the world's ninth largest economy in nominal terms in 2015, has done tremendous improvements in financial depth in the last decade, and acts as a benchmark for many developing economies in this field.

Banking correspondents (BCs), third parties allowed to act as financial intermediaries for a bank, have played a major role in the financial inclusion strategy of Brazil. Through the decrease of distribution costs, the banking correspondent model allowed the Brazilian banking system to reach thousands of previously financially excluded municipalities in the beginning of the last decade. The Brazilian banking correspondent network, unparalleled in its extent, has inspired a number of similar financial inclusion initiatives in Latin America and beyond.

Despite the well-documented success of banking correspondents in giving access to financial services to underserved populations, they have not achieved a significant improvement in the distribution of so-called "relational" services, such as microcredit and savings accounts. This is particularly due to a lack of incentives, as well as inadequacy of banking products for low-income population groups.

In this context, it is interesting to study banking correspondents operated by credit unions (CU). Credit unions have an important role in finance of proximity in Brazil and around the world, due to their engagement with communities and capacity to reach unbanked populations. The usage of

banking correspondents by credit unions has been increasing steadily in the last years, and it is interesting to study their usage in more detail. While this is still a marginal phenomenon, credit unions may have the potential to overcome the obstacles of traditional banking correspondents through their experience with finance of proximity and financially excluded populations.

The objective of this thesis is to evaluate if and how banking correspondents operated by credit unions improve financial inclusion in Brazil. This topic is important due to the essential role that access to finance plays on personal empowerment, as well as on economic development and poverty reduction.

The outcome of this study is an improved understanding of the role of this relatively new actor in the Brazilian banking correspondent network. Furthermore, this study contributes to the academic literature about the development of the credit union sector in Brazil, and improves understanding of the remaining bottlenecks in financial inclusion in the country.

1.2. **Research Question and Methodological Choices**

The participation of credit unions to the banking correspondent network in Brazil is a rather new phenomenon that has not yet received particular attention from academics. This study aims at presenting an overview of credit union correspondents from the point of view of financial inclusion.

Both credit unions and banking correspondents have an important role in access to finance among financially excluded populations. Furthermore, credit unions are seen as having better ability to deliver affordable financial services to low-income segments. Therefore, credit union correspondents present a potentially powerful tool for fighting financial exclusion.

The research question of this thesis is two-dimensional in order to develop a complete understanding of credit union correspondents.

Question 1: *Is it useful for credit unions to open correspondents?*

This first question aims at assessing whether CUs have incentives to open BCs in the first place, and to understand why they do it. If there is no incentive to do it, it is unlikely that networks of

credit union BCs would ever develop to a scale large enough to play an important role in the Brazilian banking correspondent system.

Question 2: *Do credit union correspondents improve financial inclusion in Brazil?*

After finding out what the incentives of CUs are to use correspondents, this second research question aims at addressing the effect of credit union BCs on financial inclusion. Financial inclusion is assessed through the framework used by the Central Bank of Brazil, which consists of three dimensions – access, usage and quality of financial services. The data available for this thesis does not allow for a precise quantitative assessment of the impact on financial inclusion. Nevertheless, the results may indicate in which ways credit union correspondents bring about for financial inclusion

As this topic has received rather little attention from academics, the type of research performed in this thesis is largely exploratory, and there are therefore no hypotheses for the research questions. The research is performed using a multi-method approach, consisting of a case study of a credit union in Brazil, as well as an extensive analysis of secondary data available about banking correspondents, credit unions and financial infrastructure in the country.

1.3.   **Results of the Research**

The results showed that correspondents are useful for credit unions, particularly for large ones, as well as for the ones most resembling banks. When it comes to financial inclusion, it is clear that credit union correspondents are a *niche* phenomenon in Brazil, as they represented less than 2% of all correspondents in the end of 2014. Furthermore, they could not be seen to be superior to traditional banking correspondents in any way - they were limited in scope of services and geographical reach, and did not promote relational services better than regular banking correspondents. Credit unions did not seem to use BCs as a distribution model for financial services, but rather as a way to improve operational efficiency. Furthermore, credit unions appeared to be more limited in technological infrastructure than banks, limiting their ability to distribute financial services through the network.

Notwithstanding, credit union correspondents do improve financial inclusion in some dimensions. Notably, credit union correspondents form a significant share of correspondents for access to bill payment in over 690 municipalities of Brazil, out of which 200 have low financial depth. This improvement of access may have led to the decrease of transaction costs for bill payment at the local level for millions of citizens. However, the precise number of people affected by the proliferation of credit union correspondents could not be assessed through this research.

While credit union correspondents currently remain inferior to regular banking correspondents in terms of financial inclusion, they may hold potential for gaining importance in the future. This is particularly due to the alignment of interests between credit unions and its member correspondents, which is more difficult to achieve for commercial banks.

The following part of the thesis introduces the academic framework of the research topic, from financial inclusion to credit union correspondents. The third part of the thesis presents the methodological choices of the research, while the fourth part displays the obtained results. Finally, the fifth part of this thesis discusses the results in relation to the academic framework, and the sixth part draws conclusions to answer the research questions.

2. Academic Framework of Credit Union Correspondents

2.1. Literature Framework

As this thesis aims at observing credit union correspondents in a context of financial inclusion, all these concepts need to be explained in the light of previous theory. This section thus aspires to provide the reader with a complete understanding of the theoretical framework of the topic. Each section seeks to present the topic from a universal and a Brazilian point of view, as the research object of this thesis is essentially related to financial inclusion in Brazil.

Financial inclusion has been a topic of study for at least the past 20 years and it has received growing international attention from academics, national regulators and international

organizations such as G20 and the World Bank. There is therefore a rich and wide array of literature regarding this subject.

Banking correspondents have been studied since the beginning of the 21st century, but they are often presented in the context of Brazil, as this country hosts the most successful and far-reaching network of banking correspondents up to date.

Academics have studied credit unions and mutual finance at least since the 1950s, and a relatively large literature framework about the Brazilian credit union segment has emerged in the last 15 years.

When it comes to credit union correspondents, there is little prior academic research on the topic up to date, but a few blog entries and one minor study have been published and are presented in the literature review.

2.2. Financial Inclusion

2.2.1. Definition of Financial Inclusion

When defining financial inclusion, various approaches have been presented in relation to the nature of the target group as well as to the essence of the inclusion itself. For the purpose of this thesis, the definition of the Central Bank of Brazil (BCB) is retained: *"Process of effective access to and usage of adequate financial services for the population's needs, with impact on their quality of life."* (2015, p.19)

Financial inclusion is hence a process aiming at increasing the reach of the financial sector to include the entire population of a country or area. The reach of the financial sector can be seen as the *access to* and *usage of* financial services. In addition, it is also important to consider the *quality* of the services offered, to assess their suitability to the needs of the population.

By definition, financial inclusion aims at including groups of people to the financial sector that have traditionally been *excluded* from it. According to Kempson and Claire (1999), financial exclusion is either due to poor access to financial services, inappropriate conditions of the formal

financial sector, non-targeted products, too high prices or self-exclusion (out of fear of refusal). Financially excluded populations are thus not a homogenous group.

According to Jansen and Hannig (2010), catering to the lowest income groups has traditionally not been of the interest of formal financial institutions, due to the costs associated with high information asymmetry. This information asymmetry between banks and low-income populations could be seen as one of the root causes of financial exclusion. Nonetheless, Jansen and Hannig (2010), also remind that the number of financially excluded people in the world is much larger than the number of people living under $2 a day. Hence, despite a large focus of the financial inclusion discourse on low-income socio-economic groups, the underbanked do not only represent the poorest people in the society.

2.2.2. Importance of Financial Inclusion

It is widely believed that financial inclusion presents benefits for the society, which has led it to become an important topic of discussion in international organizations and central banks. Financial inclusion is accepted to be strongly related to development, although there is no consensus on causality. A good way to start looking at the benefits of financial inclusion is to observe the disadvantages of financial exclusion.

Leeladhar illustrates some of the challenges faced by people excluded from the formal financial sector (2006). People with no access to financial infrastructure may have to travel long distances to receive governmental transfers or to make payments. In addition, with no access to formal financial instruments, financially excluded people may have to rely on informal moneylenders that charge exorbitant interest rates. Transactions are also difficult in unbanked communities, and investment remains at suboptimal levels.

Besley (1995) describes the difficulty that financial exclusion imposes on low-income populations. In large areas of the world, the poor are subject to several risks that are not familiar to more affluent socio-economic groups. Due to poor sanitation and reliance on agriculture, they are exposed to serious contagious diseases and unexpected income shocks. Being generally excluded from the formal financial sector, they cannot protect themselves against those risks with insurance, savings or credit, which renders their situation even more precarious. Aggarwal

and Klapper (2013) also mention, that the lack of risk management instruments often leads to children of farmers dropping out of school in case of income shocks, which perpetuates poverty.

Demirgüç-Kunt and Klapper (2012) add that without the ability to borrow money from financial institutions, low income populations must rely on their savings for investments in education and business, for example, which is economically inefficient and maintains income inequality in the society. Murdoch (1995) also points out, that the unavailability of financial services makes the poor very risk averse and leads to poor decisions in terms of work and production. A further example is given by Abramovay (2004), in which farmers lacking more liquid investment options would invest in livestock, risking having to sell entire animals in case of unexpected liquidity requirements.

From a macro-economic point of view, Mettenheim, Diniz and Gonzalez (2013) indicate that financial exclusion implies a lower effectiveness of monetary policy, as large parts of the population do not participate in the formal financial system, as was the case in Brazil until the beginning of the 21st century.

Due to these rather explicit inconveniences of financial exclusion, policies aiming at including all population segments to the formal financial sector have yielded positive results.

According to Jansen and Hannig (2010), financial inclusion has a causal impact on economic growth, as access to finance for small companies fuels creative destruction. Sarma (2012) confirms this effect on economic growth and likewise explains it through a more effective allocation of productive resources and capital formation.

In addition, according to a study by Beck, Demirgüç-Kunt and Levine (2007), financial development both improves income levels and reduces poverty. Furthermore, financial development benefits the lowest income segments disproportionately compared to the higher ones, and thus is an effective tool for reducing income inequality.

According to Jansen and Hannig (2010), research results on the improvement of the lives of low-income groups have apparently been ambiguous, as the effect of financial access is hard to isolate from other factors. Nevertheless, Sarma (2012) states that the access to formal financial services improves the management of day to day finances of the poor, while reducing their

dependence on often exploitative informal sources of credit. Burges and Pande (2005) as well as Bruhn and Love (2009) have observed positive effects of bank branch penetration on income and unemployment of local population in India and Mexico, as having an account makes receiving wages and remittances easier.

Finally, based on Mettenheim, Diniz and Gonzalez (2013), improving financial depth has proved very beneficial for monetary policy in Brazil, for the Central Bank overnight rate hike required to counter shocks decreased as the percentage of Brazilians affected by the policy grew.

Overall, it can be agreed that financial inclusion brings about numerous benefits to the society, and it has therefore been accepted as one of the main instruments of economic development by various governments, not only in developing countries but also in developed ones.

2.2.3. Measuring Financial Inclusion

As it has already been established, financial inclusion is largely regarded as an important factor for economic development. In order to monitor the evolution of financial inclusion over time, compare countries, and appreciate the effectiveness of public policies, it is essential to be able to measure it.

The number of banked people has often been used as a proxy for financial inclusion, but according to Sarma (2012), this measure ignores the access to and quality of usage of the financial system. As Leeladhar (2006) puts it, financial inclusion is not "black and white", in the sense that people cannot be categorized into either financially "included" or "excluded" individuals. Instead, there would be different levels of inclusion, meaning that a person could for example own a bank account, but not be eligible for loans due to information asymmetry.

Jansen and Hannig (2010) admit to the difficulty of measuring financial inclusion, but propose four attributes against which it could be observed: access (existence of barriers), quality (adequacy of products to the client), usage (frequency and regularity) and impact (how the client's life is affected by the usage of formal financial services).

The World Bank started compiling data about the worldwide usage of financial services in the beginning of this decade, in an attempt to systematize the measurement of financial inclusion (Demirgüç-Kunt and Klapper, 2012). This Findex database was updated in 2014 (Demirgüç-

Kunt et al., 2015), and now contains data based on a survey of 150,000 individuals above 15 years of age in 148 countries. This database looks at the demand side of financial services, and provides information on four main types of indicators: account penetration, savings behavior, sources and purposes of borrowing and insurance for health and agriculture. The Findex database is widely referred to globally, as it allows for a comparison of several indicators across countries and years.

Despite the plenitude of the first Findex database published in 2011, Sarma (2012) sees it as an incomplete measurement of financial inclusion. According to his criticism, the survey method used to compile the Findex database gives an incomplete picture, as it only conveys information about the individual level. For some countries, the individual financial behavior data in the database can be very similar, despite those countries exhibiting very different financial inclusion data on the macro level. Sarma (2012) proposes a single weighted indicator measuring inclusion on three dimensions: banking penetration, availability of banking services and usage of the banking system. Arithmetically, the method is analogous to the Human Development Index (HDI) of the United Nations Development Program (UNDP), and its formula is displayed in Appendix 1.

The Central Bank of Brazil adopted Sarma's (2012) measurement for its Financial Inclusion Report (2011a)[1], but divided each dimension into sub-dimensions – for example, access was measured both in terms of demographic and geographic density. In the Financial Inclusion Report of 2015 (Banco Central do Brasil, 2015a), the Central Bank adds quality of services to the measured dimensions, in order to track the adequacy of financial products to the needs of the population. However, this dimension was not yet integrated to the composite indicator in 2015 due to a lack of appropriate data.

An adaptation of the Sarma (2012) model is used for computing a municipal financial inclusion index for the research of this thesis, in a manner that is specified in the methodology section. This referred model measures the *access* and *usage* dimensions of financial inclusion and ignores quality due to lack of data.

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[1] The Financial Inclusion Report 2011 of the Central Bank of Brazil was based on the first version of Sarma's IFI, published in 2008.

2.2.4. State of Financial Inclusion around the World

After having examined the importance of financial inclusion and its measurement, this section presents the current state of financial inclusion in the world, factors explaining financial inclusion, as well as the evolution of policy response to improve financial reach.

Despite all previous efforts, in 2014, 2 billion people, more than a third of the world's working age population, remained excluded from the formal financial sector (Demirgüç-Kunt et al., 2015). Such a large amount of people was still unable to save, borrow or protect themselves against the unexpected, despite continuous efforts for greater inclusion. Nevertheless, it is worthwhile to note that the number of people excluded from the formal financial sector had decreased by 20% since 2011 (Demirgüç-Kunt and Klapper, 2012).

The map below, based on data of the Findex database, gives an overview of the global situation in bank account ownership in 2014. On average, only 6% of adults in OECD-countries did not have a bank account in 2014, compared to 46% in developing countries. At first glance, the map seems to imply that more developed countries have a higher penetration of bank account ownership, but that is not the whole story.
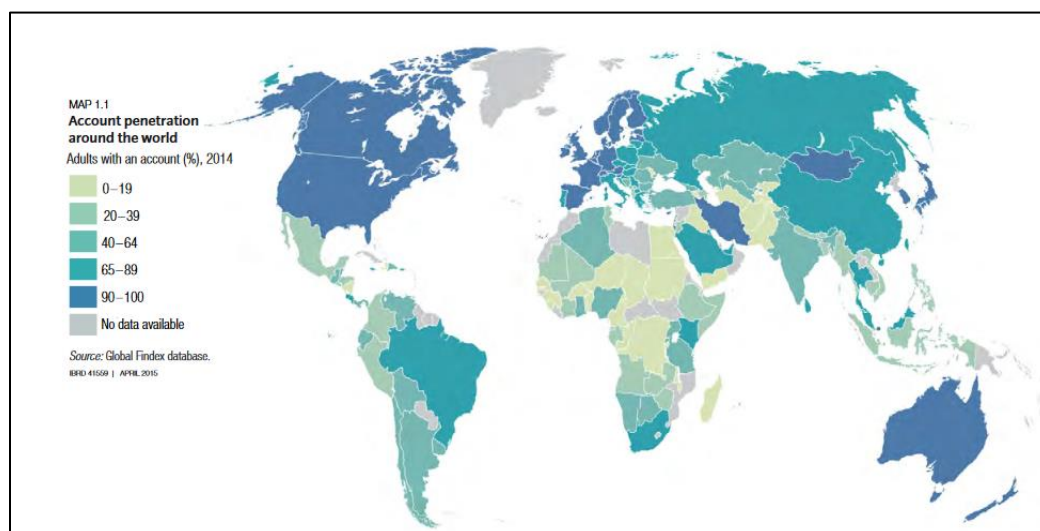
Figure 1: Account penetration around the world. (Demirgüç-Kunt et al., 2015)

According to Demirgüç-Kunt and Klapper (2012), national income does indeed explain differences in financial inclusion indicators when looking at the world as a whole. However, when observing only low and middle-income countries, national income does no longer explain

financial depth. There are significant differences between levels of financial inclusion of many countries of this category at the same level of economic development, implying that other factors could explain financial inclusion. Sarma (2012) also comes to the same conclusion when applying his index of financial inclusion to different countries in the world. Based on Findex data (Demirgüç-Kunt et al, 2015), there are also important differences between regions and inside regions between socio-economic groups. The difference between men and women is also remarkable, women tending to be more excluded from the formal financial sector everywhere in the world. The differences in bank account ownership rather concisely reflect income inequalities in the country. Moreover, rural populations also tend to be more excluded from the formal financial sector than urban populations.

Demirgüç-Kunt et al. explain (2015) that a major reason for not having a bank account was distance to banks, implying that there is a lack of banking infrastructure in many deprived regions of the world. Other barriers stated were religious reasons, lack of trust, lack of documentation, family member with an account, expense of bank account ownership or lack of money to keep on a bank account. Interestingly enough, there are indeed large differences between countries with respect to the number of documents required to open a bank account, and the minimum balance required to keep a bank account, for example.

Aggarwal and Klapper (2013) confirmed that the cost of ownership of a bank account is undoubtedly excessively high in Africa, as it costs around $4 per year on average. Documentation, minimum balance requirements and distance impose an indirect cost on many people, leading to financial exclusion. These differences among countries, along with distance to banking services, seem to be main explicative factors behind the large discrepancy in financial inclusion in low and middle-income countries.

According to Chakrabarty (2006), it is also often not economically viable for banks to cater to the poor, generally due to poor infrastructure that renders the "last mile problem" very hard to overcome. In addition, as previously mentioned, Jansen and Hannig (2010) explain that banks often do not cater to the poor due to high information asymmetry.

Considering the factors stated above, public actors of a given country can try lower the barriers that lead to exclusion, for instance by facilitating bureaucracy, strengthening institutions and

making banking with the unbanked segment more affordable for banks. According to Ardic, Heimann and Mylenko (2011), in 2010, 86% of countries had at least one policy objective regarding financial inclusion on their agenda. The issue is given more attention in developing countries, but is also part of government policies in many developed countries.

In an article published on the website of the Consultative Group to Assist the Poor, Tsuji (2015) contemplates the most dramatic changes in the last 20 years of financial inclusion. After the rapid growth of microcredit, academic interest started shifting towards a larger array of financial services, such as savings, insurance, remittances, payments and leases, together with credit. This phenomenon of diversification in services has also been visible in the actors operating in the field of financial inclusion: on top of the traditional microfinance institutions (MFIs), also commercial banks, national governments and non-financial organizations participate in the action against financial exclusion. In addition, digitalization and the development of information and communications technology (ICT) has become an integral part of financial inclusion today. Finally, Tsuji (2015) notes the increased importance of financial inclusion on global agendas and the improved quality of its measurement as major developments of the last 20 years. There is a wide consensus that nobody should be left behind from participating to the financial sector.

2.2.5. Policies for Improving Financial Inclusion

According to Mettenheim, Diniz and Gonzalez (2013), the global financial crisis led to disillusionment with private sector-led initiatives for improving financial inclusion. These initiatives, mostly consisting of micro credit, often involved abusive practices and led to over-indebtedness of target populations. Conforming to the same authors, reaching the poor with profitable interest rates was often not possible, and the importance of financial inclusion is such, that its implementation cannot be left solely to the private sector. Jansen and Hannig (2010) also stress the importance of partnerships between the private and public sector in reaching financial inclusion. Furthermore, savings should be stressed over credit as a buffer against income shocks. Jansen and Hannig (2010), as well as Mettenheim, Diniz and Gonzalez (2013) equally stress the role of public banks in the implementation of public financial inclusion objectives, due to their usually high reach and scale in developing countries. There is nowadays global consensus that the public sector has a major role to play in the promotion of financial inclusion.

The G20 has taken financial inclusion as a main development objective, and created the Global Partnership for Financial Inclusion in 2010, a platform of G20 and other countries for learning, knowledge sharing, policy advocacy and coordination on financial inclusion (G20 Financial Inclusion Experts Group, 2010). One of the main targets of the group is to include micro-entrepreneurs in the financial system as engines of economic growth and employment generation. According to the group's report from 2014, 47 countries committed to actions to promote financial inclusion by signing the Maya Declaration of 2011 (Global Partnership for Financial Inclusion, 2014).

Policies adopted around the world for promoting financial inclusion aim at removing some of the barriers discussed in the previous section, such as distance, documentation requirements and cost (Demirgüç-Kunt et al. 2015).

Basic accounts have been a way to reduce distribution costs for banks when promoting financial inclusion, and have been tested, among others, in South Africa (Aggarwal and Klapper, 2013),in India (Leeladhar, 2006 and Thorat, 2006) and in Brazil (Mettenheim, Diniz & Gonzalez, 2013). In South Africa, many of the opened accounts were dormant and the solution was not commercially viable for banks, but its initial success caused the formal financial sector to see the vast demand of the unbanked population for financial services (Aggarwal and Klapper, 2013).

In several countries, document requirements for opening bank accounts have been relaxed (Aggarwal & Klapper, 2013). The Anti-Money Laundering (AML) and Combating the Finance of Terrorism (CFT) controls, adhered to by most countries, often impose unreasonably strict identification requirements on low-income populations, effectively barring them from the formal financial sector. Indeed, studying the Findex data, Aggarwal and Klapper found that the number of documents required for opening bank accounts was very negatively correlated with the amount of accounts opened (2013). The Reserve Bank of India (RBI) has also engaged in measures to facilitate the procedure for opening a bank account (Thorat, 2006).

As mentioned by Demirgüç-Kunt et al. (2015), one reason identified for poor bank account penetration was a lack of trust towards the banking sector. According to Aggarwal and Klapper (2013), previous defaults of financial institutions in developing countries could explain this mistrust towards the formal financial sector. Only 16% of developing countries have deposit

insurance, and the implementation of such a system holds potential for improving the trust of the population towards the financial sector.

In the Findex database (Demirgüç-Kunt et al., 2015), distance to banking services was an important explaining factor behind exclusion. Numerous initiatives have been put in place to increase the physical proximity of financial services to unbanked segments of the population.

According to Thorat (2006), the RBI has mandated banks to open a share of new branches in underserved areas, but this has not been successful as reported by Aggarwal and Klapper (2013). In agreement with Chakrabarty (2011), this is a sort of subsidy paid by the banks, while financial inclusion can only be sustainable if it is economically viable for financial institutions.

According to Mas (2009), banks are not inherently incapable of catering to the poor, but have rather never had the right incentives to do so. Branchless banking can be a way of making financial inclusion economically viable for the formal financial sector. Policy makers rather need to ensure that proper regulation exists to incentivize private actors to adopt new distribution models.

Branchless banking can essentially be divided into mobile banking and agent banking (or correspondent banking). Jansen and Hannig (2010) and Demirgüç-Kunt and Klapper (2012) write about the success of mobile banking in Kenya and the Philippines, where the model has met the largest success. Mobile payments are a practical way to overcome physical infrastructure barriers, which tend to be high in Africa, for example. In 2014, 12% of Africans used mobile payments, a figure much larger than on any other continent, according to Demirgüç-Kunt et al. (2015). Mettenheim, Diniz and Gonzalez (2013) point out that mobile banking is a good solution to overcome cost barriers, but it requires a complex infrastructure in order to function properly. Such an infrastructure is harder to put in place, the more there is competition on the mobile phone market and banking sector, and it has thus been successful in countries with more concentrated markets. Furthermore, mobile banking solutions raise issues with respect to monetary mass and AML/CFT controls, which form a challenge to their wider adoption (Mettenheim, Diniz & Gonzalez, 2013 and Jansen & Hannig, 2010).

Another form of branchless banking, referred to as agent banking (or correspondent banking in Brazil), has become rather popular around the world, particularly in Latin America and India (Jansen and Hannig, 2010 and Mettenheim, Diniz & Gonzalez, 2013). This model will be covered in detail in later sections, but it consists of banks collaborating with retailers to solve the "last mile" problem. This model, just as mobile banking, is highly dependent on national financial regulation and availability of adapted ICT-solutions.

Bold, Porteous and Rotman (2012) as well as Mettenheim, Diniz and Gonzalez (2013) present another form of public policy aiming at improving financial inclusion – Government to Public (G2P) transfers. These initiatives in several countries have originally aimed at improving the disposable income of low-income populations, but have recently also been the object of financial inclusion policies by national governments. Payment of these benefits on bank accounts or electronic cards, as has been done in South Africa, Brazil, Mexico or Colombia, for example, promotes the usage of the formal financial sector while decreasing the cost of these cash transfers (Bold, Porteous & Rotman, 2012). As reported by these authors, the economic viability of such programs has often been precarious, but technological advances and increase of scale might change the setting in the future.

Jansen and Hannig (2010) write that in order for financial inclusion to be successful, the formal financial sector should have low barriers of entry, competition between financial service providers, quality infrastructure, informed demand and customer protection put in place. Villasenor, West & Lewis (2015) also highlight the importance of informed demand, as financial illiteracy is a key factor behind low adoption levels of financial services. The improvement of financial literacy has thus become a major policy objective in different countries (Alliance for Financial Inclusion, 2011 and Jansen & Hannig, 2010). The stability of the financial system also needs more careful monitoring as more actors enter the field (Jansen & Hannig, 2010).

2.2.6. Financial Inclusion in Brazil

In a report of the state of financial inclusion published by the World Bank and the International Monetary Fund (2013), the authors complement Brazil on the significant progress made in the last decade. The country has one of the highest banking penetrations in developing countries, and the Central Bank of Brazil, in cooperation with various public and private sector partners, has

engaged in a number of successful actions to promote financial inclusion in the country. The Financial and Digital Inclusion Report 2015 ranked Brazil third after South Africa and Kenya (Villasenor, West & Lewis, 2015). According to the Central Bank, a stable macroeconomic environment (since 1994) and public policies have been main factors behind the success of financial inclusion in the country (Banco Central do Brasil, 2015a).

A major Brazilian policy initiative, explained in detail in the next section, is the facilitation of regulation concerning agent banking, referred to as correspondent banking in Brazil. This initiative has allowed banking services to reach all Brazilian municipalities (World Bank & IMF, 2013).

Another main contributor to financial inclusion in Brazil is the Bolsa Família program (PBF), a G2P program of the type portrayed by Bold, Porteous and Rotman (2012) in the previous section. This program has been successful in increasing the available income of the poor while bringing them closer to the formal financial sector. The public bank Caixa Econômica Federal (CEF) has distributed this benefit through its correspondents, and developed simplified bank accounts to promote the use of financial services. This initiative led to a massive penetration of bank accounts among the unbanked in the last decade, as reported by Bold, Porteous and Rotman (2012) and the Central Bank of Brazil (2011a). According to Mettenheim, Diniz and Gonzalez (2013), the payment of the transfer on simplified accounts or electronic cards increased convenience and safety for recipients, while decreasing costs for the government. The simplified bank account itself was an important decision by the BCB to promote financial inclusion. In 2010, there were already 8.75 million such accounts in the country (Banco Central do Brasil, 2011a).

Despite this success, the Central Bank of Brazil (2011a) noted the inability of the involved banks to promote other products through the simplified bank accounts – only 2.3% of recipient households were using formal savings products in 2010. Nonetheless, the program was one of the first ones to tap the potential of the banking correspondent networks in Brazil and gave useful lessons for future policies.

The Central Bank of Brazil has also made an effort to promote microcredit in Brazil through regulation (2011a). All banks are mandated to use 2% of their sight deposits for microcredit or

deposit it on a non-remunerated account of the Central Bank, which has led to a somewhat large volume of money available for microcredit operations, at least in theory. Furthermore, a program for rural lending, Pronaf was initiated by the government in the 1990s. In addition, the Central Bank of Brazil has pushed for the creation of a positive credit registry, as the lack of one proved a serious deficiency for financial markets due to high information asymmetry (International Finance Corporation, 2006). The recent approval of the registry should bring downwards pressure on interest rates and boost the financial sector, if implemented correctly, according to the World Bank and the IMF (2013).

Nichter, Goldmark and Fiori (2002) report that private sector-led microcredit initiatives have always been marginal in Brazil, due to the macroeconomic instability of the country until the implementation of the stabilization program Plano Real in 1994 as well as due to the tradition of government subsidized micro credit programs. One such program, Crediamigo of the Banco do Nordeste, has reached over one million beneficiaries (representing 75% of the microcredit portfolio of the country) in the Northeast region of Brazil, improving livelihoods through subsidized credit (Mettenheim, Diniz and Gonzalez, 2013). Furthermore, the inability of MFIs to accept deposits has been an obstacle to private sector-led credit programs.

Having signed the Maya treaty in 2011, the BCB participates actively in G20 programs for the promotion of financial inclusion (Banco Central do Brasil, 2015a). The Central Bank gives high importance to partnerships between the public and private sector to achieve targets. The tasks of the bank include data collection, monitoring of indicators, and definition of targets as well as evaluation of adopted strategies. The BCB launched the National Partnership for Financial Inclusion in 2011 to reach G20 objectives (Parceria Nacional para Inclusão Financeira, 2012). One of the latest initiatives of the Central Bank has been the Financial Citizenship program, launched in 2013, with a focus on financial education and consumer protection, identified as main barriers for financial inclusion in the country and worldwide (Banco Central do Brasil, 2015a).

Since 2010, the BCB has published a report on the state of financial inclusion in the country, the latest issue dating from 2015 (Banco Central do Brasil, 2015a). A persistent problem noted in these reports (Banco Central do Brasil, 2011a & 2015a) has been the unequal distribution of

financial depth in the country. There are large differences in the penetration of financial services among regions, as depicted in Appendix 4. These differences seem to reflect rather consistently the differences in development inside Brazil. Indeed, the index of financial inclusion of the BCB strongly correlates with HDI in Brazilian mesoregions (Banco Central do Brasil, 2011a).

Cazella and Búrigo (2009) criticize Brazilian initiatives for financial inclusion for not reaching the poorest people in rural areas. According to them, the national financial system, based on urban centers, leads to capital flight from the interior to cities, and ruins the potential for innovativeness and sustainable development in rural communities, thus perpetuating regional inequalities. The authors equally criticize the concentration of the Brazilian banking sector, and also note the fact that millions of people are not served by the formal financial sector, the products of which are not adapted to their needs.

Nevertheless, as already mentioned, a lot of positive development has taken place in Brazil in terms of financial inclusion. Indeed, since 2003, every Brazilian municipality has had at least one point of access (POA) to financial services, and 84% of Brazilians have some type of relation with a formal financial institution (Banco Central do Brasil, 2015a). However, only a share of those people make use of this relation, as many people keep very low balances on bank accounts or use formal services only for simple transactions. Between 2011 and 2014, the number of bank branches increased by 24% in the country, but 35% of municipalities remained unserved. It is worthwhile mentioning that there has been a wide expansion of Electronic Service Points (PAE) in recent years (Banco Central do Brasil, 2015a). A list of the different types of Points of Access (POA) in the country is available in Appendix 3, and the regional division of POAs is illustrated in Appendices 4, 7 and 8.

The Central Bank of Brazil (2015a), as well as the World Bank and the IMF (2013), have highlighted the rapid growth of credit in the country. The ratio of credit to GDP reached 25.6% of GDP in 2014, and 73% of the population of the lowest income quintile had some sort of debt. This issue is of particular importance, as savings are not aligned with credit due to the lack of savings habit in Brazil – only 20% of Brazilians reported saving in 2012, half of them in the informal sector. According to the World Bank and the IMF (2013), the expansion of credit is mostly due to the wide availability of consumer credit and credit cards, as well as to the

popularity of virtually risk-free payroll credit, sometimes aggressively marketed to low-income populations. As reported by the World Bank and the IMF (2013), Brazil has a very high cost of credit compared to most countries, a phenomenon that they speculate is linked to the lack of savings, information asymmetry, and lack of competition (from mobile operators, for example). The high availability of credit and the relatively generous government pension programs do not incentivize the population to save. Financial education programs should tackle this issue in order to decrease risks in the financial system (World Bank & IMF, 2013).

Gonzalez et al. (2013) describe how integration with the formal financial sector in Brazil is strongly linked with socio-economic class, as 61% of low-income households have a bank account, compared to 91% of high-income ones. The authors also note the low penetration of insurance products in Brazil, as only 26% of the population has health insurance.

In terms of mobile banking, Brazil has not reached levels of usage reported in Africa, despite having a large base of mobile phone users. This is mostly due to regulation and to the strong competitive position of banks on the market (World Bank & IMF, 2013), as well as to taxes on broadband (Villasenor, West & Lewis, 2015). Nevertheless, the BCB believes that a future field of development in Brazil will be wireless technological platforms (2015a), even though the implementation of identification and AML/CFT-controls remains an issue. Furthermore, lowest income segments might not have access to these technologies, a fact that cannot be ignored in the design of future financial inclusion policies.

In the future, a large focus of the BCB (2015a) will be on the improvement of the quality of services and products offered to the population, promotion of savings, as well as financial education and consumer protection, due to an increase in complaints in the last years (The World Bank & IMF, 2013).

2.3. Correspondent Banking

2.3.1. Overview of Correspondent Banking

As already mentioned in the previous section, banking correspondents (BC) are third parties contracted by financial institutions to deliver predetermined services for a commission. This type

of branchless banking has gained large popularity in Laos, Bangladesh, Nepal, the Philippines, and particularly Brazil (Demirgüç-Kunt & Klapper, 2012). According to Aggarwal and Klapper (2013), banking correspondents allow banks to reduce costs significantly by mobilizing networks of local retailers for the distribution of their products, thus also addressing potential trust issues of local population towards banks. In consonance with the same authors, the cost of opening a banking correspondent could represent as little as 0.5% of the costs of opening a branch in Brazil.

Correspondent banking is essentially based on technological infrastructure, such as microcomputers or Point-of-Sale (POS) devices. According to Cernev, Diniz and Jayo (2009), the use of banking correspondents is a manifestation of the "fifth wave of banking technology", the four prior waves being the automatization of back-office functions, the advent of branch level processing through minicomputers, self-service platforms and internet banking. This fifth wave of banking links the back office with banking intermediaries engaging in distribution, with the target of increasing the customer base and opening new markets, motivated by the excessive costs of distribution involved with the traditional channels.

The quality of technology and technological infrastructure is indeed a key factor of success, and as Aggarwal and Klapper (2013) describe, many banking correspondents in India failed at performing transactions in real time due to inappropriate technology. Additionally, regulation plays an important role in correspondent banking, as several countries do not allow non-bank actors to engage in financial services. Furthermore, in the case of India, correspondents originally were not allowed to be located further than 15 kilometers away from the contracting institution, which effectively reduced the reach of the network.

In his analysis of different set ups of branchless banking, Mas (2009) concludes that the banking correspondent network based on retailers allows to reduce fixed costs for the institution by using existing infrastructure, while also reducing transaction costs to the customers (in terms of travel time and cost, for example). A fee-based remuneration system guarantees minimal risk for the contracting institution, while providing remuneration for the retailer to cover for working hours and trips to the institution, if volume is large enough.

Overall, a functioning banking correspondent network thus requires advanced technological infrastructure, adapted regulation and agreements mutually beneficial for financial institutions and the contracted third parties.

2.3.2. Development of Correspondent Banking in Brazil

According to Batista and Menéndez Rodríguez (2010), the BCB already authorized some sort of usage of banking correspondents in 1973, but started to change regulation towards the modern BC system in 1999, in an attempt to democratize access to finance. This was fore mostly due to the unequal regional development of financial services in Brazil. As Batista and Menéndez Rodríguez explain (2010), the end of hyperinflation achieved by the macroeconomic stabilization program "Plano Real" in 1994 caused a geographical restructuration of bank branches in the country. After the loss of inflationary revenue, often representing over 40% of the turnover, many branches of formal financial institutions had to be closed in areas that had become unprofitable. Banks refocused their activities to urban areas and to the richest regions of the country, leading to an effective decrease in banking infrastructure in the North and Northeast regions between 1991 and 2000, as illustrated by the figure in Appendix 5.

This development gave incentives to the Central Bank of Brazil to develop innovative solutions for the provision of financial services to underserved regions (Batista & Menéndez Rodríguez, 2010). Originally, banking correspondents were only allowed to serve municipalities with no branches, but through the Bolsa Família program, banks were finally permitted to contract correspondents everywhere in the country.

The Central Bank decisions 3.110 and 3.156 of 2003 consolidated the regulation concerning banking correspondents (Banco Central do Brasil, 2003a and 2003b). All financial institutions were allowed to contract banking correspondents for the provision of services such as opening accounts, payment of bills and loan requests (a detailed list of services is available in the Appendix 3). The range of services to be offered remains at the discretion of the contracting financial institution. Originally, the rules did not permit correspondents to sublet the contract, but the BCB changed this rule to allow for the use of network integrators, a type of actor introduced below. All private institutions and companies could become banking correspondents since 2003. The contracting institution is entirely responsible for the actions of the

correspondent, and the BCB has the right to access all data concerning the correspondent (Banco Central do Brasil, 2003a, 2003b). With the decision 3.954 of 2011, the Central Bank allowed public companies to become banking correspondents and required training and certification for BCs, in order avoid abuses and protect customers (Banco Central do Brasil, 2011b). The resolution 4.294 of 2013 involved changes in the nature of credit proposals, requiring a plan of economic viability for each credit operation (Banco Central do Brasil, 2013).

Kumar et al. (2006) describe the evolution of the correspondent networks of largest Brazilian banks. CEF was the first bank to set up a BC network in 2000 for the distribution of the Bolsa Família. The bank entered in cooperation with the national lottery, which already operated a rather extensive network of lottery offices around the country. By modernizing the technology used in the lotteries, Caixa quickly was able to cover all municipalities of Brazil. After regulatory changes in 2003, the bank expanded its correspondent network to include retailers. According to Mettenheim, Diniz and Gonzalez (2013), Caixa's network was divided into "transactional" and "business" correspondents, lotteries mostly belonging to the former category. Banco do Brasil created a subsidiary, Banco Popular, for operating its BC network. Bradesco won a public tender for tapping the network of the national postal service with the target to reach all unbanked municipalities by 2003. In 2011, Bradesco lost this network to Banco do Brasil in a second public tender, but opened new branches to compensate for the loss (Taraborelli, 2015). Lemon Bank was an actor that entered the market in 2002 only with BCs and grew with retailers and integrator networks in urban areas (Kumar et al., 2006), until selling its network to Banco do Brasil in 2009 (Travaglini, 2009).

An aspect of the Brazilian correspondent network that deserves attention is the network integrator, a type of intermediary between banks and correspondents. According to Jayo and Diniz (2009), these actors were born in the 1990s in the Northeast region of Brazil, where retailers collected payments for public concessionaries, due to a lack of banking infrastructure. These retailers started being operated by "collection networks managers", which retained a share of the fee paid by the public service concessioner. When the BCB decided to allow correspondents to "sublet" their contract and hire other correspondents, these network integrators modernized their "correspondents" (mostly with POS devices) and offered their services to

banks. Jayo and Diniz (2011) provide a detailed explanation of the way in which different banks outsource their BC networks, as the management of 54% of all BCs was partly or completely outsourced in 2010. They conclude that the Brazilian BC network is very heterogeneous in structure, and the architecture of each bank's own BC system needs to be considered for future development of public financial inclusion policy.

According to Kumar et al. (2006), opening a banking correspondent represents on average 0.5% of the cost of opening a new branch, and operational costs are negligible. This saving in costs is particularly due to the strict security requirements of bank branches. Batista and Menéndez Rodríguez (2010) add that banking staff is expensive due to strong unions in the sector, and outsourcing this service is a material saving. Banks only furnish installation of the technological platform and pay fees for each transaction made through the system. It can therefore be seen as an innovation that allows reaching segments of population previously unreached by the banking sector. For Mettenheim, Diniz and Gonzalez (2013), the banking correspondent network could be seen as a social innovation from the point of view of the customers that previously had difficulties accessing finance.

Diniz, Birochi and Pozzebon (2012) affirm that the success of banking correspondents in Brazil was made possible through a combination of technology and political will. The ICT solutions used in the banking sector in Brazil are among the most advanced in the world, as they were developed under the necessity for rapid clearing during the hyperinflation period. Furthermore, the large scale of the Bolsa Família program made reaching underserved areas an important target for regulators. Kumar et al. (2006) add that high costs of unionization equally pushed banks to outsource, while the lack of restrictions for non-financial actors to handle cash made it possible to do so. Diniz, Pozzebon and Jayo (2009) also mention the continental dimensions of the country, the high barriers to entry to the formal financial sector and the consequent concentration of the market as major reasons for the success of the system in Brazil. Batista and Menéndez Rodríguez (2010) also mention the high interest rates of Brazil as a motivation for banks to seek new markets. To all of this, Mas (2009) still adds the facts that bill payment is a regulated banking service in Brazil, and that people can withdraw from their account at any bank in the country. The convergence of these factors made the success of the BC concept possible in

Brazil. Overall, despite correspondent banking being practiced in many countries around the world, especially in Latin America, the concept has reached the largest success in Brazil, for the reasons mentioned above.

Indeed, the banking correspondent network was a major success - the number of correspondents grew by a yearly average of 38% between 2000 and 2009, and their share out of total transactions grew along (Batista & Menéndez Rodríguez, 2010). Between 2010 and 2014, growth was more modest, but the number of banking correspondents in the country grew from 194,438 to 207,192, with a decrease between 2013 and 2014, due to a registration update (Banco Central do Brasil, 2015a). Appendix 6 illustrates the evolution of banking correspondents between 2010 and 2014. The growth in number of correspondents mostly occurred in smaller municipalities. Banking correspondents represented 70% of all POAs in the country in 2014. According to the Central Bank of Brazil (2015a), 2.5 billion transactions were made through the network in 2014, and it was the most used channel for payments and transfers.

The Central Bank of Brazil (2015a) states that the role of the banking network in the improvement of financial inclusion has been fundamental, due to the capillarity, improved convenience and competition it has brought to the financial system.

2.3.3. Banking Correspondents and Financial Inclusion in Brazil

As the purpose of this study is to observe the relation between credit union correspondents and financial inclusion, it is important to know how regular banking correspondents have been seen to improve financial inclusion in Brazil.

Diniz, Birochi and Pozzebon (2012) studied the influence of opening a correspondent in a small community in the State of Amazonas in Brazil, Autazes. The municipality was the first in the North region to receive a Banco Postal (BC of Bradesco bank), and did not have any financial infrastructure prior to its opening. This lack of access to formal financial services led to high transaction costs for people in the municipality to get government transfers (public sector salaries, Bolsa Família and pensions), as they had to travel to the state capital, Manaus, to collect them. This was expensive, time consuming and risky, as robberies on the way were common. Additionally, after having received their money in Manaus, they would usually spend it there and bring goods back home, spending only little in their home municipality.

According to the study of Diniz, Birochi and Pozzebon (2012), one very positive outcome of the implantation of the BC was the decrease of the previously mentioned high transaction costs for using financial services. Another very explicit benefit, arising therefrom, was the stimulation of the local economy, as locals would no longer spend their money in Manaus, but in their home municipality. This significantly increased the impact of the PBF on local development.

Diniz, Birochi and Pozzebon (2012) also noted some negative impacts brought upon the municipality through the BC implementation. One of the aforementioned impacts was the rapidly increasing indebtedness of the municipality – many people were offered payroll loans with their BF as collateral. Lacking financial literacy, 90% of the municipality held a debt by the time of the study. Despite the high availability of debt for people with stable income, local SMEs were not able to contract loans due to lack of collateral. Many people wished for financial education and for products better adapted to their needs. Overall, it can be concluded that opening a banking correspondent in a municipality with no prior financial infrastructure has a large impact on the local community, with potentially both negative and positive aspects. Nonetheless, one can expect the marginal impact of BC opening to decrease significantly after the contracting of the first one in an area.

In a report by Bankable Frontier Associates, Sanford and Cojocaru (2013) studied the impact of the Brazilian banking correspondent network on financial inclusion with a survey of 2,885 adults in 2012, with interesting results. They concluded that banking correspondents manage to reach underserved populations, as people using them are more likely to be poorer and less educated, as well as living in rural areas or small towns. They also concluded that BC users are more likely to be women. The majority of Brazilians (67%) lived within five kilometers of a banking correspondent, and 57% could get to one without any cost. In rural areas, the average distance to a banking correspondent was already longer, 10 kilometers.

Despite this relatively convenient access to banking correspondents, Sanford and Cojocaru (2013) conclude that banking correspondents are mainly used for bill payment, as 67% of households use them only for performing this service. Out of other transactions, only 12% of withdrawals and 9% of deposits were made at banking correspondents. Furthermore, most correspondents do not even offer a full range of services – only 19% of all correspondents could

open bank accounts in 2012. On the opposite side, only 4% of surveyed people with a bank account had opened it at a banking correspondent. Moreover, even though 79% of BCs were accredited with credit proposals, only 6% of loan detainers had contracted their credit at a correspondent. There are large differences among regions, and citizens of the Northeast are the most likely to use this channel. Anyhow, Sanford and Cojocaru (2013) see this as a missed opportunity for the banks, as 70% of unbanked families have regular contact with correspondents and could be attracted to the formal financial sector. According to Gonzalez et al. (2013), 94% of people living close to a banking correspondent said they have already used its services.

An unexpected observation of Sanford and Cojocaru (2013) is that people prefer to pay bills at banking correspondents due to physical proximity, but do not associate them with friendliness, reliability, safety or protection of privacy. These are attributes more likely to be associated with traditional bank branches. When given the chance, people prefer to do their transactions at a branch office of a bank, which implies that there is substantial work to be done to improve the quality of service of banking correspondents.

On a positive note, Sanford and Cojocaru (2013) report that paying bills at banking correspondents has decreased the share of people having to do a special trip for that from 23% to 10%, thus somewhat decreasing transaction costs for people. Moreover, people paying bills at correspondents were more likely to use other services of the BC. Furthermore, Villasenor, West and Lewis (2015) point out that banking correspondents increase convenience to customers due to longer opening hours than those of bank branches.

Ivatury (2007) studied the Brazilian banking correspondent system through interviews with Brazilian banks in 2006. For him, the Brazilian banking correspondent system seemed to be the perfect way to promote microcredit, as it would solve the distribution problem that has commonly been problematic in microfinance. Nevertheless, it seemed that correspondents were not targeting micro-entrepreneurs with loans, but rather informal workers. Ivatury (2007) states that even though the goal of the system was never to distribute microcredit, banks might end up offering more adapted products after gaining familiarity with the segment. He believes that BCs distributing only transactional services will have to close when facing competition from nearby correspondents with larger service offerings. However, Ivatury (2007) identifies the promotion

of financial literacy as a main investment required from banks, in order to improve the system. He also raises issues with fraud that have occurred in the past, and that have led to some actors scaling down their networks. Finally, Ivatury (2007) wonders whether banks can ever provide a quality service to low-income populations while outsourcing distribution, and if competition from MFIs would change something.

Kumar et al. (2006) also note that transactions and payments are the central success of the system, while credit and other services remain minimal. Furthermore, many BC networks remain concentrated in urban areas, and numerous opened accounts remain passive. Apparently, in 2006 the majority of banking correspondents were located in urban areas with existing financial architecture, thus acting as a niche market inside them. Cernev, Diniz and Jayo (2009) state that the fifth wave of banking innovation literally aims at outsourcing low value-added services such as bill payments, in order to free capacity at branches. This innovation has not yet succeeded in diversifying services. Jayo and Diniz (2011) also write that the BC network is a good way to reach the unbanked, but it mostly works for well-structured services, such as payments, and does not succeed in delivering services requiring intense relation or exchange of information.

2.3.4. Controversial Issues Related to Correspondent Banking in Brazil

Some negative issues have been raised by the proliferation of the banking correspondent system that ought to be mentioned in this section. These issues are mostly related to labor rights and safety of correspondents.

Silva (2007) analyses the banking correspondent phenomenon from a sociologic point of view, and harshly criticizes the movement. According to her paper, banks have embraced the correspondent model as a convenient way to reorganize work to advance the capitalist agenda. Correspondent banking is a type of flexible contracting that circumvents the labor rights that the banking sector has spent decades to achieve. Banks manage to improve reach with minimal costs, while keeping competition at the minimum on the market. Allowing banks to open correspondents in cities was a convenient way for them to segment the market and serve lower value customers in low-cost service points, while keeping more affluent customers at the branch office. Silva (2007) thus gives a different and somewhat exacerbating point of view to correspondent banking.

Safety issues have equally been raised with respect to banking correspondents. Kumar et al. (2006) write that correspondents usually do not have any safety infrastructure put in place, such as bulletproof glass or security. Echoes of safety concerns are heard in two reports of the EPTV news of Ribeirão Preto, a municipality of the State of São Paulo, where retailers receiving payments of the CPFL (utility company) have stopped receiving bill payments due to the increase in armed robberies and lack of guarantee of safety. This has left people in the municipality with fewer options to pay their bills, as they have been used to the convenience of bill payment at the retailer (Jornal EPTV Ribeirão Preto, 2011a and 2011b). This is a challenging issue for banks, as the lack of security requirements of BCs in an integral part of the low cost that makes them an attractive distribution channel in the first place.

2.3.5. Future of Banking Correspondents in Brazil

According to Diniz, Pozzebon and Jayo (2009), the banking correspondent network and the expansion of microcredit in Brazil are developing on separate paths, but ICT could be a tool to make their paths converge. The authors note that the way the BC system is currently modeled is essentially well suited for the delivery of transactional services. According to them, relational services that depend on negotiation between a bank clerk and the client, such as credit and investments, are very difficult to automate. The success of transactional services can be seen in their large share out of total − they represented 70% of transactions and 95% of value transacted through the system in 2008.

Diniz, Pozzebon and Jayo (2009) try to understand the interests of actors involved in the system. At first, when the BC system aimed at expanding reach of banking services, there were no conflicting interests, but such clashes emerged in 2003, when a wider range of services was allowed by the BCB. This was also the time when network integrators entered the market, and different network set ups emerged. The system was no longer homogenous − for some actors BCs were only a way of billing, while they were a way to overcome information asymmetries for credit expansion for others. In concordance with Diniz, Pozzebon and Jayo (2009), network integrators might emerge as actors pushing for more relational services, as they already operate large networks and possess proven ability of adaptation.

Kumar et al (2006) are more pessimistic in their assessment of the future, and wonder whether relaxing rules on branch opening by the BCB would not be a better way to bring quality services to municipalities than banking correspondents, if the main factor behind their success is the low cost of set up and operation. They also see banking correspondents as the "second best option", as was also observed in the study of Sanford and Cojocaru (2013).

According to the Central Bank of Brazil, the role of banking correspondents needs to be reviewed in order to improve the quality of financial services promoted to the population, instead of simply granting access to financial services. If banks do not take the lead in this process, the banking correspondent network might find itself challenged by online and mobile banking in the future (Banco Central do Brasil, 2015a).

2.4.   Credit Unions

2.4.1. Credit Unions Explained

The World Council of Credit Unions (WOCCU) defines credit unions (CU) as "*Member owned, not for profit financial cooperatives that provide financial services to their members*" (World Council of Credit Unions, 2015). Membership in credit unions is often based on some sort of linkage between members, a common bond. According to WOCCU (2015), credit unions pool members' savings to finance loan portfolios, and do not rely on external sources of finance (however, this is not always the case e.g. in Brazil). Credit unions are also characterized by democratic control, as they function with a "one member – one vote" principle and any member can volunteer for the board of directors. Soares and Sobrinho (2008) stress the role credit unions play in development, as they reach more remote areas and form a bond with the local society. Indeed, according to Ardic, Heimann and Mylenko (2011), 40% of credit union branches worldwide are located in rural areas compared to 24% of bank branches. Conforming to Soares and Sobrinho (2008), credit unions do not impose a systemic risk on the financial sector, as credit unions use members' funds to finance loan portfolios, and all risks and losses are borne by members. Comparisons of credit unions and banks can be found in the Appendices 9 and 10.

According to WOCCU (2014), as of 2014, there were 57,000 active credit unions in the world in 105 countries, with 217 million members, representing 8% of the global working age population. Together they boasted $1.5 trillion in savings and $1.2 trillion in loans in the same year. As reported by Ardic, Heimann and Mylenko (2011), credit unions' share of outstanding loans worldwide was 19% as of 2011.

From a theoretical point of view, credit unions can be seen as a bond between people, through which resources are pooled from surplus members to people in need of liquidity. In resonance with Besley (1995), people who tend to form institutional connections are often exposed to nonsynchronous shocks in consumption and can benefit from each other's differing cash flow patterns. The physical proximity of these people reduces information asymmetry. Indeed, as Besley (1995) puts it, credit unions can reduce the cost of loan collection through their peer monitoring system, especially in cases where the formal financial sector is underdeveloped to serve low-income populations.

Furthermore, according to Fama and Jensen (1983a & 1983b), financial institutions based on mutuality, such as credit unions, are a solution to the agency problem of traditional banks in which depositors and bank owners have different risk appetites. This discrepancy disappears in a credit union, in which depositors are themselves the owners of the institution.

Smith and Stutzer (1990) as well as Bhattacharya and Thakor (1993) explain credit unions as an endogenous phenomenon of credit markets. When the market is composed of good and bad payers with respective probabilities of default, and people only know themselves to which category they belong, good payers would be likely to opt for a credit union. As the person knows that he will pay, his savings will be safe and he can even get return on his savings by paying the loan. De Aghion and Morduch (2005) equally confirm that participation in a CU encourages payment of loans, as the borrower has his own money invested in the institution. Brazilian evidence seems to prove that credit unions attract better payers, as they boast lower default rates than traditional banks (Banco Central do Brasil, 2015).

2.4.2. Brief History and Examples of Credit Unions

The history and examples of credit unions found in literature illustrate that the movement often started with a social mission, but as it grew, a dilemma was born between efficiency and social objectives.

According to Mettenheim, Diniz and Gonzalez (2013), credit unions were founded by Schulz-Delitzsch and Raiffeisen in 19th century Europe as philanthropic institutions promoting savings for the working class populations, in an attempt to solve social problems. The movement grew fast with the establishment of centrals for wholesale operations, while singular CUs remained independent. Credit unions were suppressed during the 1930s and 1940s but started growing again after World War II and are nowadays a solid part of the financial sector of several European countries.

Axworthy (1981) writes about the development of credit unions in Canada, where they had an important social role until the 1970s. Faced with efficiency imperatives, credit unions had to grow and give up part of their social mission. Membership became easy to acquire and credit unions started resembling commercial banks.

In the United Kingdom, credit unions were seen as a solution for an increasing incidence of financial exclusion in the aftermath of a credit crunch in the 1990s (Fuller, 1998). Almost 15 years later, credit unions were still seen as a safety net for rural communities and as safe havens for savings and credit during the financial crisis by regulators in the UK (Myers et al., 2012). Nevertheless, the movement remained rather marginal in the UK, as credit union penetration was only 3% in 2014, compared to 43.2% in Canada in the same year (WOCCU, 2014).

The credit union movement came to a crossroad in the 1980s, as explained by Búrigo (2006). Facing pressures of large membership base and competition with the formal financial sector, the credit union movement chose between three different paths around the world. Some credit unions partially or completely lost their credit union status. This "demutualization" occurred mostly in Australia, Belgium, New Zealand, South Africa, Sweden, the United States, and the United Kingdom, as stated by Búrigo (2006). Another path was the enforcement of cooperative activity through fusions and cooperation, which was demonstrated by the credit unions Rabobank (NL), Desjardins (CA) and Caja Rural (ES), that nowadays host extensive networks while maintaining

cooperative principles. The last option, that Búrigo (2006) calls "internal demutualization", occurred when credit unions remained with a cooperative status while acquiring shares of commercial banks to adopt methods more in line with the formal financial sector. This happened largely in France and Germany. According to Búrigo (2006), this commercial development of the credit union movement gave birth to a counter-movement of CUs focusing on local development and social inclusion, as will be depicted in a later section.

2.4.3. Challenges of Credit Unions

The literature has identified several challenges of the credit union movement, some of which were already introduced in the previous section.

Axworthy (1981) noted that Canadian credit unions faced the challenge of being efficient financial institutions with good quality management and a full range of services, while being an organization with a social focus catering to basic needs of the society. Keeping the involvement of members is difficult as the union grows, and becomes a challenge to the movement, as illustrated by Búrigo (2006) in the previous section. Axworthy (1981) highlights that staying small is important in order to accomplish cooperative mission, and therefore scale should be achieved through centrals rather than growth.

Besley (1995) describes that the transfer of credit union concepts from one region to another has not been successful – a phenomenon that he explains through the necessity for a bottom-up approach in the foundation of sustainable CUs. Furthermore, the same author illustrates how credit unions are subject to covariant risks – if all members are farmers, a bad harvest year could compromise the entire union's liquidity and lead to mass default.

Some difficulties experienced by credit unions in the United Kingdom include the difficulty to get volunteers and the lack of public awareness (Fuller, 1998). Myers et al. (2012) describe how the Welsh government wanted credit unions to be financially independent while keeping their focus on the poor. This led to the necessity to attract more affluent people with larger resources, while maintaining a focus on the poor and yet not being labeled as a "poor people's bank". Myers et al. (2012) saw that credit unions needed to improve their management significantly and increase their portfolio if they are to attract higher income populations and become a self-sufficient segment.

Several theorists have noted challenges that cooperatives generally tend to face. According to Bonin, Jones and Putterman (1983), the inability of cooperative members to sell their equity leads to a fragile financial system. Furthermore, the authors note that differences in investment horizons of members might cause conflicts. This is particularly problematic since decision making in the cooperative is democratic. As Hansmann (1996) and Staatz (1987) illustrate, the indirect costs of decision-making are high in such a system, when interests of the members are not aligned. Furthermore, the lack of hierarchy leads to inefficient governance in a cooperative, in consonance with Williamson (1980 & 1985), as performance monitoring is challenging to implement. Caves and Petersen (1986) state that, despite these disadvantages over enterprise structures, cooperatives tend to be more used during industry down turns and market failures, as competition is less intense. Despite this criticism, credit unions have managed to survive in open market economies (Mettenheim, Diniz, Gonzalez, 2013 and Búrigo, 2006), but often not without adaptation.

2.4.4. The Common Bond of Association

A concept closely related to credit unions that deserves attention is the common bond of association. As explained in earlier sections, credit unions are often formed by individuals that share a common occupation or geographical area. Indeed, as Fuller (1998) puts it, the objective of the bond is to bind members together and increase pressure for compliance with common rules. This is thus a way to decrease information asymmetry, as mentioned earlier. Arnold and Stiglitz (1990) note that members of non-market institutions (such as CUs) usually know each other well, and can better monitor each other, compared to distant formal institutions. Members have a higher threshold to cheat on their promises to people they know. Furthermore, as stated by Axworthy (1981), the more tightly defined the common bond is, the easier it is to devise services suited to the members. He also notes that the bond limits competition between credit unions, as they have different target groups.

Despite the advantages of the common bond in binding people together and overcoming information asymmetry, the rule started to be gradually relaxed in Canada in the 1970s (Axworthy 1981), and similar developments were visible in the United Kingdom on the wake of the 21st century (Fuller 1998). This had been from one side justified by the exclusionary nature

of some common bond requirements, such as those based on geography (Fuller, 1998), and from another by the need to achieve greater scale. Burger and Dacin (1991, as cited by Fuller, 1998) note that the relaxation of the common bond requirements led to unprecedented growth of the credit union movement in the United States. Nevertheless, according to Axworthy (1981), phasing out the common bond might increase competition between credit unions, which is not necessarily good for the social aspect of the movement. Along these lines, it seems that the common bond question is challenging, as it ensures the proper functioning of a credit union, but potentially prevents it from achieving sufficient scale to be competitive against banks.

2.4.5. Credit Unions in Brazil

Brazil hosts the most credit union members in Latin America in absolute numbers, but the participation rate of the population is the smallest, as illustrated on the map in Appendix 11 (World Council of Credit Unions, 2014). Only 4.3% of the active population of Brazil participates in credit unions, compared to a Latin American average of 8.3%. Nevertheless, Marques Soares and Duarte de Melo Sobrinho (2008) write that the growth pace of the movement in Brazil between 2004 and 2007 was among the fastest in the world. The Central Bank of Brazil (2015a) equally notes that credit volume grew by 128% for credit unions between 2010 and 2014, compared to a growth of 76% in the banking sector.

2.4.6. History of Credit Union Development in Brazil

In a report published by the Central Bank of Brazil, Marques Soares and Duarte de Melo Sobrinho (2008) tell a rather detailed history of normative development of the credit union movement in the country. The first credit union of Brazil was opened in the 20th century in the State of Rio Grande do Sul. It was based on agriculture, similarly to most consequently founded credit unions until the 1960s. Several "Luzzatti" type credit unions were also opened, in which membership was open and services were also offered to non-members. In 1965, the common bond rule was strictly enforced and credit unions could only be used for rural finance (Marques Soares & Duarte de Melo Sobrinho, 2008).

In the 1990s, the BCB got interested in the credit union movement again and engaged in a series of regulation changes to structure the movement. Credit union networks were allowed to create cooperative banks in the 1990s, and regulation slowly decreased the risk management

requirements of credit unions to levels similar to commercial banks. The Central Bank also decreased capital requirements to form a credit union and allowed micro-entrepreneurs and other natural persons to form them. Posteriorly, the BCB gradually relaxed the common bond rule and finally allowed "free admission" credit unions in 2003. In addition, the Central Bank progressively increased the compliance requirements on single credit unions and enforced the role of centrals, incentivizing single CUs to join a network. Most of these changes were decided with the intention of encouraging the growth and consolidation of the movement and allowing it to increase in scale, as the Central Bank saw credit unions to be beneficial for financial inclusion (Marques Soares & Duarte de Melo Sobrinho, 2008). Indeed, the movement grew fast, and the number of credit unions more than doubled between 2002 and 2006 (Búrigo, 2006).

The Central Bank of Brazil saw the removal of the common bond requirement as a global trend, and estimated that it would allow accommodating the mismatch between agricultural production and commercialization (Marques Soares & Duarte de Melo Sobrinho, 2008). This could also be seen as a way to reduce the collateral risk inherent to tightly knit credit unions, portrayed earlier by Besley (1995). In his ex-post assessment of the removal of common bond requirements in Brazil, Meinen (2013) affirms it was a major development allowing joining economically active populations from various fields under one roof. In his assessment of the change, Meinen (2013) sees free admission as the only way to build sustainable credit unions in less densely populated areas of the country. Furthermore, as free admission credit unions are already somewhat universalistic, they are more open to mergers, which is important to reach scale and reduce costs for the success of the movement. According to the BCB (2015a), free admission credit unions grew by 24% between 2010 and 2014, while other types of credit unions (mutual and rural credit) saw their number decrease by 25% over the same period. Despite only 26% of single credit unions being free admission ones, their share of the total CU credit portfolio represented 62% in 2014 (Banco Central do Brasil, 2015a).

It seems that the removal of common bond requirements has indeed boosted growth in the sector, as Meinen (2013) speculates, but one may wonder whether the removal of this bond increased information asymmetry or default rates, as would follow from theories of Besley (1995) as well as Arnold and Stiglitz (1990), cited in previous sections. This is likely to be a reason why the

Central Bank put increased pressure for governance and compliance on credit unions after relaxing common bond requirements (Marques Soares & Duarte de Melo Sobrinho, 2008). Between 2010 and 2014, the number of single credit unions decreased in Brazil, mostly due to fusions, market exits and denials of operation permits, according to the BCB (2015a). This is part of a "clean-up" of the sector to increase scale while professionalizing governance and extending services, and free admission credit unions seem to play an undeniable role in this process.

2.4.7. Different CU types in Brazil

As already implied in the previous section, there are different types of credit unions in Brazil – mutual credit unions (mostly urban), rural credit unions (mostly rural), Luzzatti credit unions (mutual with free admission, founded prior to 1999) and free admission credit unions. Singular credit unions often choose to join networks of credit unions to coordinate activities through a central. According to Soares and Sobrinho (2008), without centrals, the scale of the credit union movement would be much smaller than it is today. Centrals take care of reporting, training and fund guarantee, thus allowing single credit unions to gain scale for administrative tasks and reduce costs. Their role became particularly important after the advent of free admission credit unions, in concordance with Soares and Sobrinho (2008).

Centrals often are part of a confederation, leading to the existence of a network of single cooperatives under the same brand. In 2008, 63% of credit unions in Brazil operated under this structure, referred to as "pyramid" by Marques Soares and Duarte de Melo Sobrinho (2008). The three main networks are Sicoob, Sicredi and Unicred. On top of this structure, 19% of credit unions acted independently and a share founded networks of singular credit unions without centrals. On top of this structure, Marques Soares and Duarte de Melo Sobrinho (2008) present Ancosol, which is an organized system of rural credit unions with around 200 single members. For Cazella and Búrigo (2009), Ancosol is the only network true to the "solidary" mission of credit unions, as other networks operate in a rather bank-like manner. Cresol, the main network of the unofficial confederation has a strong focus on education of members and the community. Cresol distributes mostly public funds through governmental agriculture development and housing programs, and is as such somewhat different from the other networks of unions. A graphic illustration of the Brazilian credit union system is available in Appendix 15.

According to Marques Soares and Duarte de Melo Sobrinho (2008), the verticalization of credit unions, illustrated by the growth of networks, is a tentative to better organize activities, increase scale and improve efficiency. The quest for larger scale has also been accompanied by the increase of reach through the opening of more points of service (PACs).

2.4.8. Credit Unions and Financial Inclusion in Brazil

Credit unions are largely seen as beneficial for financial inclusion in Brazil, which is a root cause for the changes in central bank regulation described in the previous chapters (Marques Soares & Duarte de Melo Sobrinho, 2008 and Banco Central do Brasil, 2015a). The World Bank and the IMF (2013) acknowledge the importance of the credit union movement in the promotion of financial inclusion in the South and Southeast regions of Brazil. According to their report, the application of local resources in investments makes credit unions more careful and responsible in investment decisions.

Marques Soares and Duarte de Melo Sobrinho (2008) acclaim credit unions for their ability to apply private resources and assume risks in favor of the community where they develop. As citizen-led initiatives for financial inclusion, they are considered to hold great potential for sustainable local development. By facilitating savings and financing entrepreneurship, credit unions are beneficial to the community, as they promote job creation and more equal income distribution. Marques Soares and Duarte de Melo Sobrinho (2008) see credit unions as a response to globalization, managing to keep savings and jobs in small communities, while offering services more adapted to local populations.

Gonzalez and Brito (2013) studied the importance of credit unions in the provision of micro credit in Brazil. In agreement with these authors, the objectives of credit unions and microcredit are essentially the same, as they both use proximity as a tool to overcome information asymmetries deterring the formal financial sector from serving a segment of the population. MFIs and credit unions aim at knowing their borrowers to judge their credit worthiness. Taking into account these converging aspirations, Gonzalez and Brito (2013) see credit unions as the best way for proximity finance to work in Brazil. This is especially the case due to the regulatory limitations imposed on MFIs, such as their inability to attract deposits. Unlike MFIs, credit

unions already have relatively large capillarity in Brazil, with a presence in 43% of municipalities in 2014 (Banco Central do Brasil, 2015a).

In their study of credit union data, Gonzalez and Brito (2013) find that credit unions already play an important role in microcredit, as they had a total portfolio of R$ 4.8 billion of loans below R$ 5,000 in December 2011, with an average loan size of R$ 530. Furthermore, R$ 886.2 million in the portfolio consisted of loans below R$ 1,000, averaging R$ 168 per loan. Loans of this size seem to be directed to the lowest income segments. In concordance with Gonzalez and Brito (2013), credit unions are often situated where low-income populations are, which only makes it likely that they manage to distribute funds to those segments. The authors conclude that credit unions have an undeniable role in finance of proximity and in fostering income generation among the poorest socio-economic groups.

The size of the small loan portfolio of credit unions presented by Gonzalez and Brito (2013) is rather different from the figures provided by the BCB (2015a) that estimate the CU micro credit portfolio at R $331.6 million in 2014. This is most likely due to particular classification methods of micro credit in Brazil. In any manner, according to the BCB (2015a), credit unions have the lowest default rate in micro credit − 1.8% in 2014, compared to 4.2% for banks and 4.7% for MFIs ("SCHMEPPs"), which could be explained by proximity and lower information asymmetry. This implies that credit unions hold great potential for financial inclusion in Brazil. Marques Soares and Duarte de Melo Sobrinho (2008) still remind that credit policies of CUs should be better adapted to micro entrepreneurs, in order to improve loan quality and reach to MSMEs.

Búrigo (2006) exhibits a somewhat more pessimistic view about the credit union movement. For him, most credit unions in Brazil have lost touch with their solidary roots and have become almost undistinguishable from banks. According to him, the only credit unions that do not only care about their members, but also try to extend impact to a maximum of people in the community are the Cresol unions, part of the Ancosol network. Búrigo (2006) explains that these credit unions achieve deep penetration in communities and focus on products adapted to the need of low-income populations, while promoting financial education. Despite Búrigo's criticism of credit union networks, they at least improve financial inclusion for their members. Nevertheless,

it would be interesting to know whether Cresol member CUs have larger portfolios of small loans than other networks.

2.4.9. Success Factors for Credit Unions in Brazil

As mentioned in the previous sections, the credit union sector in Brazil has recently seen some concentration (Banco Central do Brasil, 2015 and Marques Soares & Duarte de Melo Sobrinho, 2008), as the total number of credit unions has decreased due to market exits. According to Marques Soares and Duarte de Melo Sobrinho (2008), the mortality rate of credit unions in Brazil between 2000 and 2008 was 74%.

In their study of factors behind longevity of credit unions in Brazil, De Carvalho et al. (2011) conclude that size is the biggest determinant of survival. According to these authors, the pressure put on credit unions to remain competitive against banks while adhering to cooperative principles has led to numerous market exits, mostly in the form of mergers. Mergers as such are a way for credit unions to reach scale, and the larger the credit union, the smaller its probability of market exit. As De Carvalho et al. (2011) state, financial indicators are of secondary importance for credit unions, whose main targets are of social nature. Nonetheless, a certain level of financial solidness is required in order to ensure the continuity of activity, and size is one of the main "cushions" against market exit. Other important factors for the survival of credit unions are their funding ability and management focus. Credit unions that have a large share of revenue outside of lending have higher probabilities of market exit, as it may imply failure in the core activity, according to De Carvalho et al. (2011). Critical financial ratios for credit union market survival are listed in Appendix 16. Interestingly, Barroso, Bialoskorski and Neto (2010, as cited by De Carvalho et al., 2011) conclude that the surplus distribution policy of a credit union has a significant effect on the attractiveness of membership and thus on the ability of the CU to attract funds. In concordance with the same authors, credit unions that distributed surplus directly on the members' current account were more attractive than credit unions that transform the surplus into equity or do not divide it. De Carvalho et al (2011) still add that in order to outperform banks, credit unions have to manage their costs in a professional manner.

Garcia and Villa Lhacer (2012) write about the maximization of value to customers. As the aim of credit unions is to offer benefits compared to the traditional banking system, the authors

studied whether credit union members receive "abnormal benefits" compared to bank customers. These benefits would materialize to the customers in the form of lower interest rates on loans and higher interest rates on deposits. The liquid benefit to members is maximized when the spread between CU rates and bank rates for these products is maximized. Interestingly, Garcia and Villa Lhacer (2012) note that the more concentration on the market, the higher the spreads between these rates. This implies that member benefits are greater in large credit unions. Garcia and Villa Lhacer (2012) found that credit unions had indeed generated abnormal returns for members in the studied year 2008.

Both studies by Garcia and Villa Lhacer (2012) as well as De Carvalho et al. (2011) imply that credit unions need to reach scale in order to be successful, which explains the recent restructuring of the market. The success of "free admission" credit unions in this process might be explained by their better ability to grow both organically and through acquisition, as suggested by Meinen in a prior section (2013). This phenomenon is part of a general "rationalization" of the credit union sector in Brazil, in consonance with Marques Soares and Duarte de Melo Sobrinho (2008).

2.4.10. Challenges of the Credit Union Sector in Brazil

Marques Soares and Duarte de Melo Sobrinho (2008) write that even though regulators in Brazil see credit unions as a corrective force for resolving regional inequalities, most credit unions are located in the South East and South regions, which are already the most developed and financially included parts of the country. An illustration of this unequal distribution can be seen in Appendix 12. According to BCB data (2015a), the South region, being the "cradle" of the credit union movement in Brazil, still has by far the most active population in this respect. In the South, 90% of municipalities had a credit union branch, compared to only 17% of the municipalities in the North and 9% in the Northeast region. Similarly, the South region represented 44.4% of total CU credit to physical persons in 2014, whereas the North and Northeast region together represented only 6.1% (see Appendix 13). Furthermore, as illustrated by data of the BCB (2015a) available in Appendix 14, credit union penetration reached 12.2% in the South and only 0.8% in the North and Northeast. In 2014, 6.4% of Brazilian municipalities were lacking a bank branch, and only a quarter of those municipalities were covered by credit

unions (Banco Central do Brasil, 2015a). Moreover, 72% of small municipalities did not have credit union presence in 2014.

Marques Soares and Duarte de Melo Sobrinho (2008) note that it might be necessary to develop different principles for credit union development in order to ensure their success in less densely populated regions. Meinen (2013) highlights the improvement brought upon the sector by the removal of the common bond requirement and claims that credit union development in sparsely populated places such as Rondônia, a federal unit of the North region, would never have been possible without it.

Another challenge seen by Marques Soares and Duarte de Melo Sobrinho (2008) is the heterogeneity of the credit union sector in terms of assets, and the difficulty this imposes on regulators. In consonance with the same authors, credit union regulation would be best left to the CUs themselves, but the reality of generally poor education and management knowledge in the sector makes this impossible. Fixing objectives and planning future cash flows would prove very useful to credit unions, but is rarely done, according to Marques Soares and Duarte de Melo Sobrinho (2008).

A further issue noted with respect to credit unions is the competition brought upon them by payroll loans. Marques Soares and Duarte de Melo Sobrinho (2008) report that these loans often have lower interest rates than credit union loans due to the low risk for financial institutions. It has to be noted that credit union networks that own cooperative banks, namely Sicredi and Sicoob, may also be able to offer payroll loans. However, these credit unions represent only a minor share of all credit unions in Brazil. In consonance with the same authors, it is important for credit unions to manage their costs in order to remain competitive with banks. This could be best done through mergers, but there is a large resistance against consolidation on the market, as Marques Soares and Duarte de Melo Sobrinho (2008) note that mergers are often resorted to only in case of financial distress. The same authors also propose cooperation between actors in the form of a mutual guarantee fund in order to improve trust.

Marques Soares and Duarte de Melo Sobrinho (2008) also note that in 2007, only 50% of credit union assets were in financial use due to inefficient management. Meinen (2013) claims that credit union members still get a substantial amount of loans from the formal financial sector due

to the insufficiency of credit union funds. The Central Bank (2015a) sees a great need for development in the management of the sector and hopes that the ongoing restructuration will lead to a healthier and more sustainable credit union segment in Brazil.

2.4.11. Credit Union Correspondents

The BCB's decision 3.156 of 2003 allowed credit unions to contract correspondents in the same way as banks (Banco Central do Brasil, 2003b). As mentioned earlier, there is a rather constrained availability of literature concerning the use of banking correspondents by credit unions, but the topic has been mentioned in some sources that are presented here. In the light of previous theory, credit unions and correspondents can be seen to form a good match. As credit unions excel in the promotion of finance of proximity, they may be able to promote relational services through correspondents better than traditional banks. According to data of the BCB (2015g), credit unions already had around 3,100 correspondents in Brazil in December 2014.

The academic literature presents both credit unions and banking correspondents as actors that increase the proximity of financial services. Furthermore, credit unions are seen as actors with a mission to improve financial inclusion. Banking correspondents could help credit unions improve the reach of their services to low-income populations. This combination has the potential to become a powerful tool for fighting financial exclusion in Brazil.

Nevertheless, the initial literature found on the topic does not directly support the speculations of the previous paragraph. Ramos and Kovaleski (2011) performed a study of a credit union correspondent (or "accredited agent") in a municipality of the State of Paraná. In their study, a credit union had contracted a member retailer as a BC to receive bill payments to free capacity in the credit union branch. This added convenience to customers and the credit union, but was not profitable for the correspondent in question, as concluded by Ramos and Kovaleski (2011).

In a blog entry concerning credit unions, Coelho (2013) writes about the increased waiting lines at credit union branches due to non-members paying bills. In line with the same author, the consumer protection law 8.078 of 1990 gives the right to anyone to pay bills at any institution entitled to receive them. Credit unions that have signed a contract with energy concessioners for receiving payments may therefore not limit this service to its members. Coelho (2013) writes that

the wish to liberate capacity at branches has led some credit unions to open BCs for receiving bills.

These two sources suggest that credit union correspondents might be used only for transactional services, being thus more restrained than regular banks' BCs. Sicredi seems to confirm this impression, as the union's website (2015) advertises becoming a correspondent, and details that the point is to receive bill payments.

Finally, it has to be stressed that the above-mentioned sources are somewhat limited, as they focus on particular credit unions and municipalities, and can thus not be considered as universally relevant. Furthermore, as Sanford and Cojocaru (2013) concluded, BCs used for bill payments do decrease transactional costs of people and thus improve financial inclusion to some extent. It can be concluded that there is still room for improving understanding of credit union correspondents.

3. Methodology

3.1.   Research Type

As it has already been made clear, despite the existence of an abundant body of academic literature about credit unions, banking correspondents and financial inclusion, those topics have not been "combined" up to date. This means that there is no established theoretical framework for the study of credit union correspondents, despite their potential similarity to regular banking correspondents.

According to Hair, Babin, Honey and Samouel (2003), *exploratory* research is used to develop better understanding of a topic. According to Robson (2002) it is used to find out "what is happening, to seek new insights, to ask questions and to assess phenomena in a new light" (p.59). In contrast, *explanatory* research aims at establishing causal relationships between variables, and *descriptive* studies aim at portraying and describing phenomena accurately (Saunders, Lewis and Thornhill, 2007).

This thesis combines elements from exploratory and descriptive research. It aims at paving the way for research about an aspect of credit unions and banking correspondents that has received very little attention, and is therefore mainly exploratory. Nevertheless, in its attempt to portray the usage of correspondents by credit unions, this thesis can also be seen to be partly *descriptive*.

3.2.   **Research Paradigm and Approach**

In his 1990 publication, Egon Guba (1990) defines paradigm as "a basic set of beliefs that guides action, whether of the everyday garden variety or action taken in connection with a disciplined inquiry" (p.17). Research paradigms are differentiated by their answers to three main questions of ontology, epistemology and methodology. The main paradigms described by Guba (1990) are positivism, postpositivism, critical theory and constructivism. Saunders, Lewis and Thornhill (2007) present yet another research philosophy: pragmatism.

This thesis subscribes to the pragmatist school of thought, which, according to Tashakkori and Teddlie (1998), implies thinking of research philosophies as a continuum, rather than opposite positions.

According to Saunders, Lewis and Thornhill (2007), there are two main types of research approaches: deductive and inductive. The deductive approach aims at testing a hypothesis developed on theory, while the inductive approach aims at developing theory based on data. According to the same authors, deductive approach often requires a highly structured theory in order to test the hypothesis and results. The inductive approach is rather bottom-up, as theory is based on the information gathered from the field. Exploratory research is often inductive by definition, which is also the case of the research presented in this thesis.

3.3.   **Research Design**

According to Saunders, Lewis and Thornhill (2007), there are three main approaches to research – quantitative, qualitative and mixed-methods.

In consonance with Leedy and Ormrod (2001), quantitative researchers seek explanations and predictions that can be generalized in order to establish relationships and develop theory. Quantitative methodology can be classified into descriptive, experimental and causal comparative. Similarly, analysis methods used in quantitative research can be categorized to correlational, development design or observational ones.

As advanced by Sale, Lohfeld and Brazil (2002), quantitative research aims at reducing phenomena into empirical indicators to represent the truth. It is based on the positivist paradigm.

Qualitative research, according to Leedy & Ormrod (2001), often aims at building new theories. According to the same authors, it is often based on a poststructuralist paradigm and seeks to understand the complexity of a phenomenon. As explained by Williams (2007), qualitative studies are often rather inductive than deductive, and there is a clear relationship between the observer and the data. Along the same lines, Sale, Lohfeld and Brazil (2002), describe qualitative methods as being constructivist, as they are based on the vision of a socially constructed reality that exists only during the time of research. Robson (2002) defines qualitative data as relating to ambiguous concepts that are characterized by their richness and fullness, arising from the ability to study a phenomenon from different points of view.

As explained by Tashakkori and Teddlie (2003) – mixed method research refers to the integration of qualitative and quantitative methods in data collection and analysis. According to Williams (2007), mixed methods also allow to combine inductive and deductive research methods in the research. According to Saunders, Lewis and Thornhill (2007), mixed methods refer to research designs that combine quantitative and qualitative data gathering *and* analysis techniques, as opposed to multi-method studies that combine both techniques but are restricted to either a qualitative or quantitative worldview. Furthermore, mixed method research refers to a combination of quantitative and qualitative data that are analyzed separately, as opposite to mixed model research, which allows for quantitative data to be analyzed using qualitative methods, and vice versa.

Mixed methods are not without their critics. Indeed, according to Sale, Lohfeld and Brazil (2002), mixing qualitative and quantitative research methods cannot yield valid results, as both methods are ontologically and epistemologically different. According to them, qualitative data

cannot complement quantitative data, as they do not measure the same phenomena, and one cannot be a constructivist and positivist at the same time. Nevertheless, the same authors accept the usage of mixed-method designs to give answer to different phenomena forming part of a research question.

According to Saunders, Lewis and Thornill (2007), mixed methods do not lead to philosophical mismatches when the paradigm adopted by the reader is pragmatism, as is the case in this thesis. According to Tashakkori and Teddlie (2003), multiple methods are appropriate when they provide better opportunities to answer research questions and evaluate the reliability of findings, while improving the ability to draw conclusions from them.

Subscribing to a pragmatic worldview and requiring both empirical and detailed data to answer the research questions, this thesis adopts a mixed-method research design. For the first research question, the usefulness of correspondents to credit unions will be assessed both from a financial (quantitative) and managerial (qualitative) point of view. Similarly, in order to answer the second research question, the potential improvement of financial inclusion ensuing from the spread of CU BCs will be observed on the macro level with quantitative analysis, as well as on the "grass-roots" level through qualitative analysis.

3.4.   Quantitative Method – Analysis of Banking Correspondent Registration Data

The main source of quantitative data for this thesis is a banking correspondent registration database maintained by the Central Bank of Brazil, made accessible by the Center for Studies in Microfinance of the FGV (CEMF).

Archival research, according to Saunders, Lewis and Thornill (2007) refers to using archives or databases as a source of data. The difference between secondary data analysis and archival research is that the archives being studied were originally not intended for research purposes but rather for documentation of a company or organization, for example. This is the case in this thesis, as the correspondent registry database is originally compiled for internal information purposes of the BCB, rather than for a research.

This database will be analyzed both separately as well as in combination with secondary data compiled from various sources. Generally, according to Saunders, Lewis and Thornill (2007), using secondary data can be the best way to get access to good quality data when time is restricted. Furthermore, it allows access to longitudinal data, which would not be possible otherwise in a temporally constrained research. However, secondary data may have been compiled for other types of research, being thus potentially maladjusted for any other purpose. The aspirations of the original author of the data having been different, the data may have been aggregated in ways that are unfit for the purposes of the secondary researcher. Furthermore, the quality of secondary data may be difficult to assess. Some of these challenges have manifested themselves in this study, and are detailed in the following subsections.

3.4.1. Analysis of Quantitative Data

Tukey (1977) defines the concept of Exploratory Data Analysis, which aims at visualizing data using various methods, such as histograms, scatter graphs, conjunctions or mean values. The purpose of such an analysis is to observe the general characteristics of a data set, in order to get an overview of the phenomenon studied, as well as to plan potential next steps for a research. This method has become widely adopted for illustrating data of various sorts. Such an exploratory data analysis is the starting point of this research, in order to improve understanding of the characteristics of the data.

The first part of this analysis aims at improving general understanding of credit union correspondents, through metrics such as growth, geographic reach and scope of services. As illustrated by the literature review, there are several different types of credit union in operation in Brazil, and some credit unions unite through networks. Studying the evolution of credit union correspondents by region, affiliation and type of credit union provides a good general picture of the topic before engaging in further analysis. Furthermore, this gives interesting information about the scope and geographic reach of credit union correspondents, which helps in the delimitation of subsequent parts of the research

The second part of the quantitative analysis aspires to establish links between the financials of credit unions and the usage of correspondents, in an effort to answer the first research question of this thesis, related to the usefulness of banking correspondents for credit unions. De Carvalho et

al. (2011) present some financial ratios that are important for credit union survival, namely size, investments in credit operations, treasury investments, funding by demand deposits and banking margin. These and other financial indicators are calculated for all CUs and compared to the usage of banking correspondents by credit unions. The ratios used and their computation, as well as their initial effect on credit union survival according to De Carvalho et al. (2011) are detailed in Appendix 16. Some of the ratios do not reflect credit union survival according to De Carvalho et al. (2011), but they are included in the analysis as generally accepted indicators of efficiency and profitability.

This analysis is judged to be pertinent in the sense that it allows to observe the relation between BC usage and CU financials. If it is useful for credit unions to use correspondents, there may be an impact on their financials. The relationships are searched for with the aid of correlations. According to Saunders, Lewis and Thornill (2007), the Pearson Product Moment Correlation, or simply the Pearson correlation, is best suited for assessing the strength of relationship between two numeric variables, be they discrete or continuous. Despite not being able to establish causality, the performed research illustrates interesting relationships between the characteristics of CUs observed.

The third part of the quantitative analysis observes credit union correspondents at the municipal level, comparing their number to the general level of financial inclusion of the municipality. The financial inclusion level of municipalities is assessed by implementing the IFI method presented by Sarma (2012) and adapted by the BCB (2011a). The formula for this indicator is exhibited in Appendix 1, and the variables and weights used for its computation are detailed in section 4.4.5.

Analysis of the data is done using conjunctions and histograms, in order to examine the distribution of credit union correspondents in municipalities with different levels of financial inclusion, to find out in which type of municipality credit union correspondents tend to be located. If a credit union correspondent is located in a municipality with a low score on the IFI, its usefulness for financial inclusion may be larger, as the marginal improvement in access points following the opening of a CU BC is more important in municipalities with lower densities of POAs. Conjunctions of the data are also computed for other attributes of the municipalities,

namely HDI and share of urban population, as a part of exploratory research seeking to find relationships between variables.

This method is used both for looking at the absolute number of credit unions correspondents by municipality, as well as their share of all local BCs with different services, particularly bill payment and credit proposal (Inc. III and V). This gives an indication of the importance of credit union correspondents in providing access to different financial services in different municipalities, and thus improves our understanding of the relation between credit unions BCs and financial inclusion. For each category of the IFI, the number of municipalities with significant share of CU BCs out of total is calculated, both for service III and V. This is done in order to examine the importance of CU BCs at the local level for different services. The share of CU BCs out of all BCs with a service was deemed "significant" when it exceeded 25% of all BCs with this service. This number is already large, taking into account that CU BCs represented less than 2% of all BCs in Brazil in 2014.

It must be stressed that the quantitative analysis of this thesis, due to data limitations, is unable to provide a *numeric* assessment of the improvement of financial inclusion attributable to credit union correspondents. The nature of the topic makes such a measurement complicated and subject to error. However, the performed analysis is able give indications about the role of credit union correspondents in the improvement of different dimensions of financial inclusion.

3.4.2. Sources of Data

The main source of data for the quantitative part of the thesis is the database mentioned above, provided by the BCB (2015g) through the CEMF, that contains data about registered banking correspondents in Brazil as of December 2014.

Other sources of secondary data used in the thesis are the Brazilian Institute for Geography and Statistics (IBGE), other databases of the Central Bank of Brazil, as well as Atlas do Desenvolvimento Humano (ADH), an online database of development indicators.

The IBGE censuses of 2000 and 2010, as well as the population count of 2007 and estimates of 2013 are used for extracting the following municipal-level data: population, share of adult

population and share of urban population. The IBGE database is also used to extract the area of Brazilian municipalities.

The Central Bank is a valuable source of information concerning the financial sector of Brazil. Trial balances of financial institutions (BCB, 2015b) are used to gather financial data of credit unions for calculating financial ratios. The "Report of branches and points of access" of the BCB (2015f) is used for compiling data of access points at municipal level (PAB, PAA and PAE, as described in Appendix 2). Furthermore, the Central Bank of Brazil provided a file with non-bank points of access by municipality in 2010 and 2014 (Banco Central do Brasil, 2015d), which is used to extract information on PAC location. The database of banking institutions (2015g) provides data concerning active credit unions in Brazil. The banking sector statistics by municipality of the BCB (2015e) are used to extract data about deposits and credit by municipality. Finally, ADH is used to extract data for municipal HDI (2013).

It has to be noted that the analyses conducted at the municipal level consider only 5,565 out of all 5,570 Brazilian municipalities. The following four municipalities are excluded from analysis, for they were founded in the middle of the period of analysis (2012 or 2014), and would disrupt results at municipal level: Paraíso das Águas (MS), Mojuí dos Campos (PA), Pescaria Brava (SC) and Pinto Bandeira (RS). In addition, Balneário Rincão (SC), founded in 2003, is excluded from analysis due to incomplete demographic data for the period.

3.4.3. Data Validity

The BC registration database is compiled and maintained by the Central Bank of Brazil, which can be considered a reliable source. Nevertheless, financial institutions input the data to the base, and despite being required to keep it updated by law, they may take a long time to do it. This has resulted in some inconsistencies, and the database is not entirely up to date. Despite measures taken to clean the data, this inherent limitation of the database is difficult to remediate, and results must thus be taken with some level of caution.

When it comes to other data from the BCB, while the source is generally trustworthy, similar levels of precaution are needed. However, the table about points of access by municipality, provided by the Central Bank of Brazil (2015d), contains a level of data aggregation that is impractical for the purposes of this thesis, and illustrates one of the classic drawbacks of

secondary data, portrayed by Saunders, Lewis and Thornill (2007). Fortunately this problem is overcome with the aid of data from other bases of the BCB.

The IBGE carries out national censuses, and despite potential occasional measurement error, can be seen to detain the most reliable data about demographics in Brazil. When it comes to the municipal HDI data provided by Atlas Brasil, it is compiled by the UNDP, which is a rather trustworthy source. The calculation method of the HDI in general can be subject to criticism, but it can be assumed to provide a means to compare and classify municipalities based on generally agreed upon proxies of development.

According to Saunders, Lewis and Thornill (2007), when using quantitative methods for measuring relationship and significance, so called *type 1* and *type 2* errors may arise. A type 1 error refers to rejecting a null hypothesis (or claiming relatedness of data) incorrectly, whereas type 2 error refers to not rejecting the null hypothesis when the variables are in fact related. In order to avoid these errors, the statistical significance level needs to be appropriately set.

According to the same authors, testing for significance is done in order to assess the representativeness of a sample compared to the total population. In this thesis, correlations are measured between credit union financials and usage of correspondents, using all active credit unions. As this is not a sample but the whole population, one might suggest that testing for significance is not required. Nevertheless, the current population of credit unions in Brazil could be seen as a mere sample of the whole population in, say, 10 years, and in order to allow for the generalizability of results, significance levels should be calculated. Significance tests are done mostly at the 0.01-level, and occasionally at the 0.05-level.

3.4.4. Processing the BC Database

The database of banking correspondents (BCB, 2015g) is composed of around 850,000 lines. Each line of the database refers to one "service" permitted for a credit correspondent. Therefore a correspondent allowed to offer several financial services is present on several lines of the database. For each service of the database, the following information is provided: identification number (CNPJ) of the responsible institution, type of institution (Commercial Bank, MFI, Credit Union etc.), identification number (CNPJ) of the correspondent and the installation, as well as

respective addresses, the service provided (list in Appendix 3) as well as the opening and potential closing date of the service.

For each line of the database, there is a "correspondent" institution and an "installation" institution. The "correspondent" is the natural person to which the service is granted by the financial institution, while the "installation" is the location where this service is in use. If these entries are different, it means that the correspondent sublet the service to another institution. This can imply the usage of a network integrator, a concept explained in the literature review. The installation is the subject of study, as it refers to the physical place where the service is provided.

In some cases, the correspondent-case is the only available information, as the installation part has been left blank. This concerns around 12.2% of the lines of the database. In cases where only the correspondent information is provided, that one is used for the analysis. Another problematic feature of the database was the high occurrence of services opened on April 4th 2011, equally representing around 12% of the lines in the database. These lines were mostly the same as the ones without the "installation" information. It is possible that this data represents correspondents that had been opened for longer, but that had remained unregistered until 2011. This may be related to the BCB decision 3.954 of February 2011 (BCB, 2011b). This is also the impression gotten from the credit union interviewed in the framework of this thesis. Be it as it may, it certainly presents a challenge for the comparability of longitudinal data for the period prior to 2011.

In many cases, a correspondent identified by a CNPJ can be found in different locations, making this information insufficient to provide information about individual correspondents. An individual correspondent is therefore denoted by a combination of the identification number of the correspondent (CNPJ) and the municipality code (IBGE-identifier). This allows identifying individual correspondents in the database, as many correspondents have several services assigned to them, and in many cases act as correspondents for several financial institutions.

After clearing the data of these inconsistencies, the opening (and potential closing) year is searched for each correspondent for different services. This way, information is extracted about the correspondents operated by different institutions in different years, as well as about the number of banking correspondents with different services in each municipality of Brazil for each

year. The data resulting as an outcome of this process is used as the main source for the quantitative analysis of credit union correspondents.

It has to be noted that the amount of correspondents is always showed at year-end, except for the year 2014, where the situation is reflected as of December 16th, as the database is dated at that moment.

3.4.5. Municipal Index for Financial Inclusion

The municipal index of financial inclusion is computed based on the formula of the Index of Financial Inclusion presented by Sarma (2012), as well as its adaptation by the Central Bank of Brazil (2011a). Financial inclusion is observed on two dimensions – access and usage. Both dimensions have a total weight of 0.5 out of total in the model. The index is computed from 2010 to 2014. As already noted by Sarma (2012), a key challenge of the IFI is the recurrent lack of accurate data. This is also a challenge faced by the research of this thesis, and this chapter aims at detailing the process through which missing data is approximated.

	Category of financial inclusion	Weight
Access	Operational bank branches and CU seats at year end / 1 000 km^2	0,08
	Operational bank branches and CU seats at year end / 10 000 adults	0,08
	Operational PAB and PAA at year end / 1 000km^2	0,07
	Operational PAB and PAA at year end / 10 000 adults	0,07
	Operational PAE at year end / 1 000km^2	0,05
	Operational PAE at year end / 10 000 adults	0,05
	Banking correspondents (all actors) / 1 000 km^2	0,05
	Banking correspondents (all actors) / 10 000 adults	0,05
Use	Bank credit to private sector by municipality (fixed) / 10 000 adults	0,25
	Bank deposits from private sector by municipality (fixed) / 10 000 adults	0,25
	Total	1,00

Table 1: Weighting used for calculating the municipal Index of Financial Inclusion (As defined by the author)

The access dimension is assessed through access points of financial services by municipality, both in terms of demographic density (per 10,000 adults), as well as geographic density (per 1,000 km^2), in order to make municipalities comparable between each other. In the weighting of these access points, bank branches are given the highest weight, and other points of access and correspondents lower weights, due to their lower scope of services and potentially lower attractiveness to customers, as suggested by Sanford and Cojocaru (2013). Therefore, advanced points of access (PAA) and banking points of access (PAB) are given a lower weight than bank

branches, while correspondents and electronic service points (PAE) are given the lowest weight. It is important to note that all access points include both bank and non-bank actors, meaning that credit union seats receive the same weight as bank branches. This is judged appropriate due to the wide range of basic financial services available at credit unions. Credit union branches that are not seats are given the same weight as PABs and PAAs. The weights used to compute the IFI are illustrated in Table 1. It is important to note that these weights are defined by the author of this thesis, as explained above, and hence are likely to be different from the ones used by the BCB, which had not been made public as of December 2015.

For the usage dimensions, data on bank deposits from the private sector as well as bank credit to the private sector by municipality is used. Unfortunately, data about credit unions' or MFIs' deposits and credit by municipality is not accessible for the calculation of this index. However, credit from banks represented around 95% of total credit in Brazil in 2014 (BCB, 2015a), which already allows for a relevant comparison of the usage of financial services between municipalities. However, a major challenge for the computation of the index is the fact that credit and deposits are only shown for municipalities where a bank branch is active, as if all bank deposits and credit were distributed solely through branch offices. As theory has made clear, banks use correspondents and other points of access (PAB and PAEs, for example) for attracting deposits and distributing credit. Therefore, one may assume that citizens of branchless municipalities with bank service points also have deposits and credit. This calls for a reallocation of deposit and credit data based on the availability of POAs in different municipalities. Leaving over 1,000 municipalities without deposits and credit, despite wide availability of access points, would automatically push them to the lowest category of financial inclusion, as the weight for usage is 0.5 in the model.

This rearrangement can at best yield approximate results, and its arbitrariness is well acknowledged. Nevertheless, the method used aims at reflecting the amount of different types of points of access to financial services in the municipality, as well as the general amount of deposits and credit in the region. Lacking more accurate information, such a rearrangement is seen fit for an index whose main purpose is to compare Brazilian municipalities in terms of

financial inclusion. The methodology of this rearrangement is explained in detail in Appendix 17.

When it comes to the population by municipality and the share of adult population, the only available data is for the years 2010 and 2014. This makes it necessary to approximate values for years from 2011 to 2013, in order to compute the demographic density of access points to financial services. Lacking more accurate methods, values for the years from 2011 to 2013 are estimated using the compound annual growth rate (CAGR) of the indicator between 2010 and 2014. This is naturally only an approximation of the real value, but it does not drastically influence the score of municipalities in relation to each other, and hence can be seen as a fair assumption for this case. The same method was used for approximating the value of non-bank points of access by municipality from 2011 to 2013 (only 2010 and 2014 available).

Another decision regarding the computation of the IFI concerns the maximum and minimum limits of variables. The lower limit for each dimension of the index is set to be zero, as was done by Sarma (2012) in his model. Lacking the definition of a universal maximum value for any of the indicators, the upper limit for each dimension is set to be the value under which 90% of all Brazilian municipalities lie. This is justified as the purpose of the index is to classify Brazilian municipalities with respect to *each other*, and not to a theoretical maximum level of financial inclusion. This results in a relatively balanced distribution of municipalities over the IFI index from 0.0 to 1.0, useful for observing patterns in the location of credit union correspondents.

As one may already infer, the use of this model entails some limitations. Firstly, the selection of weights for the model, despite being based on the theoretical framework of financial inclusion, is ultimately an arbitrary decision. Secondly, the rearrangement of deposit and credit information in municipalities, as explained above and in Appendix 17, makes longitudinal comparisons over the IFI difficult. As the allocation of deposits and credit in a municipality is dependent on the number of access points, a change in the number of access points over one year also changes the level of deposit and credits in the municipality, leading to a multiplied effect on the IFI. The IFI of this thesis is a valuable tool for comparing municipalities where credit union correspondents are located, but it is best fit for cross-sectional analyses, rather than longitudinal ones.

3.5.   **Qualitative Method – Case Study of Sicredi in Panambi**

As previously explained, the academic literature lacks research about the use of correspondents by credit unions. Therefore, even though data of the Central Bank of Brazil allows for quantitatively assessing the evolution of this phenomenon, it does not give information on the motivations and aspirations of credit unions in this process. A qualitative method allows shedding light on credit union usage of BCs and gives valuable insight for answering both research questions. Understanding the reasons behind the adoption of credit union correspondents allows appreciating the dimensions in which credit unions perceive banking correspondents as useful. Furthermore, this method can increase our understanding of the contribution of credit union correspondents to financial inclusion on the "micro" level.

The selected method of analysis is a case study focusing on a Sicredi-affiliated credit union in a small town of the Brazilian state of Rio Grande do Sul, Panambi. This area has the highest concentration of credit union correspondents with credit proposal services (Inc. V), that are more interesting than correspondents with bill payment only, with respect to financial inclusion. In the framework of this case, numerous stakeholders of the credit union are interviewed.

A case study, according to Robson (2002), involves an empirical investigation of a particular phenomenon within a real life context using various sources of evidence. Morris and Wood (1991) see case studies as a particularly good method to gather a rich understanding of the context of a research. According to Leedy and Ormrod (2001), case studies allow researchers to learn more about a situation that is little understood. Such is the case of credit union correspondents in this thesis, as without qualitative data, the motivations and aspirations of credit unions in this process could only be speculated about.

The case study presented here is cross-sectional, as the interviews took place during a two-week period in July 2015. Despite a potentially enrichening impact for the thesis, a longitudinal study could not be adopted due to temporal and logistical constrains.

3.5.1. Plan of the Case Study

Two undergraduate students from the FGV, Leonardo Fujisima Yada and Melina Chen Padoin, accompanied by their mentor, doctoral student Erico Przeybilovicz, travelled to Panambi to perform the interviews. Interview questions were planned together with the thesis writer, and

audio recordings as well as interview notes were used for the qualitative analysis. The interviewees included managers of the credit union, its correspondents as well as employees of local banks, the city's trade association and the city hall. Meetings were scheduled with the interviewees, and the local Sicredi president appointed the correspondents to be interviewed. The users present at time of interviewing the correspondent were also interviewed for the case study. The initial schedule of interviews is exhibited in Appendix 18.

The interview questions, available in Appendix 19, were open-ended and semi-structured. It has to be noted that part of the questions served the interviewers own ends, and were not used for the research of this thesis, despite providing interesting additional information. The prepared questions generally aimed at unraveling the motive of the credit union for using correspondents, as well as revealing the plans for the network and the usefulness of BCs for the credit union. Reasons behind a rapid increase in BC adoption in 2011 and 2012 were also inquired about. Furthermore, the plan included questions concerning practical issues such as technological infrastructure as well as union membership of correspondent clients.

According to Saunders, Lewis and Thornill (2007), a semi-structured interview consists of a list of questions to be covered that might vary from interview to interview. Some questions can be omitted in particular situations and additional questions can also be asked when required, in order to increase knowledge. This is in contrast with structured interviews, which are used to collect quantifiable data, and therefore involve much stricter rules for internal coherence of questions, as well as a larger distance between the interviewee and interviewer.

As explained by Saunders, Lewis and Thornhill (2007), non-standardized interviews, such as semi-structured ones, are useful for understanding reasons behind decisions, opinions and attitudes. The lack of standard structure allows interviewers to adapt questions to the situation, and interviewees to give more information about a particular topic that is seen as important.

An advantage of conducting interviews over doing surveys, according to Saunders, Lewis and Thornhill (2007), is that participants may be more willing to give information, and the researcher is often able to know why some question was left unanswered.

3.5.2. Data Analysis Method

According to Saunders, Lewis and Thornhill (2007), qualitative data should be analyzed through conceptualization, by first understanding the characteristics or language, discovering regularities, understanding the meaning of text and finally, reflecting on the content. This process starts through the transcription of interviews.

King (2004) explains the concept of *template analysis* – based on the preparation of a list of codes and categories that represent themes revealed in the interview transcripts. These codes should be based on the existing theory, but can evolve as understanding about the topic increases. According to Saunders, Lewis and Thornhill (2007), this analysis method is a mixture of inductive and deductive analysis, due to its base in theory but relative flexibility. This method is judged to be relevant for this analysis, as the qualitative research is exploratory in nature, but there is an existing theoretical framework from which codes can be developed.

This analysis is somewhat similar to the one baptized *directed content analysis* by Hsiu-Fang and Shannon (2007). Such an analysis is formed by open-ended questions that are directed towards categories predetermined from the theory. The transcripts are coded with predetermined codes, and new codes are created if needed. According to the authors, an advantage of this approach is its ability to support or extend a theory, but it entails a bias of the researcher towards the wanted results.

The initial codes used for the analysis of the interview transcripts are related to the development of Panambi, the management of Sicredi, the registration and usage of BCs, technology, financial inclusion and credit proposal, as well as opinions of stakeholders. The final coding is detailed in Appendix 31.

3.5.3. Data Validity and Generalizability

A potential concern when using semi-structured interviews is the generalizability of the results. Indeed, the inherent lack of standardization of semi-structured interviews might cause difficulties with reliability, and it remains unclear whether other researchers would reach the same result (Easterby-Smith, Thorpe and Lowe, 2002). However, according to Marshall and Rossman (1999), the interviews performed do not necessarily need to be repeatable, as they only reflect

the reality of the actual situation. The value of the interviews is in the flexibility they offer, not in their capacity of replication.

Nonetheless, there is a clear limitation on generalizability arising from this method, as it focuses on only one credit union. However, the studied credit union represents Sicredi, a network under which most CU BCs operate. Furthermore, with a large number of credit union correspondents with credit proposal services, Panambi makes for a very interesting case to be studied in detail.

A potential data validity issue that can arise in the chosen method is the interviewer bias, as explained by Saunders, Lewis and Thornhill (2007). The interviewer may influence the answers of the interviewee through tones and non-verbal behaviors. Non-verbal behavior cannot be perceived through audio recordings, which equally limits the validity of this method. Furthermore, recording the interview in itself can cause respondents to answer questions differently than they would without the recording.

On the same note, it can be added that the managers of the credit union have incentives for embellishing their image by masking the real motivations for decisions taken. There is unfortunately no way to control for this in the transcripts. Another practical limitation of this case study is the fact that part of the interview records went missing or were of poor quality, and the research has to rely on notes of the interviewers for some interviews. However, this was luckily not the case for interviews with the credit union management, which are the most relevant ones for this research.

4. Results

4.1. General Data about Credit Union Correspondents

4.1.1. Credit Union Correspondents – Growth, Exclusiveness and Type of Service

Credit unions have used correspondents for over ten years, but the phenomenon started gaining momentum in the year 2008, which is illustrated by a tenfold growth in the number of correspondents registered in the BCB database (2015g). Interestingly, according to the database,

there were already 12 credit union correspondents operational prior to 2003, even though this practice was not officially permitted before the BCB decision 3.156 of 2003 (BCB, 2003b).

The year 2011 presents another year of high growth in correspondents, but as already mentioned, this increase may be due to pressure from the BCB on financial institutions to register unregistered correspondents, as was revealed during interviews in Panambi (explained in the following section). In the worst case, the same could apply to the year 2008. This uncertainty sets a limitation on the reliability of longitudinal analysis of correspondent data, particularly prior to the year 2011. This is also reflected in the high CAGR of operational CU BCs from 2008 to 2011 compared to the period from 2011 to 2014 (see Table 2). Due to this limitation, analyses conducted in further sections of this thesis mostly consider the period from 2011 onwards. Most of the further tables present growth between 2011 and 2014, due to the uncertainty of CU BC registration data before year-end 2011.

As the number of registered correspondents started to grow in 2008, so did the number of closed correspondents, which slowed down the growth in operational correspondents. Much alike the overall trend in banking correspondents growth in Brazil, the year 2014 saw a weaker growth in CU BC than in the previous years. This may imply a saturation of growth, or may be due to changes in BC registration by the Central Bank, as was generally the case in 2014 (BCB, 2015a).

Registration of CU BCs 2003-2014														
Year	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2008-11	CAGR 2011-14
Opened CU BC	12	5	0	3	13	71	882	699	532	1 493	490	554	308	19,2 %	-40,9 %
Closed CU BC	0	0	0	0	0	2	9	59	84	137	145	364	206	147,8 %	14,6 %
Operational CU BC	**12**	**17**	**17**	**20**	**33**	**102**	**975**	**1 615**	**2 063**	**3 419**	**3 764**	**3 954**	**4 056**	**51,9 %**	**5,9 %**
Only Exclusive	12	17	17	20	28	94	805	1 260	1 620	2 656	2 817	2 901	3 054	48,9 %	4,8 %
Share of exlusive CU BC	100 %	100 %	100 %	100 %	85 %	92 %	83 %	78 %	79 %	78 %	75 %	73 %	75 %	-2,0 %	-1,0 %

Table 2: Registration of credit union correspondents, 2003 - 2014 (Based on BCB, 2015g)

Interestingly, a large share of CU BCs is not exclusive to credit unions, but also distributes services for commercial banks, as can be seen from Table 2 and Figure 2. This is an important detail, for if credit unions use a correspondent that already acts as a BC for a commercial bank, it cannot be seen as an increase in financial access. Nonetheless, in some cases, a BC may distribute different services for banks and credit unions. In Table 2, the exclusiveness of BCs is considered in general, while in the analyses of section 4.4, for example, exclusiveness is considered for individual services. In general, as illustrated in Table 2, the exclusiveness of CU

BCs has decreased along with the overall growth in credit union correspondents, dropping from 92% in 2007 to 75% in 2014. In the analysis of increase in access to financial services of later sections, only exclusive correspondents will be considered for each service.
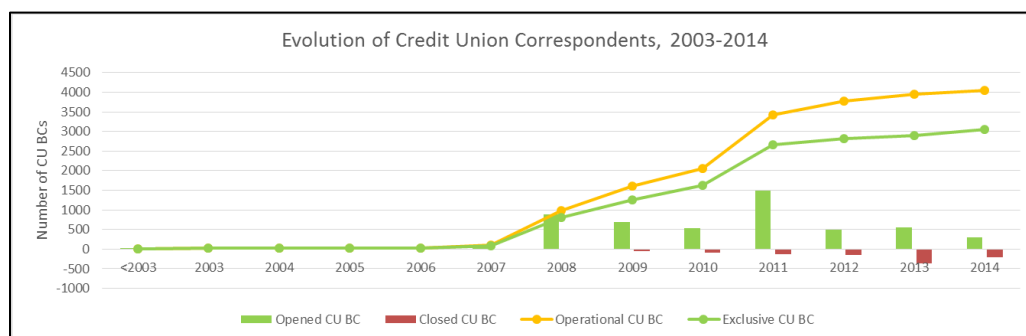
Figure 2: Registration of credit union correspondents, 2003 - 2014 (Based on BCB, 2015g)

Out of 4,056 active credit union correspondents in 2014, only 3,054 were exclusive to credit unions. While credit unions had only a modest share of 1.6% of all correspondents in Brazil, as illustrated in Table 3, the growth of CU BCs was larger than that of the sector in general. From 2011 to 2014, the number of BCs in general increased by an annual average of 0.5%, while CU BCs increased by 4.8%. Therefore, while CU BCs remained a limited phenomenon in 2014, their share of all BCs was growing rather steadily, at a CAGR of 4.3% over the period.

Share of Credit Union Correspondents out of all BCs in Brazil, all services, 2003-2014													
Number of BCs	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Total BCs	33 365	43 859	60 511	74 240	89 690	109 204	117 519	136 151	145 366	192 960	212 168	219 718	195 664	0,5 %
Exclusive CU BCs	12	17	17	20	28	94	805	1 260	1 620	2 656	2 817	2 901	3 054	4,8 %
CU BC Share	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,1 %	0,7 %	0,9 %	1,1 %	1,4 %	1,3 %	1,3 %	1,6 %	4,3 %

Table 3: Credit union correspondents versus all banking correspondents, 2003 - 2014 (Based on BCB, 2015g)

An interesting observation that deserves mention in this part of the thesis is related to the growing popularity of electronic access points (or PAEs) among credit unions, as visible in Table 4 and Figure 3. In 2010, credit unions started to use PAEs alongside BCs, which often offer similar services as correspondents – according to the Central Bank of Brazil (2015a), several commercial banks have substituted parts of their correspondents by PAEs.

Registration of CU BCs vs. PAEs 2008 - 2014							
Year	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Operational CU BCs	975	1615	2063	3419	3764	3954	4056	5,9 %
Exclusive Operational CU BCs	805	1 260	1 620	2 656	2 817	2 901	3 054	4,8 %
Operational CU PAEs	0	0	12	212	330	523	684	47,8 %

Table 4: Operational credit union correspondents and PAEs, 2008-2014 (Based on BCB, 2015f and 2015g)

While there were almost five times more (exclusive) CU BCs than PAEs in 2014, the growth rate of electronic access points was staggering - with a CAGR of 47.8% over the period compared to 5.9% for BCs, PAEs could be expected to exceed the number of CU BCs by 2020.
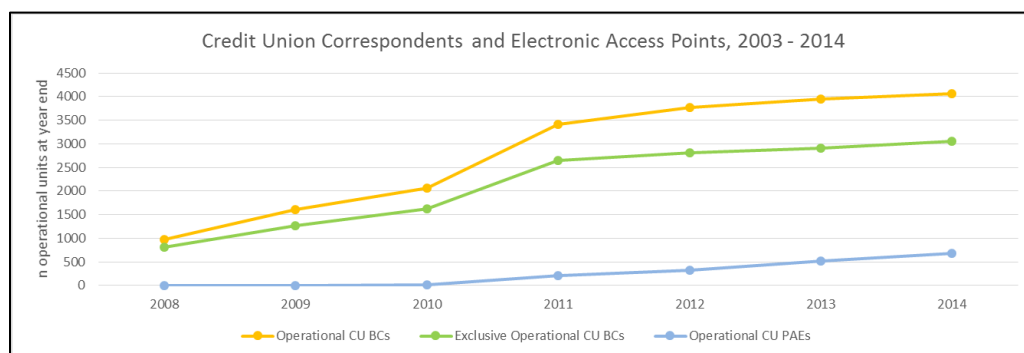
Figure 3: Operational credit union correspondents and PAEs, 2003-2014 (Based on BCB, 2015f and 2015g)

When looking at the service portfolio of credit union correspondents, the predominance of payment services (Inc. III) is explicit – out of 4,056 correspondents in 2014, 3,938 were accredited with this service (97% of total). The second most common service was credit proposals (Inc. V), with 93 correspondents (2% of total). Other services are distributed by a small number of BCs, and their numbers have not increased in the past years, as is exhibited in Table 5. The total sum of services exceeds the total number of correspondents, as some correspondents have more than one service. However, this remains a marginal phenomenon, as only nine correspondents had more than one service in 2014, out of which two had both services III and V (See Appendix 21). Despite the low share of CU BCs with Inc. V out of total, their growth rate between 2011 and 2014 was much larger than that of other services, as exhibited in Table 5. It is important to note that the fact that a correspondent is registered to deliver a certain service does not necessarily mean that it is doing it. However, this thesis focuses only on *registered* services, due to the lack of means for assessing the actual services offered by CU BCs.

Operational CU BCs by type of service, 2003 - 2014													
Type of Service	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Service I - Opening accounts	0	0	0	0	0	0	0	0	1	1	0	0	0	-100,0 %
Service II - Transfers, remittances	0	0	0	0	0	0	1	1	2	11	12	11	11	0,0 %
Service III - Payments	12	17	17	20	33	101	973	1 612	2 058	3 386	3 685	3 844	3 938	5,2 %
Service IV - Remittances	0	0	0	0	0	0	0	0	0	7	7	7	7	0,0 %
Service V - Credit Proposals	0	0	0	0	0	0	0	0	0	6	53	86	93	149,3 %
Service VII - Collection	0	0	0	0	0	0	0	1	1	11	11	11	11	0,0 %
Service VIII - Credit cards	0	0	0	0	0	1	1	1	1	4	4	4	4	0,0 %
Service IX - Other control services	0	0	0	0	0	0	0	0	0	3	3	3	3	0,0 %
Total	**12**	**17**	**17**	**20**	**33**	**102**	**975**	**1 615**	**2 063**	**3 429**	**3 775**	**3 966**	**4 067**	**5,9 %**

Table 5: Credit union correspondents by type of service, 2003-2014 (Based on BCB, 2015g)

While CU BCs represented only 1.6% of all BCs in 2014, the share of CU BCs out of all BCs with payment services was much larger, as illustrated in Table 6 below. CU BCs with Inc. III represented 6.7% of all BCs with this service. Furthermore, the growth of CU BCs with Inc. III from 2011 to 2014 was much larger than the average growth of BCs with this service.

Credit Union share of BCs with service III in Brazil, 2003-2014													
	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Exclusive CU BC with Inc. III	12	17	17	20	33	101	896	1 453	1 803	2 919	3 136	3 296	3 445	5,7 %
All BCs with Inc. III	128	1 114	3 354	5 547	8 918	16 750	25 721	30 703	40 503	50 939	56 281	57 048	51 141	0,1 %
CU Share of total	9,4 %	1,5 %	0,5 %	0,4 %	0,4 %	0,6 %	3,5 %	4,7 %	4,5 %	5,7 %	5,6 %	5,8 %	6,7 %	5,5 %

Table 6: Banking Correspondents with service III, 2003-2014 (Based on BCB 2015g)

When observing the exclusiveness of banking correspondents between the two most prevalent services, payments and credit proposals, the difference is striking. In 2014, 87% of CU BCs with service III were exclusive, but only 24% of CU BCs with service V. This means there were only 22 exclusive credit union correspondents with credit proposals in 2015. As mentioned above, a correspondent may be multi-bank, but not have the same services for all different actors. This explains the fact that 87% of CU BCs with payment services were exclusive in 2014, while overall only 75% of CU BCs were exclusive the same year. As illustrated in Table 7, CUs "contributed" to the availability of BCs with payment service by 3,445 correspondents in 2014.

CU BCs with bill payment and credit proposal services 2003 - 2014													
Type of Service	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Inc. III All CU BC	12	17	17	20	33	101	973	1 612	2 058	3 386	3 685	3 844	3 938	5,2 %
Inc. III Only exclusive	12	17	17	20	33	101	896	1 453	1 803	2 919	3 136	3 296	3 445	5,7 %
Share of exclusive	100 %	100 %	100 %	100 %	100 %	100 %	92 %	90 %	88 %	86 %	85 %	86 %	87 %	0,5 %
Inc. V All CU BC	0	0	0	0	0	0	0	0	0	6	53	86	93	149,3 %
Inc. V Only exclusive	0	0	0	0	0	0	0	0	0	3	19	21	22	94,3 %
Share of exclusive	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	50 %	36 %	24 %	24 %	-22,1 %

Table 7: Exclusiveness of CU BCs with payment and credit proposal services, 2003 – 2014 (Based on BCB, 2015g)

4.1.2. Banking Correspondents by Credit Union

Appendix 20 exhibits the distribution of correspondents between credit unions. In 2014, 200 credit unions used correspondents (17.5% of all active CUs), and the average number of correspondents by credit union was 21, with a rather high standard deviation of 28. Indeed, some credit unions had large amounts of correspondents, while several had only a few, as illustrated in Figure 4 below. In 2014, only 42 credit unions had over 30 correspondents, while the majority of credit unions (158) had up to 30 BCs. Six credit unions had over a hundred correspondents in 2014.
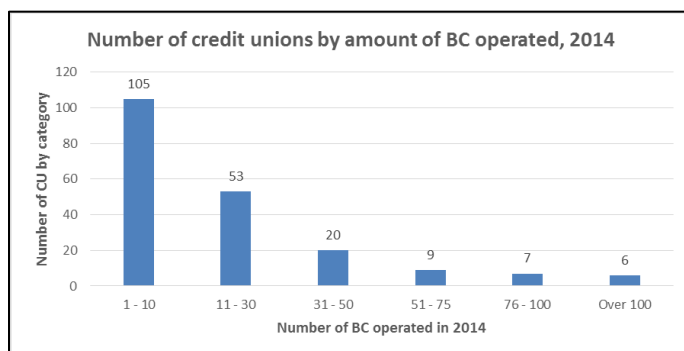
Figure 4: Number of credit unions by BCs operated, 2014 (Based on BCB, 2015c and 2015g)

Interestingly, as can be observed from Appendix 20, many credit unions did not have any exclusive correspondents at all – only 177 credit unions had exclusive correspondents in 2014. Figure 5 below exhibits the distribution of exclusiveness between credit unions. Around 85 credit unions had "exclusiveness rates" above 80%, while for 54 credit unions the exclusiveness was below 60%. As illustrated in the histogram, the exclusiveness category between 60% and 79% had the highest number of credit unions, 61. In 2014, 42 credit unions operated only exclusive correspondents, but as is visible from the graph, those CUs operated only 1.6 BCs on average. The same goes for CUs in the lowest exclusiveness category. The average exclusiveness of correspondents was 65% in 2014.
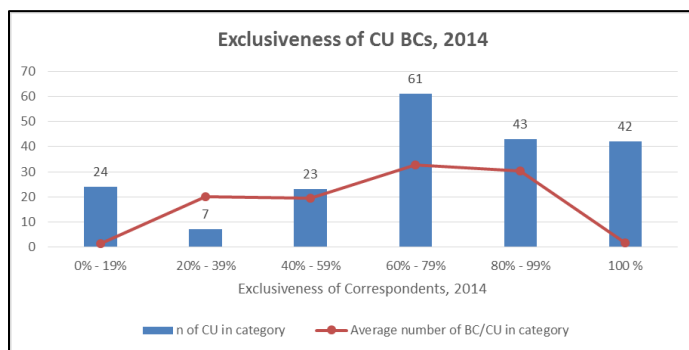
Figure 5: Credit unions and exclusiveness of CU BCs in 2014 (Based on BCB, 2015c and 2015g)

It has to be noted that the totals of BCs exhibited in Appendix 20 differ from the ones presented in the previous subsection. This is due to the fact that around 140 correspondents are shared among credit unions, and are counted twice when observing the total of correspondents at the CU-level. The same applies when observing only exclusive correspondents, as BCs shared between two or more CUs are not exclusive to any particular credit union, and are thus not factored in on that level of analysis.

4.1.3. Geographical Distribution of Credit Union Correspondents

Basic descriptive statistics of credit union correspondents, available in Appendix 20, reveal a high disparity of CU BCs among Brazilian municipalities. Indeed, the maximum amount of CU BCs (of any type) in any municipality was 34 in 2014, while most municipalities did not host any CU correspondents. The average number of CU BC by municipality was 3.3 in the same year, with a standard deviation of 4.1.

Number of municipalities with credit union correspondents, by service, 2003 - 2014														
Type of Service	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Municipalities with CU BCs with any service	7	10	10	12	25	72	522	704	788	1074	1100	1129	1145	2,2%
Municipalities with exlusive CU BCs with any service	7	10	10	12	20	66	475	642	731	971	981	1009	1025	1,8%
% of Brazilian municipalities with exclusive CU BCs	0,1%	0,2%	0,2%	0,2%	0,4%	1,2%	8,5%	11,5%	13,1%	17,4%	17,6%	18,1%	18,4%	1,8%
Municipalities with CU BCs with Inc III	7	10	10	12	25	71	521	702	786	1069	1096	1126	1140	2,2%
Municipalities with exlusive CU BCs with Inc III	7	10	10	12	25	71	503	675	753	1010	1027	1066	1083	2,4%
% of Brazilian municipalities with exclusive CU BCs w/ Inc III	0,1%	0,2%	0,2%	0,2%	0,4%	1,3%	9,0%	12,1%	13,5%	18,1%	18,5%	19,2%	19,5%	2,4%
Municipalities with CU BCs with Inc V		0	0	0	0	0	0	0	0	6	13	22	23	56,5%
Municipalities with exlusive CU BCs with Inc V	0	0	0	0	0	0	0	0	0	3	9	14	15	71,0%
% of Brazilian municipalities with exclusive CU BCs w/ Inc V	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,1%	0,2%	0,3%	0,3%	71,0%

Table 8: Proliferation of credit union correspondents in Brazilian municipalities, 2003 - 2014 (Based on BCB, 2015g)

Looking at the proliferation of credit union correspondents in municipalities, one may notice that already 1,025 municipalities had exlusive CU BCs in 2014 (all services), representing 18.4% of all municipalities in Brazil. This trend is depicted in Figure 6. When looking at payment services only, there were already 1,083 municipalities covered with exclusive CU BCs with this service in 2014, which represents 19.5% of all municipalities. As it has become clear, credit union correspondents with credit proposals are not widely spread, as exclusive BCs with this service could be found in only 15 Brazilian municipalities in 2014, as can be seen from Table 8.
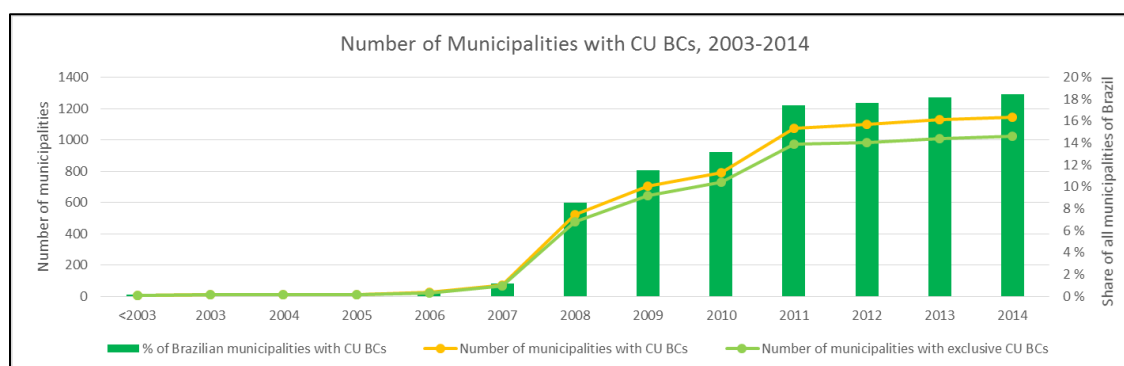
Figure 6: Number of municipalities with credit union correspondents, 2003- 2014 (Based on BCB, 2015g)

Not surprisingly, municipalities with credit union correspondents are not evenly distributed within Brazil, as is visible from Appendices 22 and 23, as well as the following figures. The dissemination of CU BCs among Brazilian regions seems to reflect the disparities in

development and financial inclusion within the country, as can be seen from Figure 7. Apart from levels of development, the strong tradition of credit union activity in the South is likely to play a big role in explaining the high concentration of CU BCs in that region.
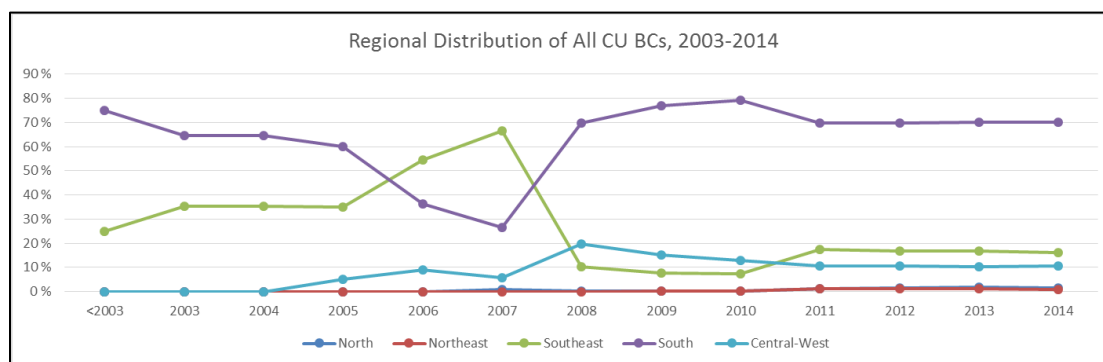
Figure 7: Share of all CU BCs by region, 2003 - 2014 (Based on BCB, 2015g)

The South region, the most developed in Brazil in terms of both HDI and IFI, hosted around 70% of credit union correspondents in 2014, while the Southeast and Center-West regions hosted 16% and 11%, respectively. The North and Northeast regions, the least developed and most financially excluded parts of the country, correspondingly, had only 2% and 1% of CU BCs in 2014.

The depth of the penetration of CU BCs in the South becomes even clearer when looking at the share of municipalities of each region covered by credit union correspondents, depicted in Figure 8. Indeed, almost 60% of municipalities in the South region were covered by credit union correspondents in 2014, compared to around 27% in the Center-West region, 10% in the Southeast and less than 3% in the North and Northeast regions together.
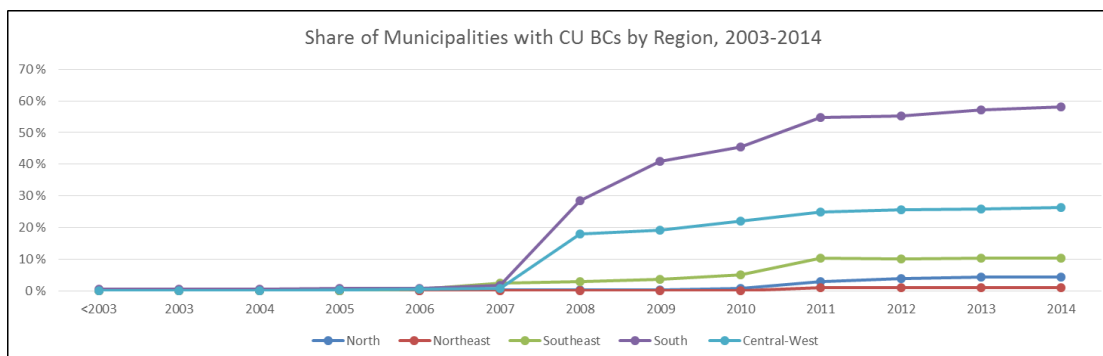
Figure 8: Share of municipalities with CU BCs by region 2003 -2014 (Based on BCB, 2015g)

4.1.4. Banking Correspondents by Credit Union Type and Affiliation

As previously explained and depicted in Appendix 15, there are different networks of credit unions in Brazil, under which centrals and singular credit unions operate. Those confederations are Sicredi, Sicoob, Ancosol and Unicred. Singular credit unions in Brazil, members or not of a network, are divided into four different types: rural credit unions, mutual credit unions, free admission credit unions and Luzzatti credit unions. This section contemplates the use of banking correspondents by credit unions of those different types and affiliations. Appendix 24 illustrates the distribution of credit unions by type and affiliation in 2008 and 2014.

When looking at the prevalence of credit union correspondents among different types of credit unions, it becomes clear that free admission credit unions have by far the most correspondents, accounting for 89% of total in 2014, while mutual credit unions accounted for 9% of total. This is illustrated in Table 9. One may note that the total number of correspondents is different from figures presented above – this is due to many correspondents being "multi-credit union", as explained in the previous section. Such a correspondent is counted twice if it serves different types of credit unions. The same applies to the number of credit unions by affiliation. In addition, a fifth type of actor is included in the comparison, a *cooperative bank*. Indeed, Banco Cooperativo do Brasil, a cooperative bank pertaining to the Sicoob centrals, operated 17 correspondents in 2014. This actor is not analyzed in detail, as its comparability with credit union correspondents is unclear, due to potentially differing targets and motives.

Type of CU	Figure	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	% of Total
	Operational and exclusive CU BCs by type of credit union														
Rural Credit	All BCs	0	0	0	0	2	28	33	28	66	72	65	66	0,0 %	1,6 %
	Exclusive BCs	0	0	0	0	2	20	22	21	31	33	22	29	-2,2 %	1,0 %
	Exclusiveness %	-	-	-	-	100 %	71 %	67 %	75 %	47 %	46 %	34 %	44 %	-2,2 %	-
Mutual Credit	All BCs	0	0	1	2	2	12	21	26	326	327	330	330	0,4 %	8,1 %
	Exclusive BCs	0	0	1	2	2	9	13	13	280	280	279	280	0,0 %	9,3 %
	Exclusiveness %	-		-	100 %	100 %	100 %	75 %	62 %	50 %	86 %	86 %	85 %	85 %	-0,4 %	-
Free Admission	All BCs	17	17	19	31	98	942	1568	2011	3042	3384	3582	3671	6,5 %	89,6 %
	Exclusive BCs	17	17	19	26	90	767	1212	1575	2302	2465	2557	2699	5,4 %	89,2 %
	Exclusiveness %	100 %	100 %	100 %	84 %	92 %	81 %	77 %	78 %	76 %	73 %	71 %	74 %	-1,0 %	-
Luzzatti	All BCs	0	0	0	0	0	3	6	8	7	7	8	15	28,9 %	0,4 %
	Exclusive BCs	0	0	0	0	0	2	4	4	4	2	3	9	31,0 %	0,3 %
	Exclusiveness %	-	-	-	-	-	67 %	67 %	50 %	57 %	29 %	38 %	60 %	1,6 %	-
Cooperative Bank	All BCs	0	0	0	0	0	0	0	0	17	17	17	17	0,0 %	0,4 %
	Exclusive BCs	0	0	0	0	0	0	0	0	9	9	9	9	0,0 %	0,3 %
	Exclusiveness %	-	-	-	-	-	-	-	-	53 %	53 %	53 %	53 %	0,0 %	-

Table 9: Number of correspondents by type of credit union, 2003 - 2014 (Based on BCB, 2015c and 2015g)

Table 10 presents the "popularity" of using banking correspondents for different types of credit unions. Out of free admission credit unions, almost 60% operated banking correspondents in

2014, compared to 6% and 10% of mutual credit and rural credit unions, respectively. Out of Luzzatti-credit unions, 40% had banking correspondents in 2014, but the low number of credit unions of this type (five) decreases the relevance of this figure. Out of credit unions with banking correspondents in 2014, 74.5% were free admission credit unions, a fact that is certainly linked to the flexibility of membership of this type of CU.

Correspondent usage by type of credit union									
Comparison of different CU types		2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Free Admission	n of CU BC	942	1 568	2 011	3 042	3 384	3 582	3 671	6,5 %
	Total n CU of this type	301	305	302	301	302	295	291	-1,1 %
	n of CU with BC	102	110	118	164	166	170	172	1,6 %
	Share of total CU with BC	34 %	36 %	39 %	54 %	55 %	58 %	59 %	2,8 %
Luzzatti	n of CU BC	3	6	8	7	7	8	15	28,9 %
	Total n CU of this type	9	8	8	7	7	5	5	-10,6 %
	n of CU with BC	1	1	1	1	1	2	2	26,0 %
	Share of total CU with BC	11 %	13 %	13 %	14 %	14 %	40 %	40 %	40,9 %
Mutual Credit	n of CU BC	12	21	26	326	327	330	330	0,4 %
	Total n CU of this type	825	784	758	720	688	645	617	-5,0 %
	n of CU with BC	6	10	14	35	36	35	35	0,0 %
	Share of total CU with BC	1 %	1 %	2 %	5 %	5 %	5 %	6 %	5,3 %
Rural Credit	n of CU BC	28	33	28	66	72	65	66	0,0 %
	Total n CU of this type	291	280	266	252	243	236	225	-3,7 %
	n of CU with BC	5	4	4	22	22	22	22	0,0 %
	Share of total CU with BC	2 %	1 %	2 %	9 %	9 %	9 %	10 %	3,8 %

Table 10: Prevalence of correspondents by type of credit union, 2008-2014 (Based on BCB, 2015c and 2015g)

Interestingly, as detailed in the aforementioned appendix, there was a moderate correlation between the number of free admission credit unions and the number of CU BCs in a mesoregion, (Pearson = 0.55, significant at the 0.01-level). This makes sense, as most credit unions with BCs represent this type of CU.

When observing credit union correspondents by affiliation, as presented in Table 11 and Figure 9, clear trends are also visible. In 2014, the majority of credit union correspondents, 67%, were operated by Sicredi-affiliated credit unions, while 30% were operated by Sicoob-affiliated CUs. Ancosol affiliated credit unions represented 0.1% of all BCs, while independent credit unions accounted for around 4% of total BCs in 2014. A more detailed table of credit union correspondents by affiliation and type of CU is available in Appendix 25.

Municipalities with CU BC by affiliation															
Affiliation	Figure	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Unicred	Municipalities with CU BC	0	0	0	0	0	0	0	0	1	2	2	2	2	0,0 %
	Municipalities with exclusive CU BC	0	0	0	0	0	0	0	0	1	0	0	0	1	0,0 %
Sicoob	Municipalities with CU BC	1	2	2	3	14	37	56	71	93	346	356	371	374	2,6 %
	Municipalities with exclusive CU BC	1	2	2	3	9	32	49	66	89	314	317	331	334	2,1 %
Independent	Municipalities with CU BC	0	0	0	0	1	13	33	42	45	65	67	64	63	-1,0 %
	Municipalities with exclusive CU BC	0	0	0	0	1	12	27	37	39	50	52	47	48	-1,4 %
Ancosol	Municipalities with CU BC	0	0	0	0	0	0	0	0	0	2	3	3	3	14,5 %
	Municipalities with exclusive CU BC	0	0	0	0	0	0	0	0	0	0	1	1	1	0,0 %
Sicredi	Municipalities with CU BC	6	8	8	9	10	24	443	607	664	721	744	765	779	2,6 %
	Municipalities with exclusive CU BC	6	8	8	9	10	23	399	545	610	643	655	676	694	2,6 %

Table 11: Banking correspondents by affiliation of credit union, 2003-2014 (Based on BCB, 2015c and 2015g)
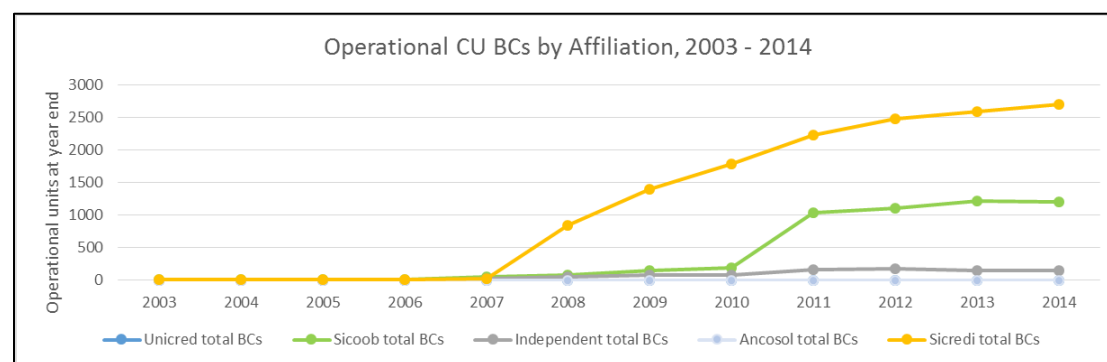
Figure 9: Operational CU BCs by affiliation, 2003 - 2014 (Based on BCB, 2015c and 2015g)

As illustrated in Appendix 26, around 40% of all correspondents opened by independent credit unions since 2003 had been closed by 2014, compared to 27% for Sicredi and only 10% for Sicoob. The reasons behind the closing of correspondents are not specified in the database.

While most credit union correspondents of different affiliations are accredited with payment services, it is interesting to note that Sicredi has over 98% of all correspondents with credit proposals, as illustrated in Table 12. Around 11% of all Sicredi-affiliated credit unions with BCs used service V, while Sicoob-affiliated CUs did not use such BCs at all in 2014.

Credit proposals	n of BC with Inc V				n of CU with Inc V BC				% of all CU with BC			
Affiliation of CU	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
Unicred	1	1	1	1	1	1	1	1	33 %	33 %	50 %	50 %
Sicoob	0	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %
Independent	1	1	1	1	1	1	1	1	5 %	5 %	7 %	7 %
Ancosol	0	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %
Sicredi	5	65	99	106	5	5	7	8	6 %	6 %	9 %	11 %

Table 12: CU Correspondents with service V by affiliation, 2011- 2014 (based on Banco Central do Brasil 2015c and 2015g)

As can be seen from Table 13 below, Sicoob correspondents are on average more exclusive than Sicredi correspondents – 83% of Sicoob-affiliated BCs are exclusive to Sicoob, compared to only 71% for both Sicredi-affiliated and independent BCs.

Exclusivity percentage of CU BCs by affiliation							
Affiliation of CU	2008	2009	2010	2011	2012	2013	2014
Unicred	0 %	0 %	100 %	0 %	0 %	0 %	50 %
Sicoob	87 %	86 %	89 %	85 %	82 %	81 %	83 %
Independent	79 %	77 %	82 %	73 %	71 %	67 %	71 %
Ancosol	0 %	0 %	0 %	0 %	33 %	33 %	33 %
Sicredi	81 %	76 %	77 %	74 %	71 %	69 %	71 %

Table 13: Exclusiveness of banking correspondents by affiliation, 2008 - 2014 (Based on BCB, 2015c and 2015g)

The following graphs trace the evolution of credit union correspondents and electronic access points by affiliation. Ancosol and Unicred are ignored in this analysis due to their insignificant numbers of BCs and PAEs.
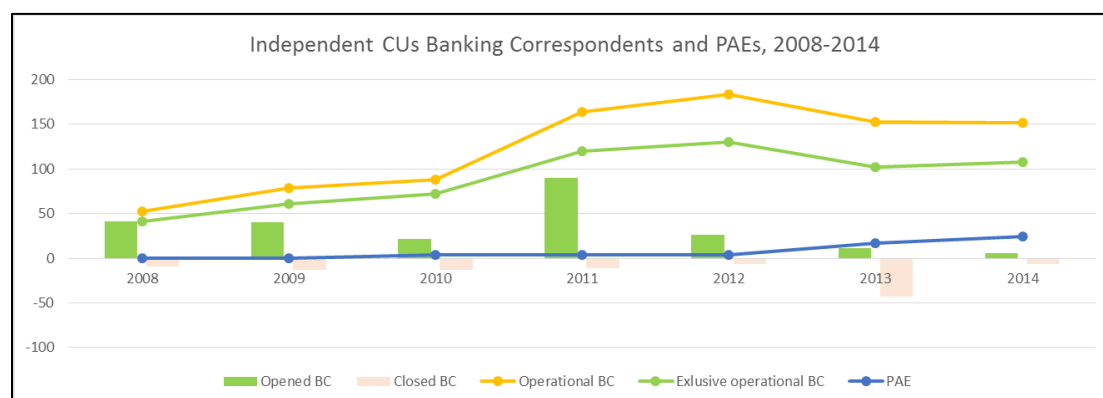
Figure 10: Independent credit unions, BCs and PAEs, 2008 - 2014 (Based on BCB, 2015c, 2015f and 2015g)

Independent credit unions operated around 150 correspondents in 2014, out of which 102 were exclusive. They also operated 25 PAEs in the same year. Independent CUs closed exceptionally many correspondents in 2013, as can be seen from Figure 10. Their number of operational BCs in 2014 was lower than in had been in 2012 (180).

As illustrated in Figure 11 and Appendix 27, Sicredi-affiliated credit unions have steadily opened correspondents over the observed period, and operated around 2,500 BCs in 2014. Out of those BCs, only around 1,950 were exclusive. Sicredi-affiliated credit unions did not use PAEs in 2014.
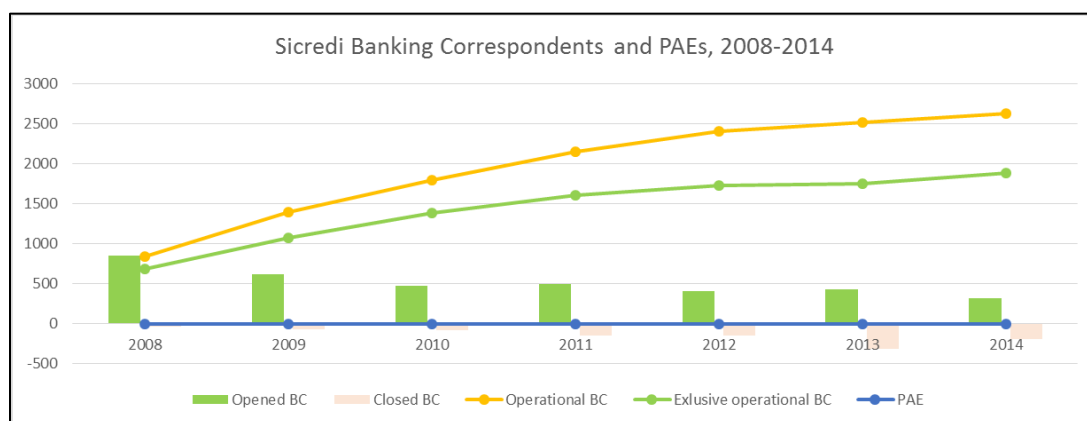
Figure 11: Sicredi-affiliated credit unions, BCs and PAEs, 2008 - 2014 (Based on BCB, 2015c, 2015f and 2015g)

As can be seen from Figure 12, 2011 was a year of massive growth in BCs for Sicoob-affiliated credit unions, which, as previously explained, suggests the registration of previously unofficial BCs. With the exception of the year 2011, the growth in BCs has been rather stable. Sicoob affiliated credit unions operated around 1,200 correspondents in 2014, out of which 1,000, or 80%, were exclusive. An interesting phenomenon in the case of Sicoob-affiliated credit unions is the rapid increase in adoption of PAEs since 2011 – there were already over 600 such access points operated by Sicredi-affiliated CUs in 2014, compared to 200 in 2011.
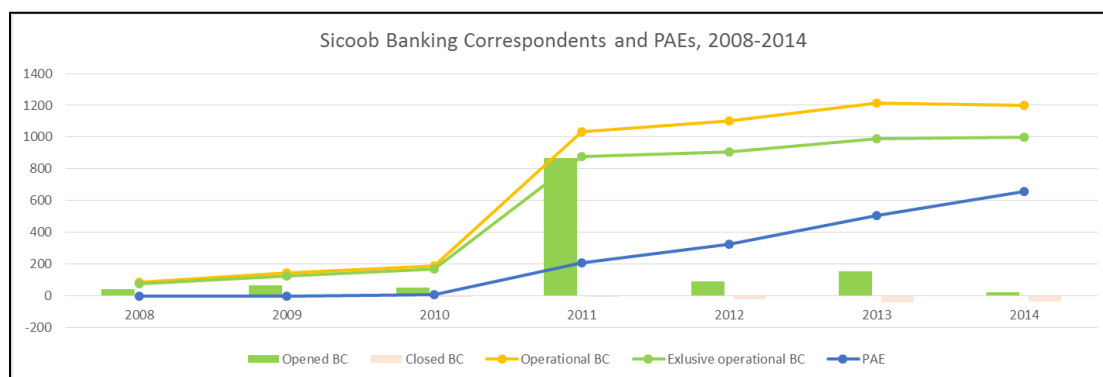
Figure 12: Sicoob-affiliated credit unions, BCs and PAEs, 2008 - 2014 (Based on BCB, 2015c, 2015f and 2015g)

As depicted in Figure 13 and Appendix 28, out of Sicoob-affiliated credit unions, 80 operated PAEs in 2014, while roughly 105 operated BCs. In the same year, 40 credit unions used both PAEs and BCs. Interestingly, the average growth between 2011 and 2014 is much larger for the number of Sicoob-affiliated credit unions with PAEs than for CUs with BCs and even larger for credit unions with both. As a matter of fact, the growth in Sicoob affiliated CUs with BCs had stalled since 2011, as can be seen from Figure 13.
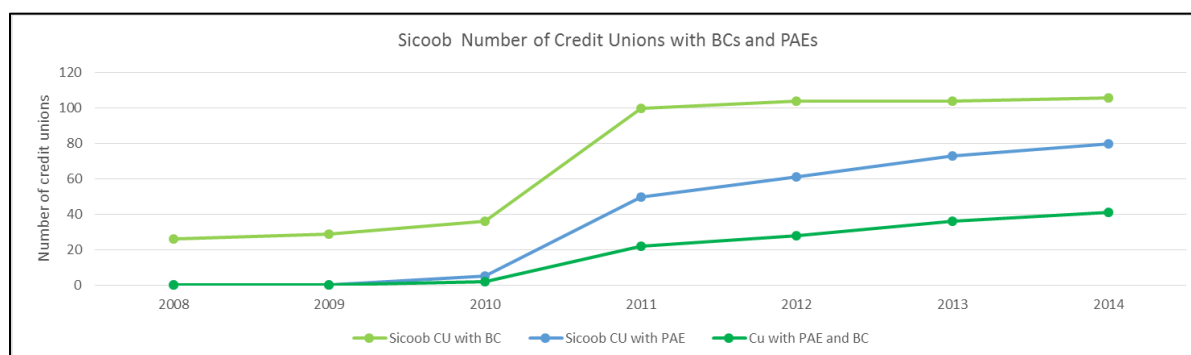
Figure 13: Number of Sicoob-affiliated credit unions with BCs and PAEs, 2008 - 2014 (Based on BCB, 2015c, 2015f and 2015g)

It is interesting to note that while Sicredi had more BCs in 2014, there were more Sicoob-affiliated credit unions using BCs – 102 Sicoob CUs used correspondents, compared to only 86 Sicredi-affiliated CUs. However, credit unions with BCs represented 34% and 74% of all Sicoob and Sicredi-affiliated credit unions in 2014, respectively. It can therefore be said that the usage of banking correspondents is more wide-spread among Sicredi-affiliated CUs than Sicoob-affiliated ones. This is illustrated in Table 14 below. The figures also imply a much larger average number of BCs per credit union for Sicredi than for Sicoob.

Share of credit unions with BCs							
Affiliation	2008	2009	2010	2011	2012	2013	2014
Unicred	0,0 %	0,0 %	1,5 %	4,7 %	4,9 %	3,4 %	3,4 %
Sicoob	8,1 %	9,2 %	11,6 %	31,6 %	33,0 %	33,2 %	34,3 %
Independent	0,9 %	1,2 %	1,4 %	3,2 %	3,2 %	2,7 %	2,7 %
Ancosol	0,0 %	0,0 %	0,0 %	3,6 %	3,6 %	3,6 %	3,6 %
Sicredi	62,0 %	66,4 %	69,4 %	71,1 %	71,2 %	74,1 %	73,8 %

Table 14: Share of active credit unions with BCs, by affiliation, 2008-2014 (Based on BCB, 2015c and 2015g)

When observing banking correspondents of different affiliations by municipality, it becomes clear that while having the largest share of all banking correspondents, Sicredi-affiliated credit unions also cover more municipalities than CUs of other affiliations. As depicted in Table 15, Sicredi-affiliated exclusive CU BCs covered 694 municipalities in 2014, compared to 334 municipalities for Sicoob-affiliated CUs and 48 for independent CUs.

Municipalities with CU BC by affiliation		<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 2011-14
Affiliation	Figure														
Unicred	Municipalities with CU BC	0	0	0	0	0	0	0	0	1	2	2	2	2	0,0 %
	Municipalities with exclusive CU BC	0	0	0	0	0	0	0	0	1	0	0	0	1	0,0 %
Sicoob	Municipalities with CU BC	1	2	2	3	14	37	56	71	93	346	356	371	374	2,6 %
	Municipalities with exclusive CU BC	1	2	2	3	9	32	49	66	89	314	317	331	334	2,1 %
Independent	Municipalities with CU BC	0	0	0	0	1	13	33	42	45	65	67	64	63	-1,0 %
	Municipalities with exclusive CU BC	0	0	0	0	1	12	27	37	39	50	52	47	48	-1,4 %
Ancosol	Municipalities with CU BC	0	0	0	0	0	0	0	0	0	2	3	3	3	14,5 %
	Municipalities with exclusive CU BC	0	0	0	0	0	0	0	0	0	0	1	1	1	0,0 %
Sicredi	Municipalities with CU BC	6	8	8	9	10	24	443	607	664	721	744	765	779	2,6 %
	Municipalities with exclusive CU BC	6	8	8	9	10	23	399	545	610	643	655	676	694	2,6 %

Table 15: Municipalities covered by CU BCs of different affiliations, 2003 - 2014 (Based on BCB, 2015c and 2015g)

Nevertheless, Sicredi-affiliated CU BCs are not dominant in all regions of Brazil, as can be seen from tables below and from Appendix 30. In the North region, Sicoob-affiliated credit unions had most of the 68 CU BCs operational in 2014. Sicredi had only 10 BCs in the region in 2014.

North Region CU BCs									
Affiliation	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
Unicred	0	0	0	0	0	0	0	0,0 %	4
Sicoob	1	1	1	30	51	58	58	24,6 %	19
Independent	0	1	1	0	0	0	0	0,0 %	29
Ancosol	0	0	0	0	0	0	0	0,0 %	3
Sicredi	2	3	4	8	9	9	10	7,7 %	3
Total	3	5	6	38	60	67	68	21,4 %	58

Table 16: Correspondents by CU affiliation, North region, 2008-2014 (Based on BCB, 2015c and 2015g)

In the Northeast region, only 25 CU BCs were active in 2014, 20 of which were operated by Sicoob. Sicredi did not operate any correspondents in the region in 2014, but also did not have any affiliated credit unions there. Interestingly enough, there are more credit union seats in the Northeast than the Central-West, but significantly less credit union correspondents. However, as exhibited in Appendix 25, there were less than 20 free admission credit unions in the North and Northeast regions, compared to 44 in the Center-West, which may largely explain the lower number of CU BCs in the region.

Northeast Region CU BCs									
Affiliation	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
Unicred	0	0	0	0	0	0	0	0,0 %	19
Sicoob	0	1	2	18	19	20	20	3,6 %	25
Independent	0	0	0	5	5	5	5	0,0 %	36
Ancosol	0	0	0	0	0	0	0	0,0 %	16
Sicredi	0	0	0	0	0	0	0	0,0 %	0
Total	0	1	2	23	24	25	25	2,8 %	96

Table 17: Correspondents by CU affiliation, Northeast region, 2008-2014 (Based on BCB, 2015c and 2015g)

In the Southeast region, Sicoob still had the lead in 2014, with 580 operational banking correspondents, despite a small decrease in number from 2013. Independent credit unions also operated 58 BCs in the Southeast in 2014, and there were only 23 Sicredi-affiliated BCs. Overall, there were 179 Sicoob-affiliated CUs in the region in 2014, compared to only 11 Sicredi-affiliated CUs. Sicredi-affiliated CU BCs had been increasing fast in the region, though.

Southeast Region CU BCs									
Affiliation	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
Unicred	0	0	0	1	1	1	1	0,0 %	28
Sicoob	75	92	121	539	573	585	580	2,5 %	179
Independent	25	29	31	46	49	55	58	8,0 %	311
Ancosol	0	0	0	0	0	0	0	0,0 %	7
Sicredi	0	1	2	7	9	18	23	48,7 %	11
Total	100	122	154	593	632	659	662	3,7 %	536

Table 18: Correspondents by CU affiliation, Southeast region, 2008-2014 (Based on BCB, 2015c and 2015g)

In the South region, Sicredi affiliated BCs were the most prevalent in 2014. In that year, there were 2,254 Sicredi BCs compared to 540 Sicoob BCs and 65 independent ones. It has to be noted that Sicoob-affiliated CU BCs saw faster growth in the region than other affiliations between 2011 and 2014 (Except for Ancosol, which had only two BCs in the region in 2014).

South Region CU BCs									
Affiliation	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
Unicred	0	0	0	0	0	0	0	0,0 %	8
Sicoob	11	52	66	443	455	548	540	6,8 %	51
Independent	10	32	40	84	95	69	65	-8,2 %	88
Ancosol	0	0	0	1	2	2	2	26,0 %	140
Sicredi	662	1 163	1 531	1 868	2 086	2 169	2 254	6,5 %	69
Total	683	1247	1637	2396	2638	2788	2861	6,1 %	356

Table 19: Correspondents by CU affiliation, South region, 2008-2014 (Based on BCB, 2015c and 2015g)

In the Center-West region, there were only four Sicoob-affiliated BCs in 2014, while most BCs were affiliated to Sicredi. There were indeed 417 Sicredi BCs in the region in 2014, while independent credit unions operated 22 correspondents in the same year.

Center-West CU BCs									
Affiliation	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
Unicred	0	0	1	1	1	1	1	0,0 %	0
Sicoob	0	0	0	4	4	4	4	0,0 %	23
Independent	17	17	16	29	34	24	24	-6,1 %	49
Ancosol	0	0	0	1	1	1	1	0,0 %	0
Sicredi	179	231	252	337	375	397	417	7,4 %	20
Total	196	248	269	372	415	427	447	6,3 %	92

Table 20: Correspondents by CU affiliation, Center-West region, 2008-2014 (Based on BCB, 2015c and 2015g)

It is interesting to note that in the Center-West, in contrast to other regions, each credit union affiliation had at least one banking correspondent in 2014. Nevertheless, the number of BCs operated by Unicred, Sicoob and Ancosol affiliated credit unions was very small in 2014.

A further interesting observation is related to the fact that Unicred and Ancosol-affiliated credit unions are widely represented in all regions (except for the Center-West), but almost do not operate correspondents.

As detailed in Appendix 29 and illustrated in Figure 14, while having more correspondents, Sicredi-affiliated credit unions are also generally more prone to use BCs. Indeed, in most regions where Sicredi is present, the share of credit unions using BCs is higher than for Sicoob. However, in the Southeast, this figure is higher for Sicoob-affiliated credit unions. In the South and Center-West regions, 80% of Sicredi-affiliated credit unions use banking correspondents, compared to 55% and 20% for Sicoob, respectively.
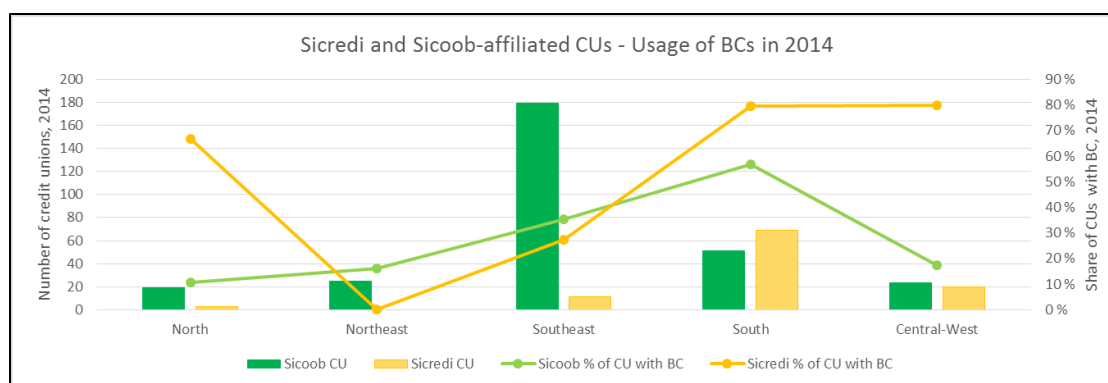
Figure 14: Sicredi and Sicoob-affiliated credit unions and BCs, 2014 (Based on BCB, 2015c and 2015g)

4.2. **Panambi Case-Study**

4.2.1. **Background of the Case**

Panambi is a municipality of the State of Rio Grande do Sul, in the South of Brazil (see map in Figure 15). The municipality was selected for the case study due to its relatively high proliferation of credit union BCs with credit proposal services – in 2014, there were 15 correspondents with service V in the municipality. All of these were operated by a Sicredi affiliated credit union, Sicredi Panambi RS, which merged with other credit unions of the region

in the end of 2013 to form a new credit union - *Sicredi das Culturas*. As its name suggests, the credit union is affiliated to the Sicredi network.

Panambi was rather well covered with financial services in 2014, as it had a score of 0.90 that year in the municipal index of financial inclusion created for the purposes of this case. The municipality had the maximum score in six of the ten categories of the index, while exhibiting lower scores in the amount of branches and PAB/PAA in the municipality. Panambi's performance on different aspects of the index of financial inclusion in 2014 is illustrated in Figure 15 below.
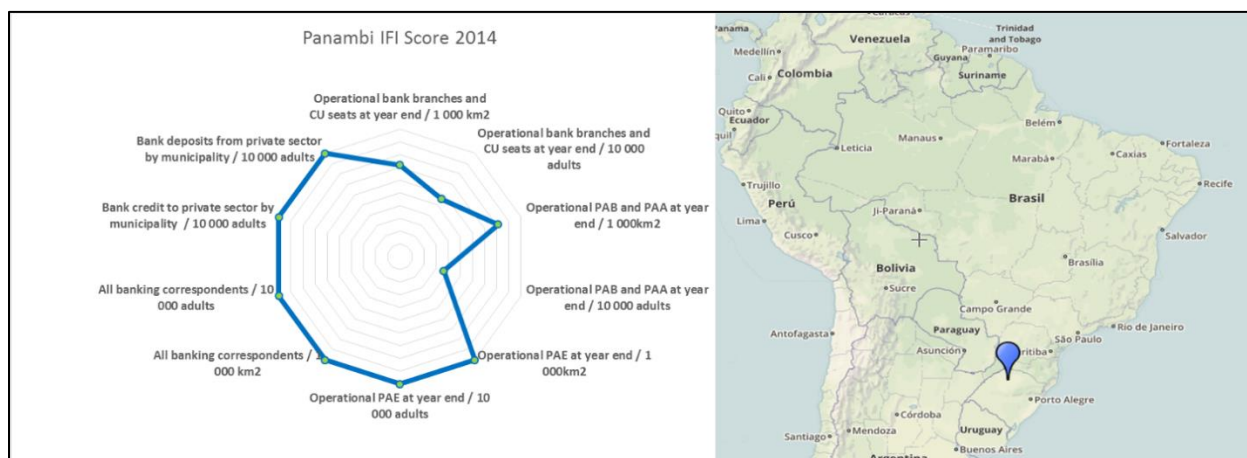
Figure 15: Location of Panambi in Brazil and performance on IFI in 2014 (Based on Banco Central do Brasil, 2015c-g)

The interview group had to carry out part of the interviews in Ijuí, where the seat of the credit union was relocated following the recent merger. Part of the planned interviews was not executed due to time and access constrains. As the planned interviews were semi-structured, not all questions detailed in Appendix 19 were asked to the interviewees. The questions rather served as a guideline for the interviews.

The group interviewed the mayor of Panambi, the president of the trade association, three managers of Sicredi das Culturas, as well as four managers of commercial banks, three correspondents and 11 users of correspondents (information detailed in Appendix 19). Some of the responses obtained were contradicting, which is discussed in the next section of this thesis.

The analysis of the qualitative data obtained through the interviews was done according to the plan detailed in the methodology section. The "codes" used were grouped in four categories, as

visible in Appendix 31: General, Sicredi BC, Banks BC and Opinions of Stakeholders. The structure of this section follows this grouping.

4.2.2. General Information about Panambi and Sicredi

Panambi had a population of around 40,804 in 2014. According to the mayor of Panambi, the municipality is the third largest industrial center in the northern part of Rio Grande do Sul, and exhibits the largest demographic growth in the region with a 2.5% annual rate.

According to the mayor of the city, the main challenge of the municipality is immigration from neighboring poorer regions, as the newcomers lack education and technical skills, and therefore often end up unemployed and risk social exclusion. According to the trade union president, other major challenges of Panambi are the logistical distance from major economic centers, the lack of entertainment services leading to the outflow of skilled labor, as well as the general poor quality of physical and telecommunications infrastructure. The City Hall has implemented several social programs in order to prevent social exclusion, by providing housing, education and buying the products of local farmers, as well as promoting entrepreneurship.

In the view of the trade association president, despite a good coverage by banks and credit unions, access to credit for entrepreneurs in the municipality is precarious, and is particularly rendered difficult by bureaucracy and structural poverty. In his opinion, the facility of access to credit that is given to physical persons through credit cards and payroll credit should be rather given to natural persons, and at affordable cost. The lack of access to credit is deindustrializing the municipality. Furthermore, default rates have risen during the crisis, and many people lack the ability to analyze cost of credit.

As retained from the interview with the Sicredi management in Ijuí, the credit union, founded in 1931, was a rural credit union until becoming a free admission credit union in 2004, making the credit union accessible to everyone. That way the credit union also started developing its portfolio, soon being able to compete with banks in financial services. Sicredi das Culturas was born through the merger of four credit unions with their central. Following the merger, processes and services were standardized.

The vice-president of Sicredi das Culturas (ex-president of Sicredi Panambi) affirmed that there was no alternative to the merger in order to keep the credit union operational. Through the merger, he attested, the credit union was able to service a much larger number of customers than in the past, partly due to the increase in equity. The merger led to a remodeling of the management of the credit union, as unnecessary management levels were removed. Despite changes brought to the credit union management by the merger, the vice-president of the CU maintained that no changes could be felt by the members.

Defending the apparent similarity of Sicredi with a bank, the credit union management stressed the necessity of a credit union to provide similar service quality as regular financial institutions in order to be competitive. Furthermore, in its discourse, the management highlighted the engagement of Sicredi with its members as a main differential to banks. The vice-president of Sicredi accentuated the "valorization of the member" as a main distinction from commercial banks. As a member-owner, the member receives a share of the proceeds of the credit union proportional to his or her transaction volume.

According to Sicredi management in Ijuí, credit is only given to members in Sicredi, even though some non-members had been able to get credit in the past. Nevertheless, the equity investment required to acquire membership had decreased significantly because of the growth ambition of the credit union.

4.2.3. Sicredi Banking Correspondents

The management of Sicredi das Culturas in Ijuí talked about banking correspondents in a rather enthusiastic way. As explained by them, banking correspondents allow the credit union to have "one more person to serve the customers". Retailers need to be Sicredi members in order to work as correspondents. This was made possible by the free admission model, as natural persons could join the credit union. Sicredi operates two types of correspondents, one for receiving bill payments, and the other to finance vehicles. In addition, some companies wanted to become correspondents for Sicredi in order to facilitate their own payments and money processing, as they are able to use the credit union's clearing system for their own transactions while receiving bills.

4.2.3.1. *Banking Correspondents for Receiving Bills*

Most correspondents are used for receiving bill payments from both members and non-members, apparently in an effort to remove waiting lines from credit union branches. The credit union imposes a limit on daily transactions, after which the correspondent has to bring the cash generated from the day's transactions to a Sicredi branch, before being allowed to continue operations. This entails a certain level or risk, according to the Sicredi management, as correspondents need to keep and transport considerable cash balances. This requirement arises partly from the fact that correspondents are unable to accept payments by check or card. In the first quarter of 2015, BCs were used on average for 50 operations a day.

The area of operations of Sicredi das Culturas around Ijuí and Panambi is composed of 13 municipalities, where it operates 19 BCs. The initial plan regarding the distribution of financial services was to have one proprietary branch and one correspondent in each municipality, but some branches did not want to have a BC. In Panambi, Sicredi has three branches, four correspondents and four ATMs, which translates to one point of access per 4,500 inhabitants.

As explained by the management of Sicredi das Culturas, the credit union has had banking correspondents since 2008, when a pharmacy was contracted to receive bills. The management attested that a number of correspondents operated without being registered prior to 2011, before the compliance requirements became more stringent. The registration of previously non-registered banking correspondents explains the large growth in BCs during that period, as revealed by the Sicredi management. Nowadays the update of BC information in the Central Bank databases is a constant process, and the management needs to keep an eye on the documentation of all 19 correspondents all the time.

In terms of location of the banking correspondents, the proximity of branches is preferred, allowing clients an easy access to both the branch and the correspondent. All but one of the 19 correspondents are located in urban areas, the exception being a correspondent located in an indigenous reserve. As the main role of the agent is to remove waiting lines, they are apparently not supposed to be located far from branches. Nonetheless, according to the CU management, in Panambi, there are two BCs in the city center and two in the suburbs. But in general, due to the coverage of all municipalities of the region with Sicredi branches, as well as to the limited size of

the municipalities, there is no need for correspondents to be located far from branches, according to the management. The management also added that a larger distance from the branch implies lower security for the correspondent, as they need to bring their cash balances to the branch daily.

When it comes to the technology used for managing correspondents, an intranet accessible online is used. This intranet is connected with the Sicredi Bank, and clearance of bills is done through it. Due to this, the correspondent only needs a basic computer with internet access in order to pay bills, on top of a receipt printing machine, or "authentication device". There is no requirement for this authentication device to be of a certain type, as long as it fills minimum requirements and is compatible with the platform, according to the Sicredi-management.

4.2.3.2.   *Car Dealers as Banking Correspondents*

When it comes to correspondents with service V, the management of Sicredi das Culturas considers them a separate type of actor. Sicredi cooperates with car dealers in order to help people buy cars for personal use. These correspondents need to get a certification from the Brazilian Bank Federation (Febraban), unlike correspondents receiving payments. The management of Sicredi das Culturas explains the involvement of the credit union in this segment through the importance of cars in Brazilian culture on the one hand, and through the ability to cross-sell financial products for the car on the other.

According to Sicredi, a competitive offer was initially crafted for dealers, in order to be recommended to potential car buyers. The car dealer is able to inform the customer on installments and to fill the credit proposal that is sent to Sicredi. After analysis and potential approval of financing, the money is transferred on the car dealer's account in the credit union.

According to the management, Sicredi entered the market when car sales were booming in Brazil, and credit was also granted to non-members in order to increase the portfolio. However, the default rate of these debtors was higher than that of Sicredi members, and the credit union finally had to back-off from this market, in particular after the economic downturn in 2014. Nowadays credit is only granted to Sicredi members.

4.2.3.3.   Advantages of Using Banking Correspondents

According to the Sicredi das Culturas management in Ijuí, a major advantage of banking correspondents are the flexible working hours, that are not limited by laws in the same way as regular financial service providers. In some cases, correspondents also serve to fill geographical gaps, as there are no branches in the suburbs, and they thus provide more capillarity and better service. Nevertheless, the managers state the removal of waiting lines at branches as the main purpose of banking correspondents, as bill payments can be directed to them. Their adoption led to a general decrease of waiting times for members, increasing customer satisfaction. Thus the role of the correspondent is related to increasing efficiency, as well as improving the image of Sicredi in the community.

As the management puts it, a major motive behind the adoption of the correspondent model was to have service levels similar to a bank and being closer to people - "Having several service channels allows you to be different and ensure service quality to the client". The management mentions the fact that as Sicredi members, banking correspondents have an incentive to help the credit union, as all the profit generated by the union is distributed back to its members.

4.2.3.4.   Challenges Encountered with Banking Correspondents

The Sicredi management in Ijuí identifies some problems related to the usage of correspondents. One of these is the operational limit compared to banks, as correspondents are not yet able to perform other services than bill payment. Furthermore, the brand of Sicredi is in the hands of the correspondent, and it is very challenging to manage it properly despite its importance to the credit union. Developing the brand and "educating" the correspondent is a long process.

Another challenge related to the use of banking correspondents is the fact that payments are done in cash only, which increases operational costs. This also leads to insecurity for the correspondent and thus to the need for insurance, which becomes an extra cost on Sicredi, according to the management in Ijuí. Generally, the physical and technological infrastructure lags behind the plans of Sicredi to improve the system. Furthermore, many correspondents do not have the required equipment to receive bills, and providing it to them is an extra cost on the credit union.

According to the Sicredi management in Ijuí, they do not forbid correspondents from working with other banks, but they do not recommend that, as they are trying to build the Sicredi brand in cooperation with the agent.

4.2.3.5.   *Sicredi Future Plans for Banking Correspondents*

According to the credit union management, the plan was for members to be able to make deposits and withdraw money at correspondents by the end of the year 2015. Generally, the management wishes for correspondents to be also used for electronic transactions, account clearance, credit cards and registrations, in order to improve competitiveness of credit unions against commercial banks. With a complete set of services, correspondents could be used for attracting new members.

However, making this possible requires an improvement of the technology used to deal with correspondents. Furthermore, this increase in scope may require many agents to get accredited by Febraban, in order to have full understanding of services offered.

4.2.4.   Commercial Bank Correspondents

Managers of the following banks were interviewed about the usage of banking correspondents: Caixa, Banrisul, Bradesco and Santander. All of these banks use banking correspondents in the region.

The Caixa manager saw the main advantage of banking correspondents in the flexibility of working hours. The Banrisul manager, in turn, saw the correspondents as a way to "unburden" the banks, streamlining its processes. Having correspondents for four years had decreased operational costs, due to a reduction in the number of employees. Banrisul affirmed using correspondents not only for payments, but also for payroll loans and housing credit.

At Bradesco, banking correspondents were only used for payments, due to the preference of retailers themselves, as this arrangement implies lower staff requirements. According to the Santander manager, correspondents are useful for decreasing the number of clients at branch offices.

4.2.5. Opinions of Stakeholders

Several people were asked for their opinions about Sicredi and banking correspondents, among others. Statements related to these interviews are gathered in this section.

4.2.5.1. *Opinion on Sicredi*

According to the mayor, Sicredi had an important role in the development of Panambi after the founding of the municipality, when it was an agricultural bank financing housing in the area. As the mayor sees it, nowadays Sicredi is a large commercial bank competing with other large banks with a similar portfolio. The trade association president sees Sicredi as having an important differential mostly for its members, as they get a financial return for being members, contrary to commercial bank clients.

Out of commercial bank managers interviewed in Panambi, one saw Sicredi as an actor much more similar to a bank than a credit union, despite incurring a different tax on financial operations. Two of the managers interviewed saw Sicredi as indeed being a credit union serving a different market than banks, thus not being in direct competition with them.

Out of correspondent users interviewed in the rural workers' union and jewelry store, two people had been Sicredi-members for a long time, the other one seeing credit unions as a safe haven in times of economic turmoil. Nonetheless, she did not see the credit union as being present in the lives of members. Two interviewed people didn't like Sicredi's service, and the other one claimed that both service level and financial return had been negatively affected by the growth of the union. One of the members interviewed also admitted having felt "prouder" to be a Sicredi member when the credit union represented Panambi citizens only.

4.2.5.2. *Opinion on Banking Correspondents*

When asked about the impact of banking correspondents on the development of Panambi, the mayor of the municipality stressed that in his opinion, the main impact of access to finance comes from bank branches. Nonetheless, he noted that correspondents help in improving access and convenience due to longer opening hours. He also mentioned that he himself does all his financial transactions through a Bradesco correspondent located in the City Hall, and it has made operations easy. However, he expressed some doubt over the durability of this phenomenon due to the increasing facilitation of online payments.

The trade association president agreed that correspondents improve access and decrease long-distance travels. He also believed that it is important for people to have access to financial services in non-bank outlets. The president equally highlighted the security issues related to being a correspondent, but noted that it can be an interesting and mutually beneficial agreement due to increased turnover for retailers.

All six correspondent users interviewed at the rural workers' union of Ijuí praised the convenience brought upon them by the Sicredi correspondent at the syndicate. Many of them saw their logistics improved significantly through the correspondent, as they previously had to pay bills in several locations. Furthermore, many of the interviewed users said they were from rural parts of the municipality, and came to the city mostly to visit the workers' union, and having a correspondent there made their transportation easier. Out of the users of a Sicredi BC located in a jewelry store in Panambi, all affirmed using the banking correspondent to pay their bills due to the lack of waiting lines, speed of service and convenient location.

4.2.5.3. *Banking Correspondents' Point of View*

According to the managers of the rural workers' union in Ijuí, being a banking correspondent does not bring financial return, but members are satisfied with its service. A farming store owner in Panambi affirms having been able to increase the turnover of the store thanks to being a banking correspondent. The owner of the jewelry store acting as a correspondent was on the same lines, saying she decided to become a BC in Panambi after the success she had perceived acting as a CU BC in a different municipality.

When interviewed about potential disadvantages of being a correspondent, all BCs had something to say. According to the manager of the rural workers' union, on top of the low financial return of the activity, other problems are the risk of robbery during cash transportation, the unavailability of card payments, constant failure of the system, as well as the lack of proper training for performing operations. The farming storeowner also deplored the cash-only payment system, and mentioned the low limit of daily transactions as a problem, as it leads her to closing bill payment activities before the store itself. Furthermore, she would wish for the system to allow for other services than only bill payment. The jewelry store manager mentioned similar problems as the first two correspondents – the low limit of daily transactions, the cash payment

and low return of the activity. She also found the initial cost of becoming a correspondent too high, as the credit union did not provide her a computer, unlike had been the case in the previous municipality where she had acted as a CU correspondent.

The owner of the farming store also mentioned that she had been offered to be a correspondent for another institution but had given up on the idea due to the expensive investment in material it would have entailed, as well as to the requirement to separate both activities.

## 4.3. **Correspondents and Credit Union Financials**

This part of the study aims at establishing links between credit union financials and the usage of banking correspondents, in an attempt to perceive potential effects of BC usage on credit unions. This process started with a search for relationships between the number of banking correspondents and the financials of credit unions, as explained in the methodology-section of this thesis. In this analysis, all correspondents operated by credit unions were observed, as exclusiveness does not matter as much from the point of view of the credit union as from the point of view of access to financial services for the population. Calculations also showed that the difference in results was minimal when considering only exclusive correspondents.

Appendix 32 illustrates examples of the initial search for correlations, which involved searching for correlations with different sub-populations of credit unions. Sub-populations observed were related to geographic regions as well as to the type and affiliation of credit unions. The relations found were often stronger in certain subpopulations than in the entire population of credit unions. In this initial search, relations were found between the number of correspondents and the following indicators: return on equity, return on assets, size, coverage with services, other revenue share as well as banking profitability. The relation was taken for further analysis if the Pearson correlation was higher than 0.20. No relations reaching this level were found between the number of credit unions and treasury investments, investments in credit operations, or funding by long-term deposits – all indicators judged to be important for credit union survival according to De Carvalho et al. (2011).

As a next step, these relations were looked into with more detail, in a manner exemplified in Appendix 33. This consisted in looking at the relations in different years for the same sub-

populations as the ones that were used in the initial search. The number of banking correspondents of a credit union was divided by its size (logarithm of assets), in order to improve the comparability of banking correspondent usage between credit unions of different sizes. The variable obtained this way was named *banking correspondent intensity* or *BC intensity*.

In order not to be biased by a relation in a single year, the average figures between 2012 and 2014 for BC intensity and financial ratios were computed to observe further relations. For all six indicators taken into further analysis, all relations were calculated for different types and affiliations of credit unions, as well as for different regions. For each relation, significance tests were carried out. These results are all represented graphically in Appendix 34. The rest of his section presents the most interesting results obtained for each observed financial ratio. The strength of correlation is assessed through the framework presented by Evans (1996), detailed in Appendix 36.

4.3.1. BC Intensity and Return on Equity
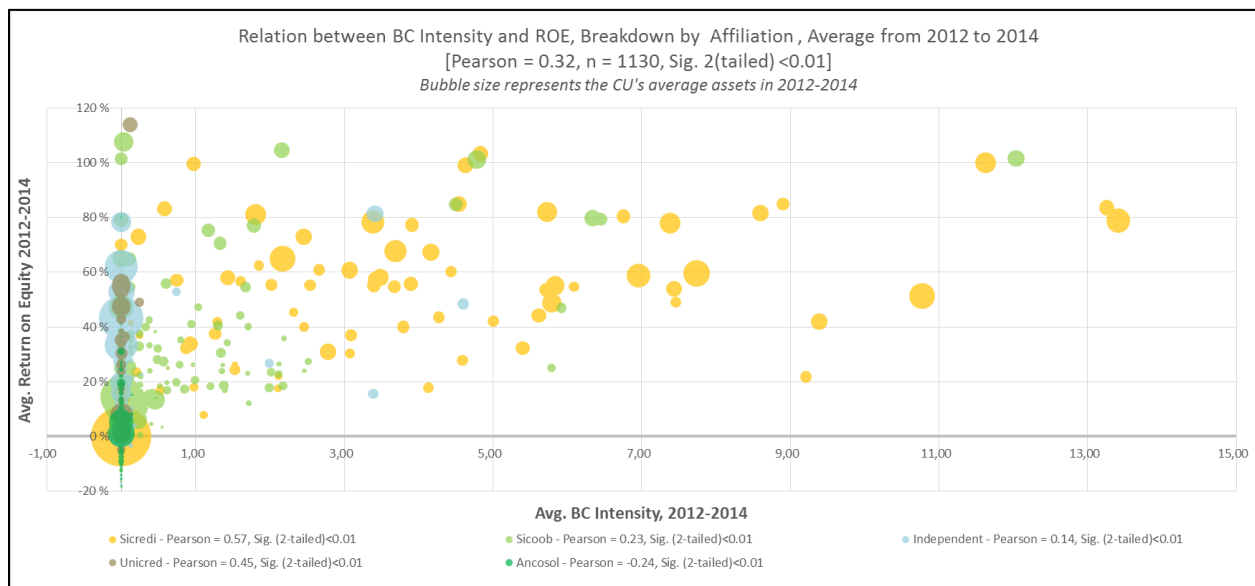
Figure 16: BC Intensity and Return on Equity by affiliation, 2012-2014 (Based on BCB, 2015b, 2015c and 2015g)

Return on Equity is a general measurement of rate of return for an organizations' ownership. When observing the entire population of credit unions, the relationship between BC Intensity and ROE is weak but positive (Pearson = 0.32, significant at the 0.01-level), as is illustrated in Figure 16.

Nevertheless, for Sicredi-affiliated credit unions, the relation was much stronger (Pearson = 0.57, significant at the 0.01-level), as can be seen from Figure 16. For Sicoob-affiliated credit unions the relationship was weak but positive (Pearson = 0.23, significant at the 0.01-level). When looking at the type of credit unions, as detailed in Appendix 34, free admission credit unions also show a moderate correlation between BC Intensity and ROE for the period – 0.57 (significant at the 0.01-level). In regional sets, this relationship was strong in the Central-West (Pearson = 0.63, significant at the 0.01-level) and moderate in the South, Southeast and North regions (0.47, 0.40 and 0.41, respectively, sig. at the 0.01-level). For the Northeast, no significant relationship was found.

4.3.2. BC Intensity and Size of Credit Union

In the study of De Carvalho et al. (2011), the size of a credit union was defined as the most important determinant of its survival. For the whole population, the relationship between BC intensity and size of the credit union was weak but positive (Pearson = 0.30, significant at the 0.01-level), as can be seen from Figure 17.
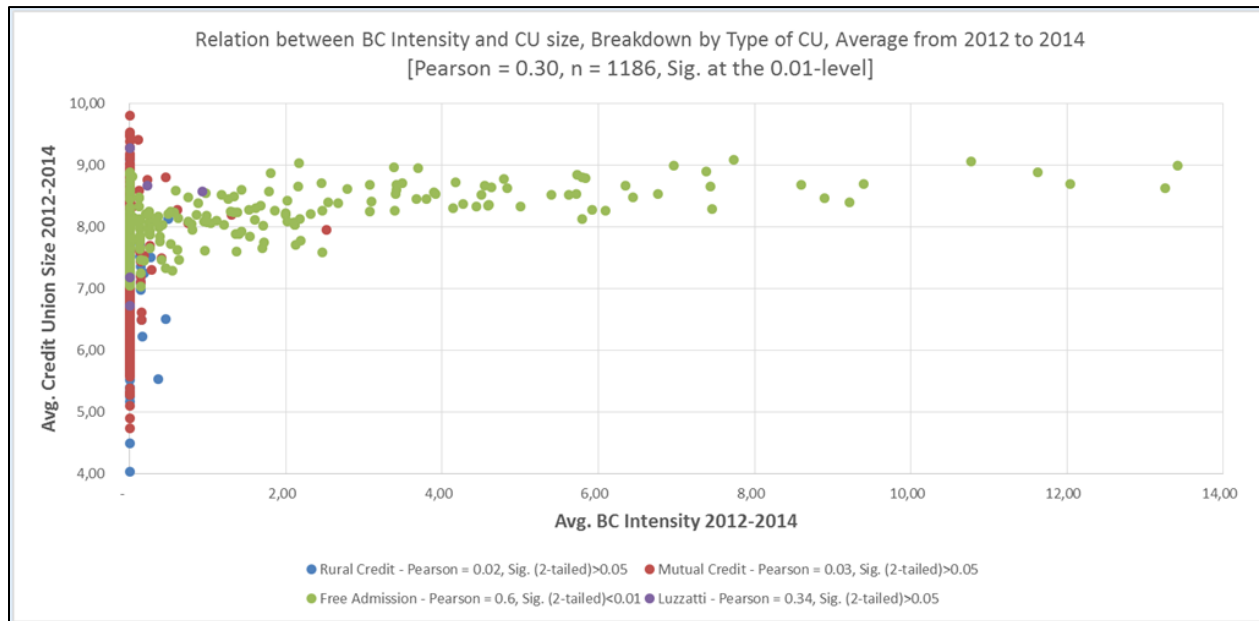
*Figure 17: BC Intensity and Size by type of credit union, 2012-2014 (Based on BCB, 2015b, 2015c and 2015g)*

Nonetheless this relationship was strong for free admission credit unions (Pearson = 0.60, significant at the 0.01-level) and moderate for Sicredi-affiliated credit unions (Pearson = 0.50, significant at the 0.01-level). For Sicoob-affiliated credit unions, the relationship was very weak

but positive (Pearson = 0.15, significant at the 0.01-level). At the regional level, the relationship was generally very weak, except for the Central-West, where it was moderate (Pearson = 0.43, sig. at the 0.01-level).

4.3.3. BC Intensity and Other Revenue Share

Other Revenue Share refers to the share of revenue from non-financial activities. It was seen to have a *negative* impact on the survival of credit unions in the study of De Carvalho et al. (2011). For the whole population of credit unions active in 2013, this relationship was very weak (Pearson = 0.14, significant at the 0.01-level).

For free admission credit unions, the relation was a bit stronger, but still weak (Pearson = 0.28, significant at the 0.01-level), as can be seen from Appendix 34. Interestingly, for Sicredi and Sicoob the relationship was almost non-existent and actually not significant (Pearson= 0.01 and -0.08, respectively, NOT significant at the 0.05-level). At the regional level, the relationship was generally also very weak, except for the Central-West region where it was moderate (Pearson = 0.43, significant at the 0.01-level).

4.3.4. BC Intensity and Return on Assets

Return on Assets measures the efficiency of an organization's assets in generating revenue. For all credit unions, there was no relationship between BC intensity and ROA, and the result was not even significant at the 0.05-level, as can be seen from Figure 18.

Notwithstanding, for Sicredi-affiliated credit unions, the relationship is moderate and positive (Pearson = 0.49, significant at the 0.01-level). For Sicoob-affiliated credit unions, the relationship was also positive but weak (Pearson = 0.20, significant at the 0.01-level). Such is the case with free admission credit unions (Pearson = 0.37, significant at the 0.01-level). At the regional level, the relationship was weak in the Central-West region (Pearson = 0.30, significant at the 0.01-level) and moderate in the South (Pearson = 0.4, significant at the 0.01-level).
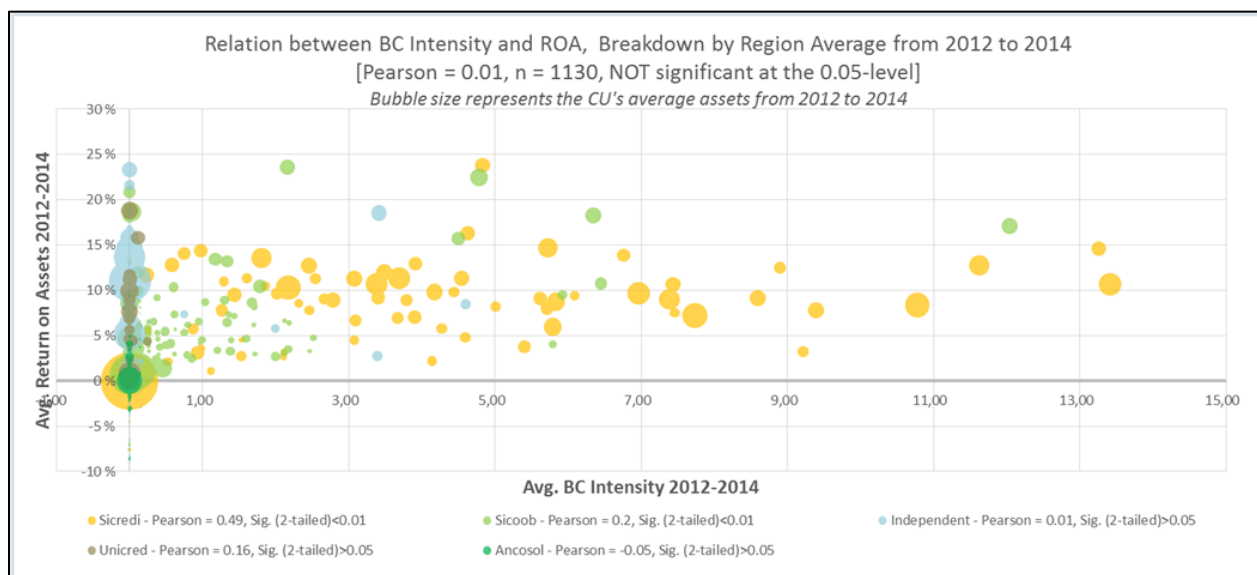
Figure 18: BC Intensity and Return on Assets by affiliation, 2012-2014 (Based on BCB, 2015b, 2015c and 2015g)

4.3.5. BC Intensity and Coverage with Services

Coverage with Services refers to the amount of structural expenses covered with revenue from services. The relationship was weak but positive for credit unions in general (Pearson = 0.32, significant at the 0.01-level). However, it was moderate for Sicredi-affiliated credit unions (Pearson = 0.44, significant at the 0.01-level), while for Sicoob it was close to that (Pearson = 0.35, significant at the 0.01-level). At the regional level, the relationship was moderate in the South and Center-West (0.43 and 0.39, respectively, significant at the 0.01-level).
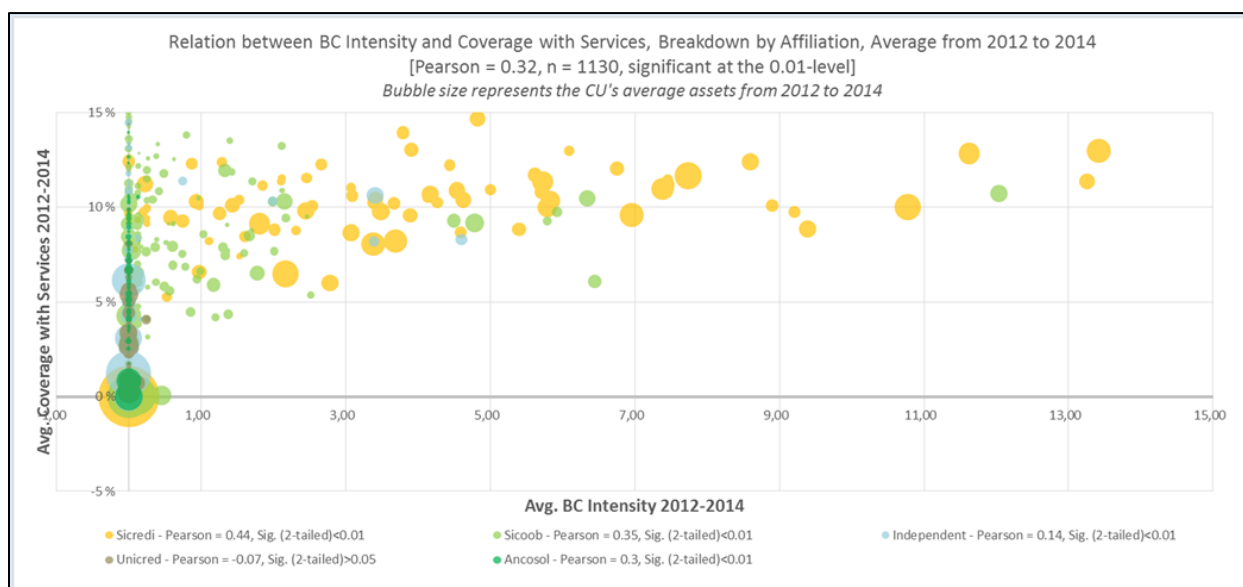
Figure 19: BC Intensity and Coverage with Services by affiliation, 2012-2014 (Based on BCB, 2015b, 2015c and 2015g)

4.3.6. BC Intensity and Banking Profitability

Banking Profitability in this case refers to the ratio of operating income and operating expenses. The relationship between BC intensity and banking profitability was overall not significant, as can be observed from Appendix 34. Nevertheless, for Sicredi- affiliated credit unions, this relationship was weak but positive, implying a potential link of some level between these two variables (Pearson = 0.3, significant at the 0.01-level).

4.3.7. Potential Hidden Variables

Some of the relationships found in this analysis are rather interesting, such as the relationship between BC Intensity and ROE as well as CU size and coverage with services, for example. However, it is important to take into account the potential existence of "hidden variables" that could explain this relation. The tables presented in Appendix 35 detail the relationships between the variables observed, and aim at providing indication of potential hidden variables.

Out of the variables observed, asset size has potential to explain many of the relationships obtained. Indeed, for all credit unions it has a moderate correlation with ROE (Pearson = 0.53, significant at the 0.01-level), and for Sicredi it also has a moderate correlation with ROA (Pearson = 0.45, significant at the 0.01-level). For free admission credit unions, the size of the CU has a strong correlation with ROE (Pearson = 0.71, significant at the 0.01-level), as is illustrated in Figure 20. It also has a moderate relationship with ROA (Pearson = 0.54, significant at the 0.01-level). The same applies to the South-region, for example, where the relation between CU size and ROE is strong (Pearson = 0.64, significant at the 0.01-level) and the relation between CU size and ROA is moderate (Pearson = 0.51, significant at the 0.01-level).

Interestingly, for Sicredi, coverage with services correlates strongly with banking profitability (Pearson = 0.67, significant at the 0.01-level) and moderately with ROE (Pearson = 0.44, significant at the 0.01-level).

All in all, it is unclear which relationship explains which, but these potential "hidden variables" need to be considered in order to reach valid conclusions on the relationship between credit union correspondents and credit union financials.

Relation between Size of CU and ROE, Breakdown by Type of CU, Average from 2012 to 2014
[Pearson = 0.53, n = 1130, Sig. (2-tailed) <0.01]
Bubble size represents the CU's average assets in 2012-2014
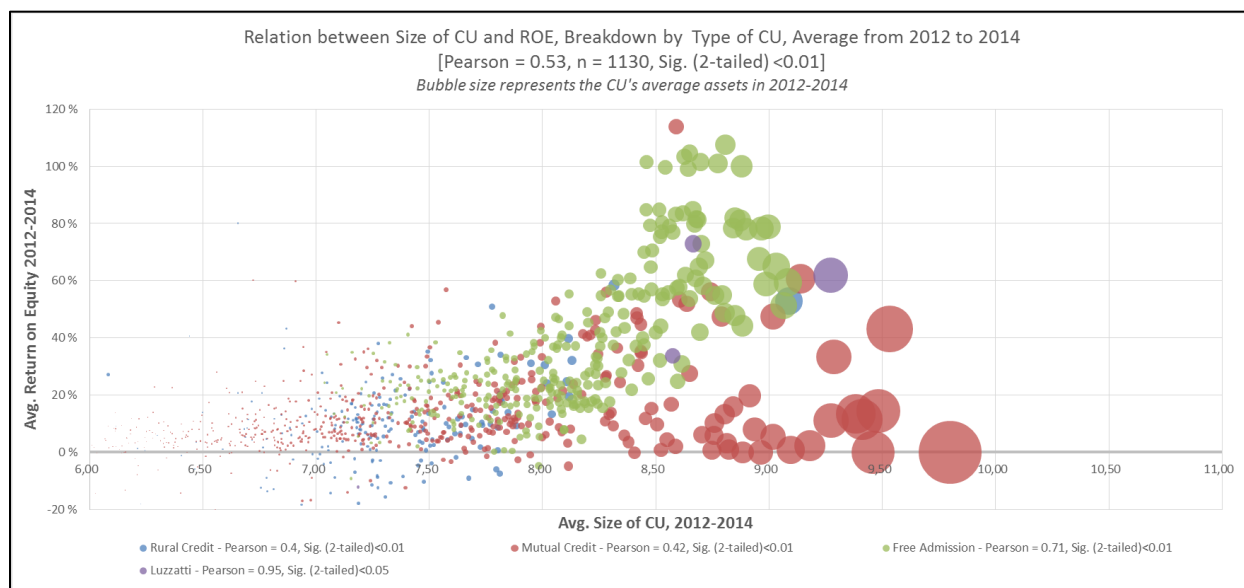
Figure 20: Asset Size and ROE by type of credit union, 2012-2014 (Based on BCB, 2015b and 2015c)

4.4.   Credit Union Correspondents and the Municipal Index of Financial Inclusion

This part of the research compares the location of credit union correspondents with municipal data. By matching the municipal IFI with BC data, it is possible to observe the general level of financial inclusion of municipalities where CU BCs are located.

While CU BCs are included in the IFI calculation, they generally represented less than 2% of all BCs in 2014, and the BC category had only a 0.10 weighting in the computation of the index. Even in the very few cases where CU BCs account for a large part of all BCs in a municipality, their contribution to the total municipal IFI score is less than 10%. This makes comparisons of the number of CU BCs with the municipal IFI possible and relevant for the purposes of this research, as the IFI represents the general availability and usage of financial services in the municipality.

The purpose of this analysis is not to claim causality between CU BC location and IFI score, but rather to use the IFI score as an indication of the level of *need* for financial services in a municipality. The presence of credit union correspondents in municipalities with low IFI could be seen to be more important for financial inclusion than their presence in municipalities with high IFI. If a municipality has a low IFI, by definition it implies that there is a restricted availability of access points to financial services and, therefore, a larger *marginal* increase in

POAs caused by the opening of a new CU BC. Following the same line of thinking, the importance of CU BCs in municipalities with already high IFI scores could be considered lower, as the general availability of services is already good. Nevertheless, it is acknowledged that there is room to improve access to financial services in most municipalities of Brazil.

4.4.1. The Index of Financial Inclusion

The index of financial inclusion was computed in the manner explained in the methodology-section of this thesis. The resulting distribution of municipalities is illustrated in Figure 21. The lowest possible score for the indicator is zero, while the highest is one. Most Brazilian municipalities are situated towards the lower end of the scale, and the average for 2014 is only 0.41, as illustrated in Table 21. The median for 2014 is 0.37, meaning that half of municipalities in Brazil have IFI scores below this figure.
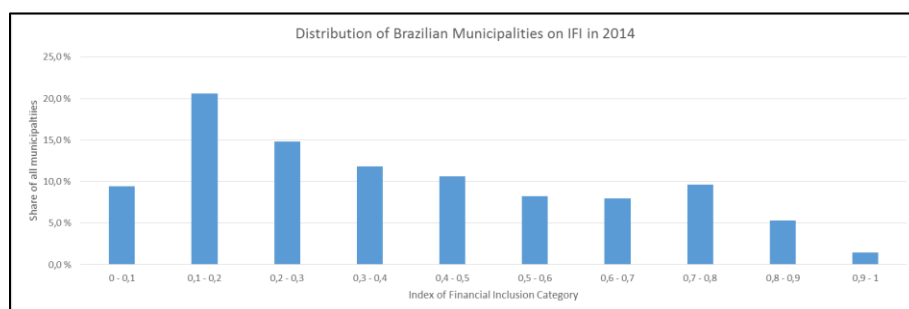
Figure 21: Distribution of municipalities on the Index of Financial Inclusion, 2014 (Based on BCB, 2015c-g)

As can be expected from the literature, the Northeast and North regions have the lowest average scores, while the South region has the highest one. The most financially deprived regions have had the highest average growth rates from 2010 to 2014, while the South-region has seen its score slightly decrease. Generally, the average score for 2014 is a bit lower than for the two previous years, which is mainly due to the decrease in POA in 2014, as well as to the correction method used for deposits and credit by municipality (which is affected by the number of POA in the municipality). This actually renders longitudinal comparisons with the index challenging.

Average IFI value per region 2010 - 2014					
Region	2010	2011	2012	2013	2014	CAGR 10-14
North	0,24	0,26	0,27	0,27	0,28	3,2 %
Northeast	0,20	0,21	0,21	0,21	0,21	1,9 %
Southeast	0,46	0,47	0,49	0,49	0,49	1,4 %
South	0,58	0,57	0,59	0,57	0,57	-0,5 %
Central-West	0,53	0,53	0,56	0,56	0,57	2,0 %
Overall	0,390	0,395	0,41	0,41	0,41	1,0 %

Table 21: Average IFI value by region, 2010 - 2014 (Based on BCB, 2015c-g)

Due to the limitation mentioned above, only the IFI of 2014 is used in this analysis. In the assessment of BC growth, the municipal IFI scores are kept constant at 2014 values, in order to ensure comparability.

4.4.2. Credit union Correspondents by Municipality on the IFI

Overall, as illustrated in Figure 22, credit union correspondents tend to be located in municipalities with higher IFI scores. Around 74% of all CU BCs were located in municipalities with an IFI score above 0.5 in 2014, even though roughly 65% of Brazilian municipalities have an IFI score *below* this figure. Furthermore, less than 3% of all CU BCs were located in municipalities with IFI scores below 0.2, while 27% of all municipalities fell into this category. Correspondingly, 27% of CU BCs were located in municipalities with an IFI score above 0.8, while only 7% of Brazilian municipalities entered in this category. The trend was similar when observing only exclusive banking correspondents. Interestingly, the general exclusiveness rate of CU BCs was lower, the higher the IFI score of the municipality. This is potentially due to the higher amount of financial institutions competing for retailers.
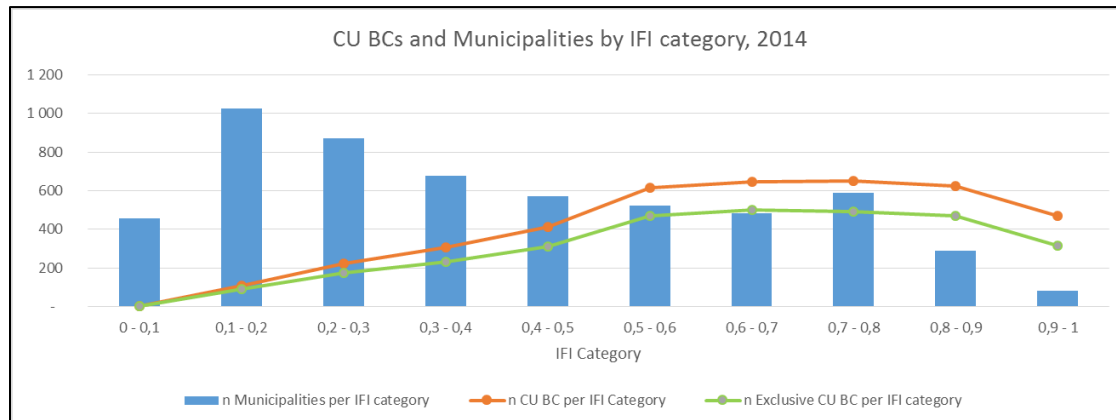
Figure 22: Number of CU BCs by IFI category, 2014 (Based on BCB, 2015c-g)

The uneven distribution of credit union correspondents on the IFI was also explicit when observing the coverage of municipalities by IFI category, meaning the number of municipalities of each category with a CU BC. As illustrated in Figure 23, more municipalities were covered in higher IFI categories - in the ones already having relatively good access to financial services. The difference is most striking at the extremes – less than 5% of municipalities with an IFI-score below 0.2 had a CU BC in 2014, compared to 60% of municipalities with an IFI score over 0.9.

When looking at absolute numbers only, the coverage of municipalities on the IFI was more even. The 0.7-0.8 IFI category had the largest number of municipalities covered, around 200, compared to roughly 55 in the 0.9-1.0 IFI category. In both the 0.3-0.4 and the 0.8-0.9 IFI categories, for example, approximately 100 municipalities were covered. Nonetheless, in the former, this figure represented around 15% of municipalities of the category, while in the latter it represented 35%.
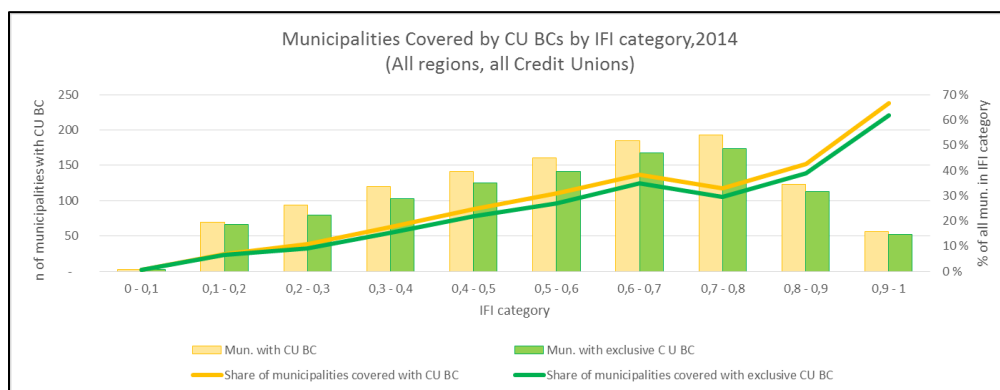
Figure 23: Municipalities with CU BC by IFI category, 2014 (Based on BCB, 2015c-g)

The apparent prevalence of credit union correspondents in municipalities with higher IFI scores can largely be explained by the regional discrepancies between CU and CU BC proliferation in Brazil. The North and Northeast regions have the lowest IFI scores, and they simultaneously have the lowest credit union activity in general, as explained previously. This certainly needs to be taken into account in this assessment.

Appendices 37 and 38 exhibit the coverage of municipalities by IFI category and by region. In the North region, around 20 cities in the 0.3-0.6 IFI categories were covered in 2014, representing roughly 13% of municipalities in the category. Interestingly, close to 0% of municipalities below the IFI score of 0.3 were covered in the region. In the Northeast, the situation was somewhat similar, and while 12 municipalities in IFI categories from 0.0 to 0.4 had CU BCs, they represented less than 1% of all municipalities in those categories.

In the Southeast region, CU BC coverage by IFI category was more balanced – CU BCs covered around 8% of all municipalities in the IFI categories between 0.1 and 0.5, in 2014. However, only one municipality of the lowest category was covered, representing less than 4% of all municipalities of the category. In the South region, the "heartland" of the Brazilian credit union

movement, the coverage of municipalities was generally higher and more balanced than in other regions, as illustrated in Figure 24. Roughly, 50% of municipalities in all IFI categories were covered, in 2014, except for the lowest IFI category, in which none of the four municipalities had CU BCs.
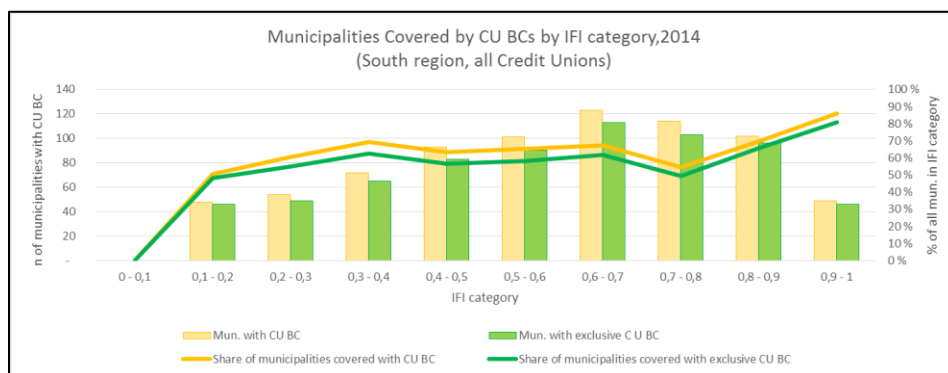
Figure 24: Municipalities of the South region with CU BCs, 2014 (Based on BCB, 2015b-g)

In the Center-West region, the coverage of municipalities with IFI scores below 0.4 was lower than in municipalities with higher scores in 2014, as 16.7% of those municipalities had CU BCs compared to 29.3% of municipalities with higher IFI scores. Nevertheless, each IFI category except for the lowest one had a coverage of around 20% of municipalities.

It is clear that the distribution of credit union BCs on the IFI score is dependent on the region – the North and the Northeast regions, already having little CU BC activity, have a lower coverage of municipalities, and a concentration of CU BCs in municipalities with higher IFI.

It is interesting to note that the number of credit union correspondents by IFI category follows the number of credit union seats in the category to some extent, as illustrated in Figure 25. This is clearly the case for lower IFI-categories, but less so for higher ones.
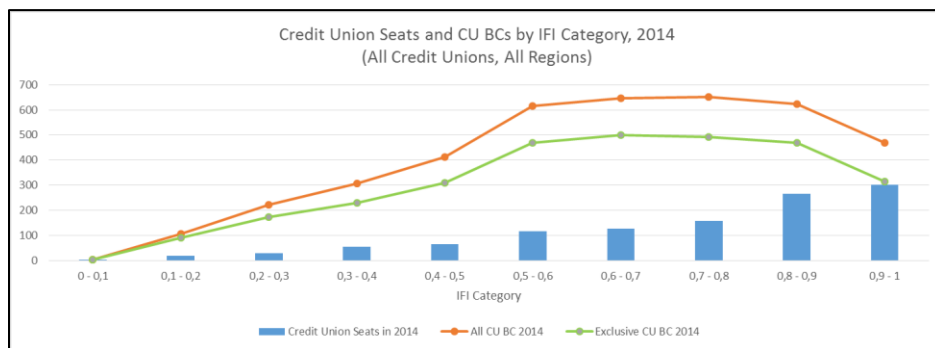
Figure 25: Credit union correspondents and credit unions seats by IFI category, 2014 (Based on BCB, 2015c-g)

If one is to observe the coverage of municipalities by credit union affiliation, it becomes clear that Sicredi-affiliated credit unions, already using BCs more than other CUs, also covered more municipalities in all IFI categories, as illustrated in Figures 26 and 27. Appendices 37 and 38 provide detailed tables for regional comparison of CU BC location based on credit union affiliation.
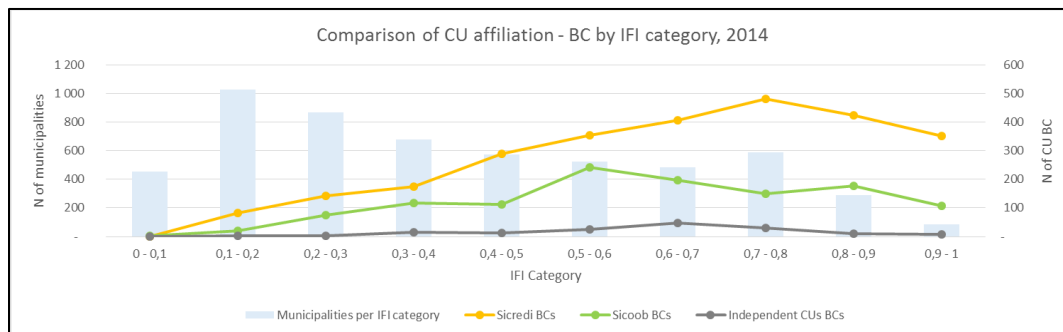
Figure 26: CU Affiliation and CU BCs by IFI category, 2014 (Based on BCB, 2015c-g)

Indeed, Sicredi affiliated credit unions had more BCs than other affiliations in each IFI-category in 2014, and they covered more municipalities in each of them, as is also visible in Appendix 37. Compared to BCs operated by Sicoob-affiliated credit unions and independent credit unions, Sicredi-affiliated BCs seemed to be somewhat more focused on the higher-end of the IFI scale.
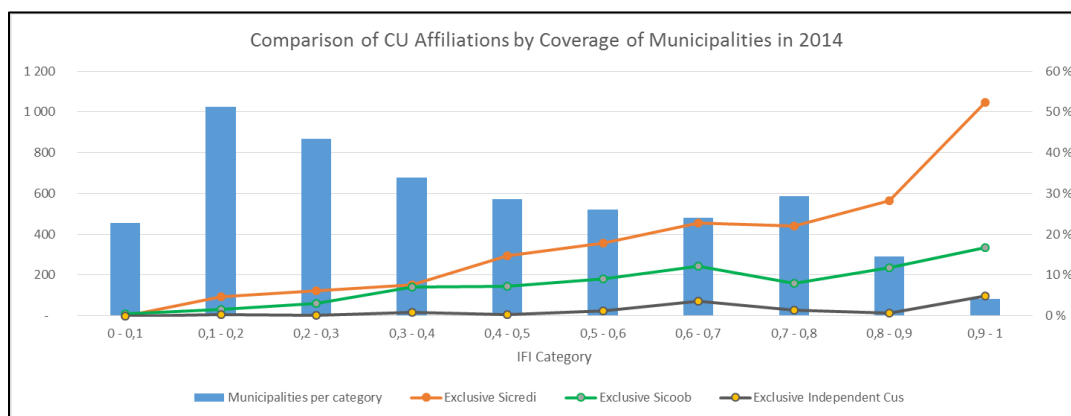
Figure 27: CU BC coverage of municipalities on IFI, by affiliation, 2014 (Based on BCB, 2015c-g)

For Sicoob-affiliated and independent CUs, the coverage of municipalities was more concentrated on the middle of the IFI-range whereas for Sicredi it seems to be increasing along with the IFI score. This is also illustrated in Figure 28, which shows that 45% of Sicredi BCs are located in municipalities with an IFI score above 0.6, compared to 35% of Sicoob BCs and only

30% of Independent CU BCs. As a comparison, 26% of municipalities had an IFI score above 0.6 in 2014. The figures imply that in 2014, all CU affiliations mainly had BCs in more prominent municipalities in terms of financial inclusion.
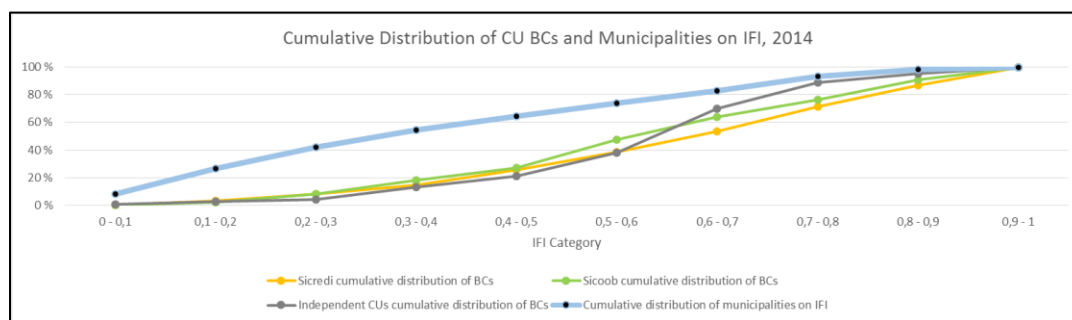
Figure 28: Cumulative distribution of CU BCs and municipalities on IFI, 2014 (Based on BCB, 2015c-g)

The difference in coverage between affiliations is also dependent on the region, as one may easily conclude from Appendices 37 and 38. For instance, in the Southeast, Sicoob covered 71 municipalities with exclusive BCs in the IFI categories from 0.1 to 0.5 in 2014 (8% of municipalities of the range), while Sicredi covered only one municipality (0.1%). In contrast, in the Center-West region, Sicredi covered 29 municipalities in that range (19% of all) in 2014, while Sicoob covered none.

4.4.3.   Credit Unions' Share of All Correspondents

In order to assess the importance of credit union correspondents in increasing access to financial services, it is important to compare them to the overall number of correspondents in different locations. This analysis focuses only on services III and V, as other services offered by CU BCs are negligible.

In this analysis, only exclusive correspondents are considered, as non-exclusive ones are shared with banks. Exclusive credit union correspondents are the ones that increase the number of access points to financial services, and are thus more relevant when considering financial inclusion.

4.4.3.1.   Credit Unions' Share of BCs with Bill Payments

Figure 29 below illustrates the distribution of (exclusive) banking correspondents in different IFI categories in 2014. From the graph, one can observe that credit unions had a minority share of BCs in all IFI categories, particularly in the municipalities with lower IFI scores. Indeed, as

illustrated in appendix 39, credit unions represented only 0.3% of all BCs with Inc. III in the lowest IFI category in 2014, while they represented on average 6.7% of all BCs with this service.
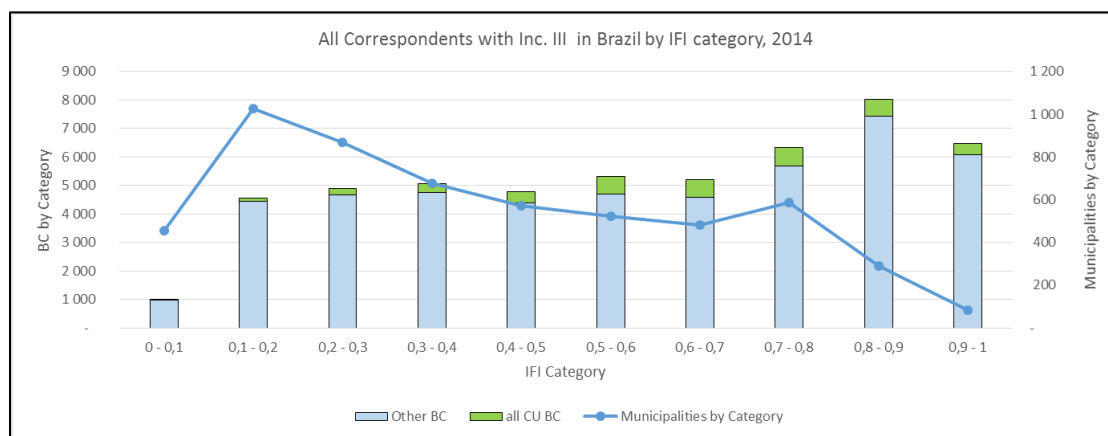
Figure 29: All banking correspondents by IFI category, 2014 (Based on BCB, 2015c-g)

As the reader might expect, the share of CU BCs out of all BCs with service III was not uniform across regions. As a matter of fact, the overall share of CU BCs out of total BCs with service III for the North and Northeast regions was 2.1% and 0.3%, respectively, in 2014. For the Southeast, the share of credit unions was also very low, only 3.0%. However, in the South and Center-West regions, the share of credit unions out of all BCs with payment services is larger, as it was 21.3% and 8.3%, respectively, for 2014.
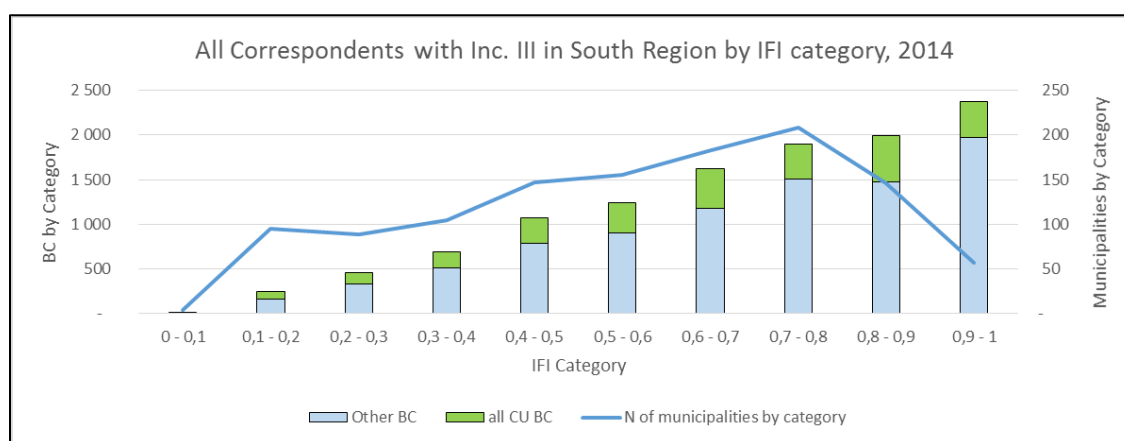
Figure 30: All banking correspondents by IFI category in the South region, 2014 (Based on Banco Central do Brasil, 2015c-g)

Furthermore, as is illustrated in Figures 30 and 31, as well as in Appendix 39, credit unions had a share of 25% of all BCs with service III in the municipalities of the 0.0-0.5 IFI range in the South region, which is already considerable. In the South, the share of credit unions out of all

BCs was lower than 20% only in municipalities with an IFI score above 0.7, as well as in the lowest category (which had only four municipalities).
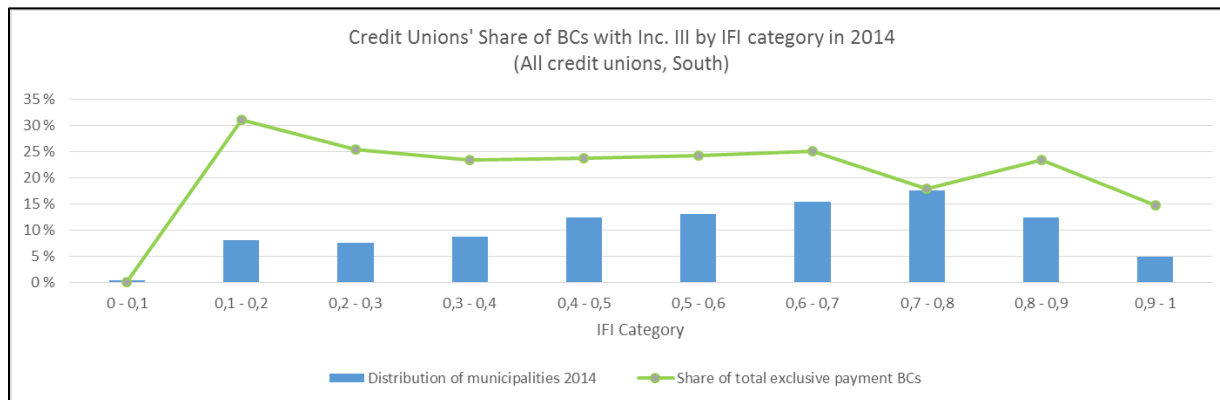
Figure 31: Credit union BC share of total BCs with Inc. III, 2014 (Based on BCB, 2015c-g)

When it comes to the affiliation of credit unions, it is evident that Sicredi also had the largest share of all BCs with Inc. III in 2014, since they had so many more BCs than other affiliations. This was true for all IFI categories in 2014, as visible in Figure 32 below.
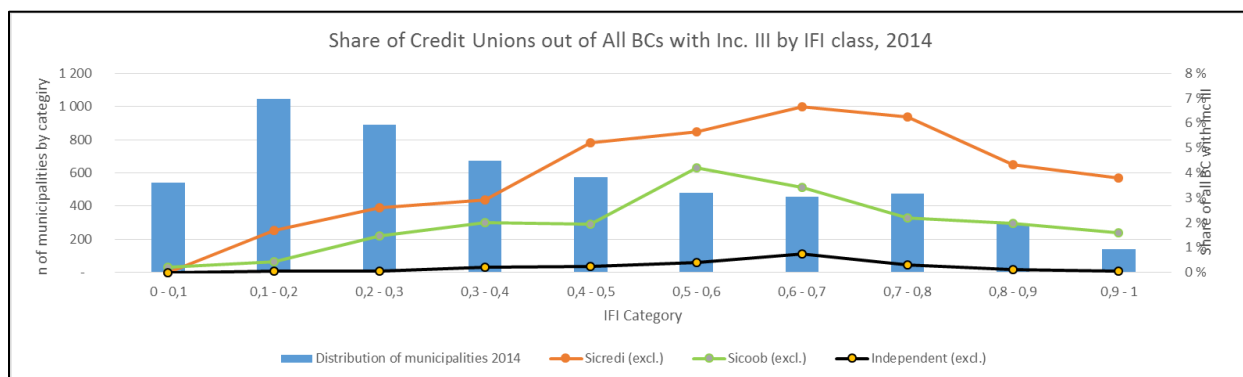
Figure 32: Credit union share of total BCs with Inc. III by affiliation, 2014 (Based on BCB, 2015c-g)

Nevertheless, as suggested by Figure 33 and detailed in appendix 39, Sicredi was superior to other affiliations only in the South and Center-West regions, while Sicoob represented a slightly larger share of BCs with service III in both the North and Southeast regions in 2014.
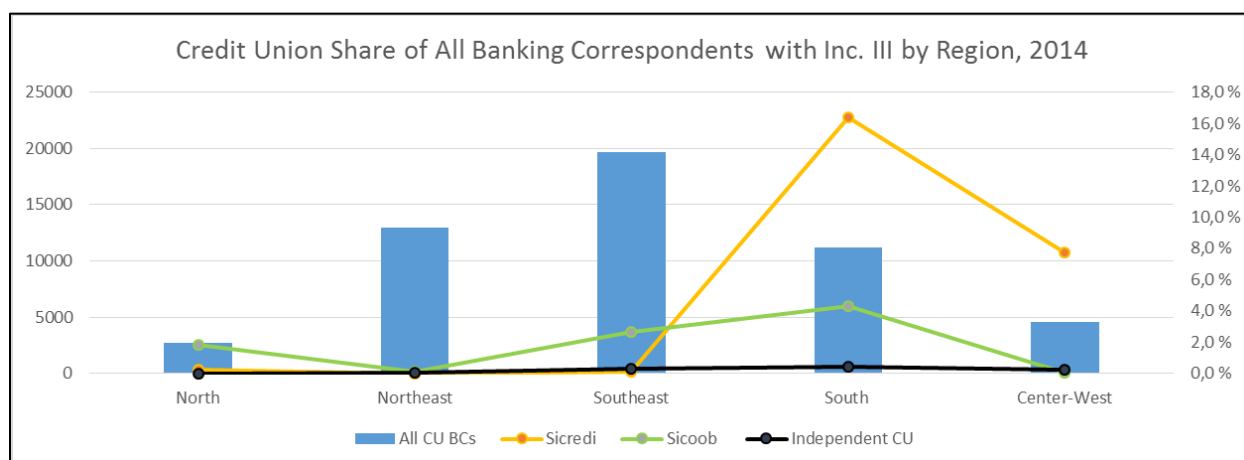
Figure 33: Share of total BCs with Inc. III by region by affiliation, 2014 (Based on BCB, 2015c-g)

4.4.3.1. Credit Unions' Share of BCs with Credit Proposals

While credit union correspondents represented a decent share of all BCs with payment services in 2014 in some areas, this can hardly be said for credit proposals. As table 22 suggests, exclusive credit union correspondents with service V represented only 0.1% of all BCs with this service in the South region. Furthermore, these correspondents were mostly located in municipalities with an IFI score above 0.6. This implies that this service is very marginal even in the South region, where credit unions generally are well represented among correspondents.

It has to be noted that this analysis only considers Sicredi correspondents in the South region, but this is justified by the fact that only two BCs with service V were not Sicredi-affiliated, and only two Sicredi correspondents with this service were not located in the South region.

Sicredi share of all BCs with service V in the South region					
IFI class	All BCs	All CU BCs	CU BC Share	Exclusive CU BCs	Exclusive CU BC Share
0 - 0,1	4	0	0,0 %	0	0,0 %
0,1 - 0,2	141	1	0,7 %	1	0,7 %
0,2 - 0,3	356	0	0,0 %	0	0,0 %
0,3 - 0,4	665	0	0,0 %	0	0,0 %
0,4 - 0,5	956	0	0,0 %	0	0,0 %
0,5 - 0,6	1394	0	0,0 %	0	0,0 %
0,6 - 0,7	2195	4	0,2 %	1	0,0 %
0,7 - 0,8	2850	13	0,5 %	7	0,2 %
0,8 - 0,9	3716	16	0,4 %	6	0,2 %
0,9 - 1	7952	55	0,7 %	4	0,1 %
Total	**20229**	**89**	**0,4 %**	**19**	**0,1 %**

Table 22: Credit union share of all BCs with service V in the South region, 2014 (Based on BCB, 2015c-g)

4.4.4. Municipalities with Significant Share of Credit Union Correspondents

In this subsection, the share of credit union correspondents out of total is observed at the municipal level, and the number of municipalities with a significant share is counted for each IFI category. In this analysis, a share of 25% or above is considered significant.

4.4.4.1. Municipalities with Significant Presence of CU BCs with Bill Payment

There are several municipalities in each region of Brazil, where credit unions have a significant share of all BCs for payment services. Appendices 40 and 41 present detailed tables of this issue.

Overall, there were 14 municipalities in the North region and 2 municipalities in the Northeast region, where credit union BCs represented over 25% of all BCs with service III in 2014. These municipalities represented an insignificant share of all municipalities in their respective regions, though. However, the number of municipalities with an important presence of CU BCs increases when moving south. Indeed, in the Southeast region, 105 municipalities (6% of total) had a share of CU BCs exceeding 25% of total. In the South, there were already 492 such municipalities, representing 41% of all municipalities of the region. In the Center-West, 17% of all municipalities, or 79 municipalities, had a share of CU BCs exceeding 25% for service III in 2014. In total, there were 692 such municipalities in Brazil in 2014.

These figures also vary by IFI class. Interestingly, in the South region, over 46% of municipalities with an IFI score from 0.0 to 0.3 had a share of credit union correspondents above 25% in 2014. In the Center-West, this figure was around 15.6%, while it was 7% for the Southeast. An equally interesting figure to observe is the number of municipalities where credit union correspondents represent half or more of BCs with service III.
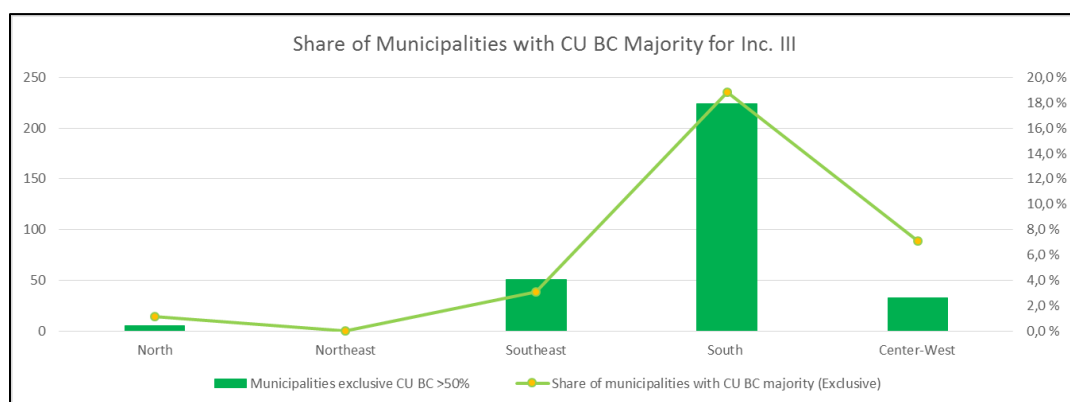
Figure 34: Share of municipalities with CU BC majority for Inc. III by region, 2014. (Based on BCB, 2015c-g)

Figure 34 above depicts the municipalities in each region, where CU BCs represent 50% or more of all BCs with service III. As illustrated in the graph as well as in Appendix 40, there were 5 such municipalities in the North-region, zero in the Northeast, 51 in the Southeast, 224 in the South, and 33 in the Center-West, adding up to a total of 313 for Brazil. While this represents only 6% of Brazilian municipalities, the role of credit union correspondents for the availability of payment services in such municipalities cannot be neglected. These municipalities would have half or less the BC access points to this service without CU BCs. As usual, the prevalence of municipalities with CU BC majority for Inc. III in 2014 was particularly high in the South, where 19% of municipalities fell into this category. The distribution of such municipalities on the IFI in 2014 is illustrated in Figure 35.
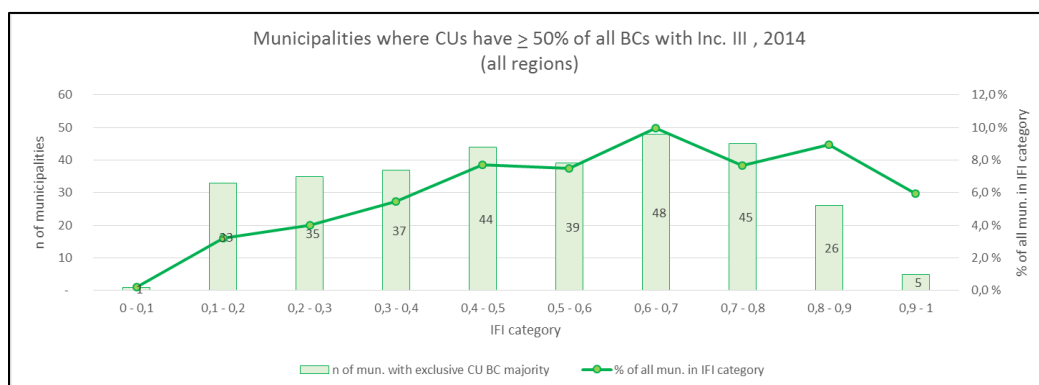
Figure 35: Municipalities where CU BCs represent 50% of more of all BCs with Inc. III, 2014 (Based on BCB, 2015c-g)

Figure 36 presents the distribution of municipalities where CU BCs represent 50% of more of all BCs with payment services in the South region in 2014. One may observe that in the South region, in 2014, 49 municipalities, or 28% of all municipalities with an IFI score between 0 and 0.3 had a majority of CU BCs for payment services.
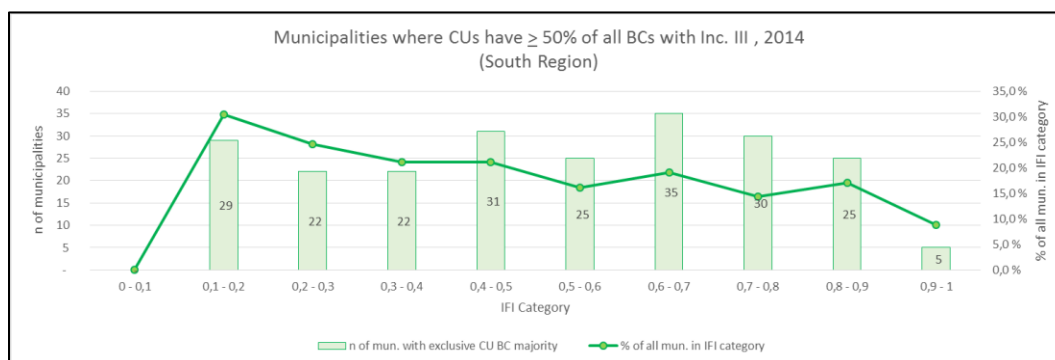
Figure 36: Municipalities where CU BCs represent 50% or more of all BCs with Inc. III, 2014 (Based on BCB, 2015c-g)

When observing the number of municipalities with CU BC majority by affiliation, one can note that once again, Sicredi-affiliated credit union BCs had the majority in most municipalities. This can be observed from Appendices 40 and 41, as well as from Figure 37 below.
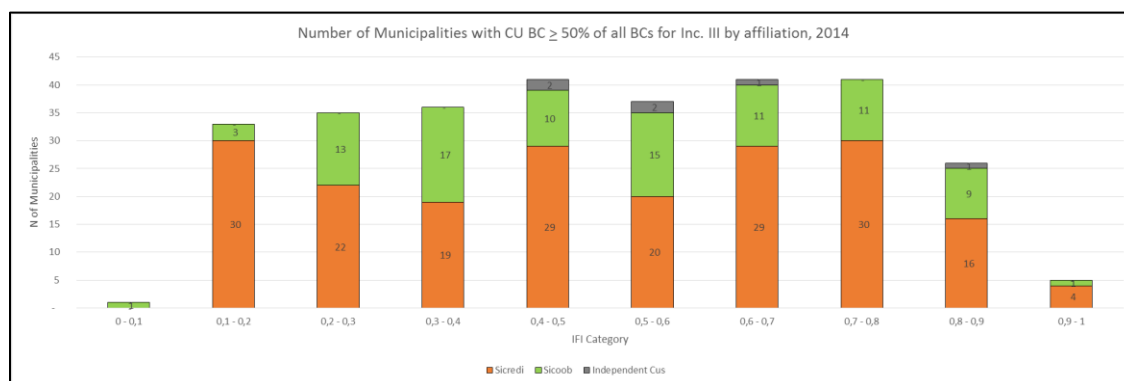
Figure 37: Municipalities where CU BCs represent 50% or more of BCs, by affiliation, 2014 (Based on BCB, 2015c-g)

While Sicredi clearly dominated in the number of municipalities where they had 50% or more of all BCs in 2014, independent CUs and Sicoob-affiliated CUs also had the majority in several municipalities. Sicoob had the majority in 91 municipalities, and independent credit union BCs in six municipalities in 2014. In the Southeast region, Sicoob had the majority in 48 municipalities, while Sicredi did not have majority in any, as can be seen from Appendices 40 and 41.

Interestingly enough, as illustrated in Appendix 41, there were also municipalities where CUs had 75% or more, or even 100% of all BCs with payment services in 2014. Indeed, there were 55 municipalities where credit unions had over 75% of BCs with payment services in 2014, of which 39 were located in the Southeast region. Furthermore, there were 30 municipalities in 2014, where all BCs with Inc. III belonged to credit unions. These were mostly located in the South and Southeast region, and were distributed in the middle range of the IFI category, as is illustrated in Appendix 41. There were 21 municipalities where all BCs pertained to Sicredi-affiliated credit unions, all of them in the South (19) and Center-West (2) in 2014. In contrast, there were nine municipalities with only Sicoob-affiliated BCs in the same year, four of them in the Southeast, four in the South and one in the North.

Looking at demographic data, one may observe that over 11 million people lived in municipalities where credit unions accounted for over 25% of BCs with payment service in

2014, out of which 1.5 million resided in municipalities with generally low financial inclusion. Similarly, over 3 million Brazilians lived in municipalities where CU BCs represented the majority of BCs with payment service. Of those people, 900 000 million lived in municipalities with IFI scores below 0.4. Finally, almost 145,000 people lived in municipalities where all BCs with payment services were operated by credit unions in 2014, 100,000 of which in municipalities with low IFI.

The numbers above aim at illustrating the size of the population potentially reachable by credit union correspondents in the municipalities where they have important "market shares" in payment services. They are not quantifications of the number of people using these services, and should not be mistaken for such.

4.4.4.1. *Municipalities with Significant Presence of CU BCs with Credit Proposals*

As could already be inferred from the previous section, credit union correspondents with credit proposals generally represent a meager share of all BCs with this service. However, as illustrated in table 23, three municipalities of the South region had a share of exclusive CU BCs with Inc. V representing over 25% of total in 2014, two of them in municipalities with IFI scores between 0.7 and 0.9, and one in the 0.1-0.2 IFI range.

IFI class	Municipalities	All CU BCs	Share of municipalities	Exclusive CU BCs	Share of municipalities
Municipalities with Sicredi share of BC with Inc V ≥25%, South region					
0 - 0,1	4	0	0,0 %	0	0,0 %
0,1 - 0,2	95	1	1,1 %	1	1,1 %
0,2 - 0,3	89	0	0,0 %	0	0,0 %
0,3 - 0,4	104	0	0,0 %	0	0,0 %
0,4 - 0,5	147	0	0,0 %	0	0,0 %
0,5 - 0,6	155	0	0,0 %	0	0,0 %
0,6 - 0,7	183	0	0,0 %	0	0,0 %
0,7 - 0,8	208	2	1,0 %	1	0,5 %
0,8 - 0,9	146	2	1,4 %	1	0,7 %
0,9 - 1	57	0	0,0 %	0	0,0 %
Total	**1188**	**5**	**0,4 %**	**3**	**0,3 %**

Table 23: Number of municipalities with CU BC share of BCs with Inc. V above 25%, 2014 (Based on BCB, 2015c-g)

Figure 38 illustrates the average share of CU BCs out of all BCs with credit proposals in the South region in 2014, out of the municipalities where they are present. As illustrated by the

graph, the average share of exclusive CU BCs out of total BCs with this service in a given municipality did not surpass 0.5% in any IFI category in 2014.
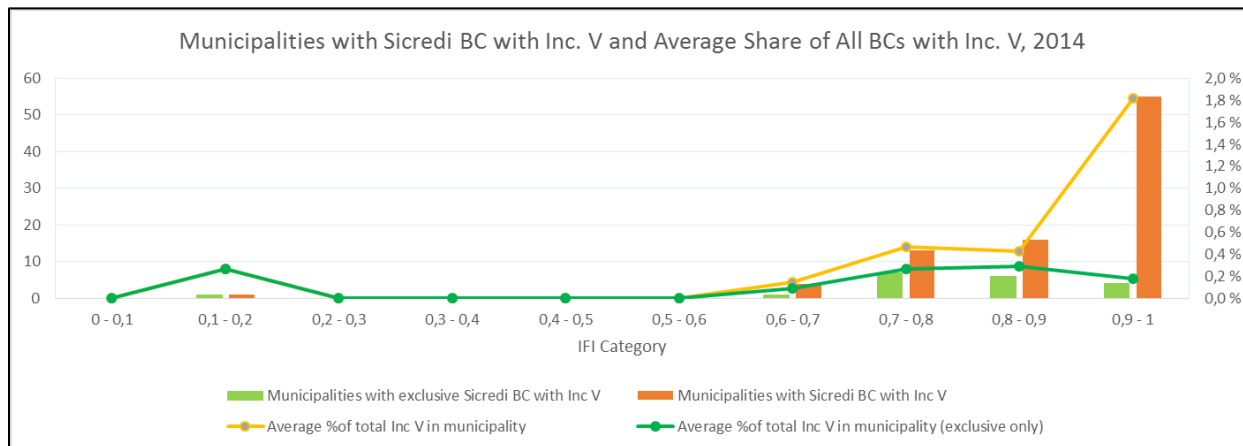
Figure 38: Average share of CU BCs with Inc. V out of total in covered municipalities, South, 2014 (Based on BCB,2015c-g)

4.4.5. Credit Union Share of Recent Growth in Banking Correspondents

In this section, the total growth in correspondents is observed between 2007 and 2014. As commercial banks have operated correspondents since the beginning of the last decade, and credit unions only started joining in the market in 2008, it can be interesting to observe growth in that period. This allows assessing the role of credit union correspondents in the total growth of access points to these services for citizens. For credit proposals, the growth between 2011 and 2014 is observed, for this service started being adopted only in 2012. The classification of municipalities over the IFI is kept fixed (at the 2014 values) for this assessment, as this allows for comparison of growth over the IFI category.

4.4.5.1. Growth in BCs with Service III, 2007-2014

As illustrated in appendix 42, banking correspondents with service III increased by nearly 34,391 between December 2007 and December 2014, out of which 3,340 were operated by credit unions. This means that credit unions contributed to 9.7% of the growth in CUs with this service over the period. The CU share of growth in BCs with service III was the lowest in the lowest quartile of the IFI range, 3.1% while it was 15.5% in the range from 0.50 to 0.74, as illustrated in Figure 39.
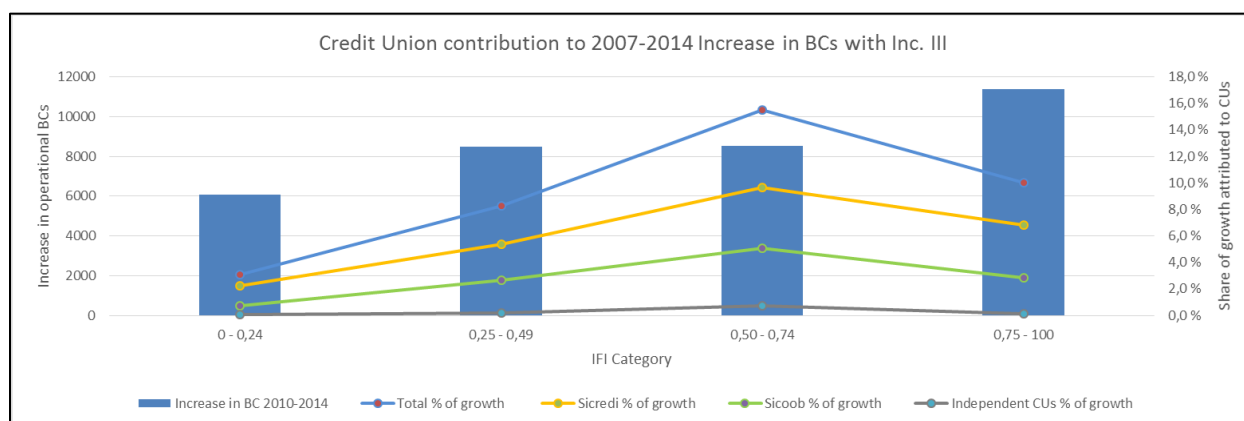
Figure 39: Share of CUs out of total growth in BCs with service III, 2007-2014 (Based on BCB, 2015c-g)

As it has become logical to expect, this contribution to growth in BCs was not homogenous in different regions of Brazil – the credit union share of total growth in BCs with this service was 30.0% in the South, while it was only 0.4% in the Northeast. This share was 3.0% in the North and 4.2% in the Southeast. In the South region, the CU share of growth over the three lowest IFI quartiles was rather homogenous, as depicted by Figure 40 below.
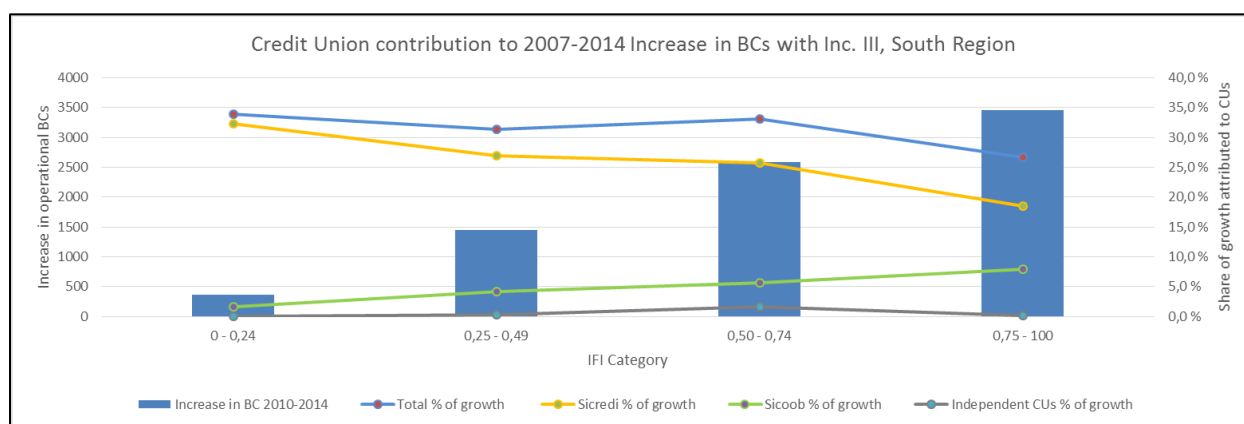
Figure 40: CU share of total growth in BC with service III in the South, by IFI category, 2007-2014 (Based on BCB, 2015c-g)

Figure 41 below illustrates the growth in the number of municipalities with a majority of CU BCs for service III from 2011 to 2014. The figure illustrates that CU BCs kept on increasing their importance in certain municipalities – over a three year-period, the number of municipalities with CU BC majority grew by 70, or 28.8%.
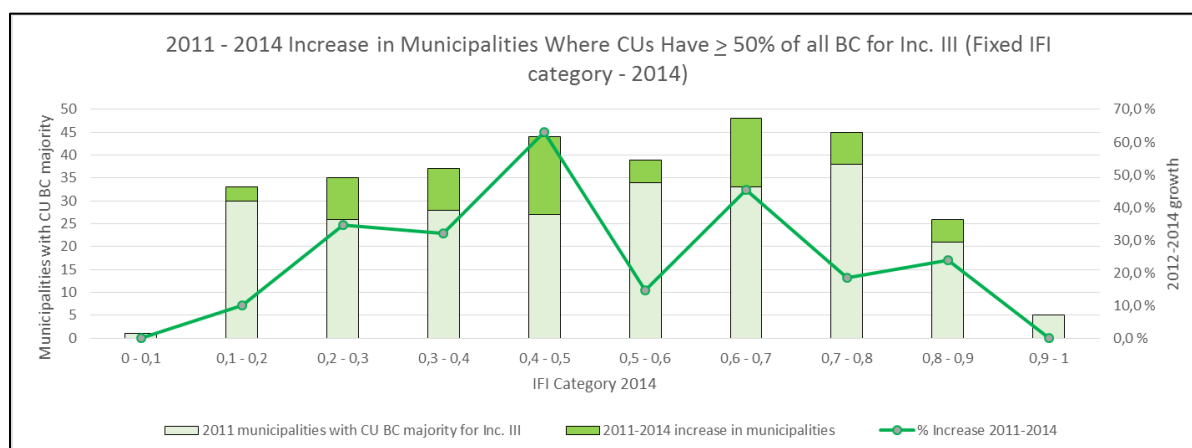
Figure 41: Increase in municipalities with CU BC majority for service III, 2011-2014 (Based on BCB, 2015c-g)

4.4.5.2. *Growth in BCs with Service V, 2011-2014*

As can be seen from Table 24 below, the number of BCs with credit proposals decreased by 2,365 in the South region between December 2011 and December 2014. At the same time, the number of exclusive CU BC with this service increased by 19, which represents a negative growth of 0.8%. Taking this into account, the importance of credit unions in this segment may be somewhat larger than suggested by the plain number of CU BCs with this service.

IFI class	All BCs	All CU BCs	CU BC Share	Exclusive CU BCs	Exclusive CU BC Share
Sicredi Share of increase in BC with service V - 2011 - 2014					
0 - 0,1	2	0	0,0 %	0	0,0 %
0,1 - 0,2	53	1	1,9 %	1	1,9 %
0,2 - 0,3	62	0	0,0 %	0	0,0 %
0,3 - 0,4	-50	0	0,0 %	0	0,0 %
0,4 - 0,5	-24	0	0,0 %	0	0,0 %
0,5 - 0,6	-3	0	0,0 %	0	0,0 %
0,6 - 0,7	-36	4	-11,1 %	1	-2,8 %
0,7 - 0,8	-383	13	-3,4 %	7	-1,8 %
0,8 - 0,9	-536	15	-2,8 %	6	-1,1 %
0,9 - 1	-1450	54	-3,7 %	4	-0,3 %
Total	**-2365**	**87**	**-3,7 %**	**19**	**-0,8 %**

Table 24: Credit union share of increase in BC with service V, 2011-2014 (Based on BCB, 2015c-g)

4.4.6. Credit Union BC Significance by Urbanization Rate and Municipal HDI

Finally, the share of CU BCs out of total correspondents was compared against two different variables – urbanization rate and municipal HDI. In rural areas, people often have more difficulties to access banking infrastructure, and tend to be more financially excluded. Likewise,

HDI is an indicator of development, and as financial inclusion ultimately aims at improving economic development, it is interesting to see whether CU BCs have strong presence in municipalities where development is badly needed.
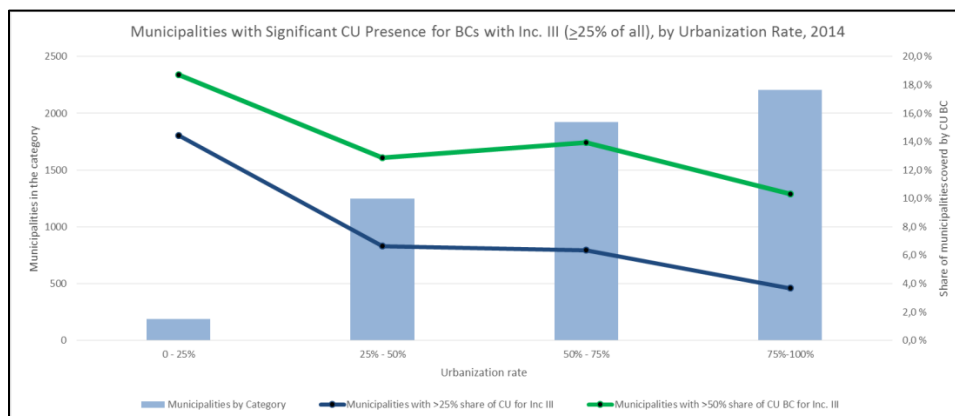
Figure 42: Urbanization rate and municipalities with significant share of CU BCs for service III, 2014 (Based on BCB, 2015c-g and IBGE, 2007-2014)

A detailed table comparing urbanization rate and the share of CU BCs out of total BCs by region and affiliation is available in Appendix 43. It seems that credit union BCs are generally rather equally distributed among the categories of urbanization. When looking at the share of total cities in the category, the lower urbanization categories have a larger representation of CU BCs out of total, as is illustrated in Figure 42.

When it comes to HDI, a detailed table is available in Appendix 44. Overall, one can see that there is a very low coverage of municipalities in the lowest HDI category – out of 911 municipalities, only nine have CU BCs at all. As, illustrated in Figure 43 below, most municipalities with important share of CU BCs belong to the highest HDI groups.
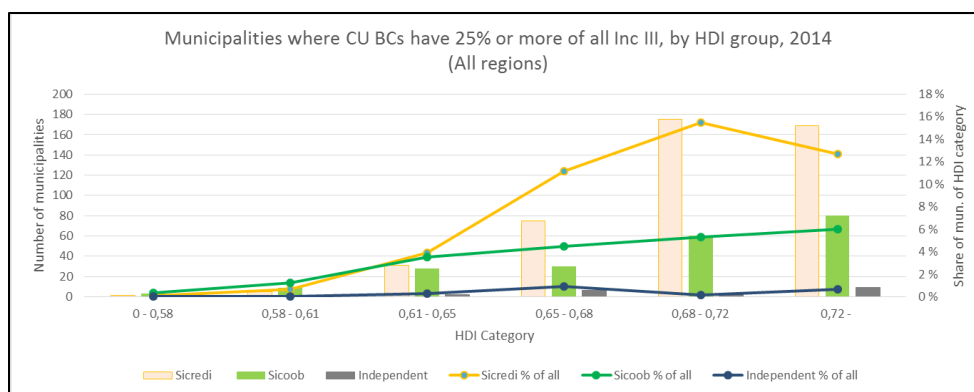
Figure 43: HDI and importance of CU BC by municipality, 2014 (Based on BCB, 2015c-g and ADH, 2013)

As 94% of the municipalities of the lowest HDI group are located in the North and Northeast regions, where there is low CU activity, it is clear that the results are different when observing different regions. Indeed, as illustrated in Figure 44, the coverage of municipalities is much more balanced in the South region, even though only four of the 21 municipalities in the lowest HDI categories have a significant share of BCs.
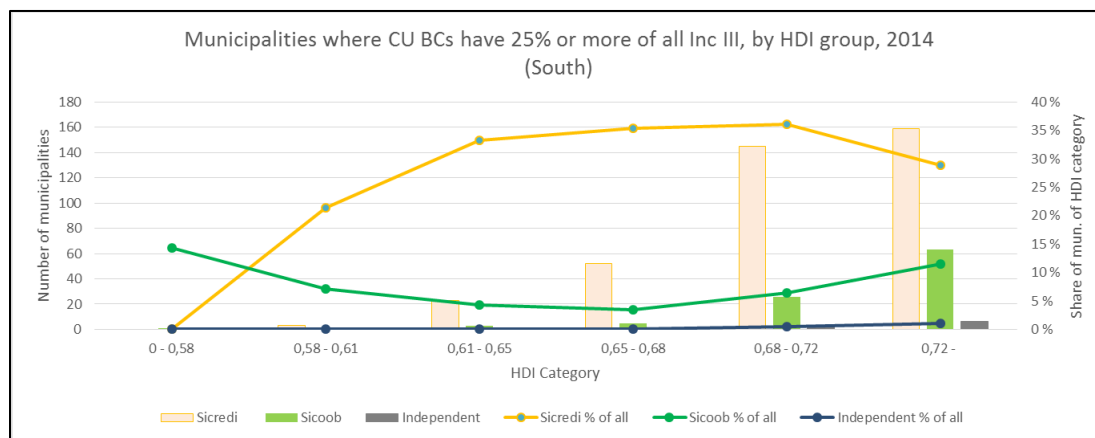
Figure 44: HDI and importance of CU BCs by municipality, South region, 2014 (Based on BCB, 2015c-g and ADH, 2013)

5. Discussion of Results

The results of the research are examined in this part of the thesis. Each step of the research presented above will first be discussed separately, after which general conclusions of the research are presented. For each step, significant contributions to research objectives are detailed separately.

5.1. General Data about Credit Union Correspondents

Credit union correspondents are clearly a marginal phenomenon in the banking correspondent network of Brazil, but they have seen their share increase rapidly. There were 3,054 exclusive credit union correspondents in 2014 (1.6% of all BCs), covering 1,025 Brazilian municipalities (18.4% of all municipalities).

An interesting phenomenon is the rather high degree of occurrence of "multi-bank" correspondents, or so to say non-exclusive CU BCs. These correspondents, representing around 25% of all correspondents in 2014, do not increase access to financial services for the population, and thus only act as a potentially useful tool for credit unions.

In terms of regional distribution, it is quite clear that CU BCs are not widely present in the most financially excluded areas of Brazil, the North and Northeast region. Instead, they are mostly present in the more developed regions of Brazil, mainly in the South region and partly in the Center-West and Southeast regions. This is not surprising though, as credit unions have mostly developed in those regions of Brazil, leaving other regions in a marginal role (BCB, 2015a as well as the World Bank and IMF, 2013).

Disappointingly, credit union correspondents are generally accredited only with bill payment services, and in a minority of cases with credit proposals. Furthermore, only nine correspondents had more than one service assigned to them in 2014, which means that most correspondents focus on only one service – bill payments. This shows that credit union correspondents, as of 2014, were mainly used for transactional services – even more so than BCs of traditional banks. Out of all banking correspondents, around 46% were accredited with credit proposal services in 2014, compared to only 3% of credit union correspondents in the same year. Moreover, other relational services such as savings or investments were practically nonexistent.

This fact not only limits the extent to which CU BCs improve financial inclusion, but also shatters prospects of credit unions performing better than banks at distributing relational services through this channel. The sheer fact that there are almost no credit union correspondents with account opening services implies that credit unions do not use this channel to attract new members. This observation credits the findings of Ramos and Kovaleski (2011) as well as the comments of Coelho (2013), although it does not allow making judgements on the intentions of credit unions.

Nevertheless, one cannot deny the role of transactional services in financial inclusion - as Sanford and Cojocaru (2013) report, facilitating bill payment often translates to decreasing both cost and time required for this activity. Therefore, credit union correspondents still can improve financial inclusion to some extent, while not being as diversified as most regular BCs. The

importance of this improvement can be seen to depend on the general availability of payment services in the municipality, as was studied in the fourth part of the analysis.

Furthermore, the CU BC network seems to be slowly improving, as the growth of banking correspondents with service V was much higher than that of other services between 2012 and 2014, which could be seen as a marginal yet rapid movement towards relational services. As most CU BCs with this service were located in the South region in 2014 and operated by Sicredi-affiliated CUs, the case study of this thesis is particularly relevant for this analysis.

Only around 18% of credit unions active in 2014 had correspondents. Interestingly, most of these credit unions were free admission CUs, pertaining either to the Sicredi or Sicoob networks. Free admission credit unions are likely to be able to accommodate correspondents the easiest, as retailers can become members of the CU, as was implied by the case study in Panambi, as well as the research of Ramos and Kovaleski (2011). Furthermore, at least in theory, free admission credit unions, lacking a common bond requirement, are also the most able to attract new members through correspondents, as anybody can join.

In general, Sicoob has the largest networks in the North, Northeast and Southeast regions, while Sicredi dominates in the South and Center-West regions. Interestingly, 80% of Sicredi-affiliated credit unions in the South region operated correspondents in 2014, while 30% of the ones in the Southeast did. For Sicoob, the respective figures were 35% and 55%. It would be interesting to understand why more credit unions chose to use BCs in the South compared to the Southeast, which is a similar region in terms of financial inclusion and economic development.

In 2014, 200 credit unions had BCs, which represented 17.5% of all credit unions active in that year. However, only 40 of those CUs had more than 30 BCs, while the majority had up to 10 BCs. Few credit unions have large networks of correspondents; BCs are rather used on a small scale. In contrast, 85 credit unions used PAEs in 2014. These electronic access points can be seen as a higher-quality substitute to BCs in cases where the latter offer only bill payment services. It is interesting to notice that these access points were mostly used by CUs in the Southeast region in 2014, and not at all in the South. For Sicoob, the number of PAEs could surpass the number of BCs in a few years, if the growth rate remains the same. Sicredi operated no such access points in 2014, but based on the case study, they already used them in 2015.

This first step of the analysis already gave valuable insight for the second research question of this thesis – the role of CU BCs in financial inclusion. It is clear that due to the limitations of CU BCs, both in terms of geographical reach and scope of services, their improvement of financial inclusion is limited at best, and mostly consists of increase of access to payment services. Access to relational services is improved by CU BCs with service V, but there were only 25 exclusive BCs with this service in 2014. It is already evident that CU BCs do not outperform regular banking correspondents in any way, quite to the contrary.

5.2.   **Panambi Case Study**

The Panambi case study was interesting in many ways for this research, particularly due to the valuable insight it provided on the benefits of banking correspondents to both credit unions and users.

According to the managers of Sicredi in Ijuí, four credit unions had recently merged in order to maintain operations. This is clearly related to the verticalization and search for scale presented by Marques Soares and Duarte de Melo Sobrinho (2008) earlier. According to the management, after adopting free admission in 2003, the credit union has been striving to improve efficiency and service quality to customers, in order to reach service levels similar to a bank.

It is exactly in this context that the management places the usage of correspondents – the free admission structure made it possible to integrate retailers as members, and the requirements of the market called for a higher service level to customers. Correspondents have more flexible working hours and can increase geographical reach. The major reason for the adoption of correspondents seems to have been the removal of waiting lines in branch offices and the increase of efficiency in service provision, while improving customer satisfaction. This also concords with Ramos and Kovaleski's (2009) research and Coelho's (2013) article presented in earlier sections. Managers of commercial banks in Panambi confirmed having been able to reduce their staff through the usage of BCs, which may also have happened in the case of Sicredi.

A contradictory element of the interviews was the fact that the management first claimed to want to increase geographical reach with correspondents, but later affirmed that correspondents need to be located close to a credit union branch in order to facilitate closing the accounts. Generally, the management's way of speaking about correspondents alternated between a discourse on optimal customer service and search for efficiency for the credit union. The impression gotten was that the management was trying to embellish the real motive of BC usage – the improvement of efficiency and increase of profits.

This was equally the case for BCs with credit proposals – the management first confirmed using them in order to improve access to car finance, but later stressed the ability to cross-sell products such as insurance as the primary reason for their usage. Be that as it may, this service is solely available at certain car dealers and promotes only credit for cars. A quick search through the correspondent database indicates that the vast majority of all CU BCs with this service are garages or car dealers, implying that this may be a general Sicredi policy for this service. Credit proposals, while already marginal in size, are not used for economically productive activities such as finance for MSMEs. Nevertheless, one may rightfully argue that people need vehicles to go to work, especially in rural areas, implying that this service is not completely without impact on people's quality of life. Nonetheless, as these services are apparently only offered to existing CU members, they do not really improve access to financial services for anyone else, as the car dealers do not attract new members.

In the light of the case study, Sicredi das Culturas (and perhaps all Sicredi-affiliated credit unions) could be seen as an example of a credit union that has "compromised its social mission" due to growth, as exemplified by Axworthy (1981) and Cazella and Búrigo (2009). The mayor of Panambi, as well as some of the managers of local banks saw Sicredi as just another commercial bank without any important role in community development usually attributed to credit unions. Membership in Sicredi had become significantly easier to acquire due to growth aspirations, as had been the case in Canadian credit unions in the 1970s (Axworthy, 1981).

While correspondents in 2015 were only limited to processing bill payments and in some cases credit proposals, the management affirmed having the intention to increase the scope of services by the end of the year. A constrain to the increase of scope that was mentioned was the

limitedness of the technological platforms used by Sicredi das Culturas – they were based on an intranet and a code reader, and transactions were made in cash only.

Mas (2009) explains banking correspondents as a phenomenon partly made possible through the development of banking technology in Brazil. As Marques Soares and Duarte de Melo Sobrinho (2008) explain, credit union management in Brazil is generally archaic and lacks forward planning and rationality. It is possible that most credit unions, particularly independent ones, do not even possess clearing technology allowing them to use correspondents. The Sicredi and Sicoob networks are viewed as resembling commercial banks the most (Cazella and Búrigo, 2009), and their technological platforms may therefore generally be of higher quality, allowing them to use this distribution channel.

On a similar note, the apparent focus of Sicredi and Sicoob affiliated credit unions on transactional services can be seen as an embracement of the "fifth wave of banking technology" (Cernev, Diniz and Jayo, 2009), aiming at outsourcing low value-added services to free space from branch offices. Nonetheless, it is unclear whether credit unions without correspondents are even willing to outsource bill payment, as they may not be dealing with the sort of waiting line problem presented in this case and mentioned by Coelho in his article (2013). Finding out the real state of things would require a further study of several credit unions.

Anyhow, the case study revealed that the technological platform of Sicredi, despite being potentially better than that of most credit unions, was still not advanced enough to tap the full potential of the BC distribution model. This limitation not only restrained the scope of services of BCs, but also the bill payment activity itself, as payment was done in cash only, requiring correspondents to keep significant cash balances. Moreover, daily limits of transactions were set low due to this constrain, further confining the usage of payment services.

Apart from technological impediments to enlarging scope, Sicredi mentioned the requirement to educate correspondents. Interestingly, Sicredi affirmed working together with correspondents in order to develop "the brand", and to offer more services in the future. The future purpose of correspondents, according to the Sicredi management, was to find new members. An intriguing point made by the management was the fact that their correspondents, as members of the credit union, have incentives to increase profits to the CU, as surplus is shared among members. If and

when technological and education barriers are removed, this alignment of incentives could result in a distribution model superior to that of banks' BCs. If credit unions are able to gather new members through correspondents, it could be a good way for the credit union to improve financial inclusion through growth. Nevertheless, the materialization of this advantage would need to be studied in practice.

When it comes to the improvement of financial inclusion, it was interesting to see that most users paying bills at correspondents were satisfied with the service, particularly due to the saved transportation time and easiness offered by this solution. Lives of those people had become easier through the CU BC, even though it offered only bill payment. This is particularly interesting when taking into account the fact that both Panambi and Ijuí had IFI scores of around 0.9 in 2014, and payments could only be made in cash. If payment services can facilitate many people's lives in a municipality with relatively high financial depth, it implies that CU BCs can in general have some sort of impact in all municipalities, despite their limitation in scope. Indeed, travelling in order to pay bills costs time and money that can be better allocated.

Despite the current usefulness of BCs with payment services, Ivatury (2007) and the Central Bank of Brazil (2015a) see that banking correspondents offering only transactional services may be quickly replaced by mobile or online banking services, or simply be forced to close due to competition from correspondents with wider scopes of services.

The interviews conducted in Panambi gave valuable insight for answering both research questions of this thesis. Firstly, correspondents are useful for credit unions in that they decrease waiting lines, increase geographical reach and can be opened longer, thus increasing customer satisfaction. Furthermore, correspondents save costs in the sense that low value-added services can be outsourced to a third party that is paid on a per-transaction basis. It can thus be said that the motivations of credit unions to open correspondents are rather operational and very similar to the reasons for which commercial banks adopted these distribution channels. It is therefore particularly interesting to note that both Sicredi and Sicoob, the most bank-like credit union groups, have been on the front line of CU BC adoption. It remains unclear whether most credit unions are unable to operate BCs due to technological limitations, or unwilling to do so in the first place.

In terms of improvement of financial inclusion, the Panambi case showed that even in municipalities with relatively high financial depth, increase of access points to payment services can facilitate everyday life. When it comes to credit proposals, being limited to car financing, they only cater to a limited group of people with a very restricted service portfolio. Despite the generally extensive microcredit portfolio of credit unions (Gonzalez and Brito, 2013) and the large credit expansion of the sector in the last years (Banco Central do Brasil, 2015a), visibly no credit was distributed through CU BCs. Credit unions, as of 2015, seemed unable to apply their expertise in finance of proximity to this distribution channel. Notwithstanding, the interviews gave hope that credit union correspondents could see their role in financial inclusion increase in the future.

5.3.   Credit Union Financials

When looking at relations between credit union financials and the usage of correspondents, most important correlations were found with ROE, ROA, size and coverage with services. No relations with other ratios judged important for CU survival by De Carvalho et al. (2011) were found, such as investment in credit operations, treasury investments, or funding by LT deposits.

All of the indicators with which relations were found can be seen to be related to efficiency in one way or another. Indeed, the size of a credit union is important in order to increase scale, as was noted by Garcia and Villa Lhacer (2012) – scale allows to save costs and increase profitability. Similarly, coverage with services refers to the ability of a credit union to cover structural costs with service revenue, and thus to improve the bottom line. Similarly, both ROE and ROA are measurements of profitability, which could be seen as the outcome of operational efficiency.

The usage of correspondents was correlated with these ratios, implying that it could also be related to increased efficiency of credit unions. Correspondents were in general more used by large credit unions with rather high profitability. Overall, while causality could not be proven, if cooperatives were used by efficient credit unions, it implies that they were a result of careful management thinking. Nevertheless, as already discussed, the correlations may also be explained through the technological platforms used by efficient CUs, which make it possible to contract

correspondents. Furthermore, large credit unions may be more likely than small ones to have issues with waiting lines, and therefore more prone to outsource part of their services. As formerly mentioned, this mystery remains unraveled in this research.

The correlations were generally most important for free admission credit unions, as well as for Sicredi-affiliated CUs, while they were weak for others. For Sicoob and mutual credit CUs, for example, the correlations were notably weaker. Indeed, based on the correlations, it seems that generally the most profitable free admission or Sicredi-affiliated CUs had BCs, while this was not necessarily the case for Sicoob-affiliated or mutual credit unions. However, free admission credit unions were generally the most profitable, and most of them used BCs. Out of Sicredi-affiliated CUs, around 80% were free admission credit unions, while this ratio was only 55% for Sicoob in 2014. This certainly could explain why correlations were stronger for Sicredi. Free admission credit unions, being more able to rapidly increase scale than other types of CU, are the most likely to remain competitive and "survive" the *rationalization* of the sector documented by Marques Soares and Duarte de Melo Sobrinho (2008) and the BCB (2015a).

Credit unions that adopt free admission may easily contract BCs to improve efficiency and increase reach. As explained by Marques Soares and Duarte de Melo Sobrinho (2008), credit unions need to improve their cost management. This was also stressed by De Carvalho et al. (2011) and Garcia and Villa Lhacer (2012). Credit union correspondents may allow decreasing costs through the decrease in staff, while yielding revenue from bill payment to cover a part of structural costs.

In relation to the first research question of this thesis, this step of the research could not directly establish causality between BC usage and "usefulness". Nevertheless, the evidence gives reasons to believe that generally more profitable and more efficient credit unions tend to use banking correspondents, implying that they view them as useful for something. There is also reason to believe that BCs improve efficiency, as was explained by managers in Panambi, and that they would therefore be used by CUs willing to professionalize the management of the cooperative. BCs could be seen as part of the "rationalization" movement of the credit union sector presented by Marques Soares and Duarte de Melo Sobrinho (2008). However, one needs to consider the

fact the correspondents may only offer benefits to large credit unions, while they may not be financially sustainable for smaller ones.

5.4. **Correspondents by Municipality**

It is already clear that the main purpose of CU BCs is not to improve financial inclusion but rather to improve the efficiency of credit union management and quality of service. Moreover, the contribution of credit unions to financial inclusion, at least in 2014, limited itself to the increase of POAs to payment services, and to a much lesser extent to the increase of access to car finance in some municipalities.

Notwithstanding, it is apparent that credit union correspondents with payment services can still be relevant for people's lives, also in municipalities with relatively good financial infrastructure such as Panambi and Ijuí. Their importance is likely to be larger in municipalities with low financial depth, as there are less other options for bill payment. The IFI computed for the purposes of this research, despite its limitations, allowed to compare Brazilian municipalities in terms of access to (and usage of) financial services.

CU BCs are generally located in municipalities with higher IFI scores, but there were still 500 of them in 252 municipalities with IFI scores below 0.4, representing 8% of municipalities in this category. This phenomenon is clearly marginal, but potentially relevant at the local level. Outside of the North and Northeast region, credit union correspondents are generally also present in municipalities of the lowest IFI categories.

The concept had been relatively successful in the South region, where up to 55% of municipalities with low IFI (below 0.4) had CU BCs in 2014 and where CUs had accounted for 31.3% of growth in BCs with service III between 2008 and 2014. Both figures are considerable, taking into account the generally low scale of the CU BC phenomenon. In around half of the "low IFI" municipalities of the South, CUs represented 50% or more of all BCs with payment services. In this region, credit union correspondents had also reached importance in rural municipalities as well as municipalities with low HDI.

Credit union BCs for payment services are a marginal phenomenon, but have undeniable importance for the everyday reality of part of the population of the 692 municipalities where they represent 25% or more of those access points, half of which are located in municipalities with low IFI. Furthermore, their importance can be seen to be even larger in the 313 municipalities where CUs represent 50% or more of all BCs with payment service, and even the 30 municipalities where there are only CU BCs for this service. This is significant for the role of CUs in improving access to payment service in those regions, as it lowers transaction costs for the people living in those municipalities.

In contrast, CU BCs with credit proposals had reached significant importance in only three municipalities in 2014, and even those were car dealers offering credit for personal vehicles. The contribution of credit union correspondents to the promotion of relational services remained close to zero in 2014. Despite its high growth in recent years, the service was confined to car dealers as of 2014.

This last step of the analysis yielded valuable understanding for answering the second research question of this thesis, concerning the relation of CU BCs and financial inclusion. Indeed, even though the service scope of CU BCs was limited to services III and V in 2014, they could be seen to have some impact on the everyday life of citizens of several municipalities.

As illustrated in the previous section, in 2014, several million Brazilians lived in municipalities where credit unions had important shares of all BCs with payment services, many of which in municipalities with low general availability of financial services, as conveyed by the IFI. While the improvement of financial inclusion brought by credit union BCs is very limited and concerns but a fraction of Brazil's population, it may be considerable at the local level. Bill payment service does not play a major role in economic development, but its role in the facilitation of everyday life in financially excluded communities is non-negligible. The exact number of people impacted by the proliferation of credit union correspondents could not be measured in the framework of this thesis, but there may well be hundreds of thousands of them.

6. Conclusions

This thesis had a dual research objective - firstly, to understand the usefulness of banking correspondents for credit unions, and secondly, to assess the potential improvement of financial inclusion ensuing from the usage of credit union correspondents in Brazil. Both research questions were answered with the means available for this research, and it is possible to draw some conclusions.

6.1. Usefulness of Credit Union Correspondents

With respect to the first research question, it is clear that banking correspondents are useful for at least a part of active credit unions. Very much like commercial banks, some credit unions use banking correspondents as a low-cost distribution channel that liberates capacity for higher value-added services at branch offices. Furthermore, correspondents are a way for credit unions to increase geographical reach. As of 2014, correspondents were mostly used by credit unions affiliated to networks that are viewed as resembling banks the most – Sicredi and Sicoob. Out of those networks of credit unions, mostly free admission credit unions use correspondents. Credit unions pertaining to networks traditionally more focused on the educational and development mission of the credit union movement, such as Ancosol, did not use correspondents in 2014. Nevertheless, it may also be that these credit unions did not have the required ICT-platforms to use correspondents, or they might not even suffer from the excessive waiting lines that have led other CUs to adopt this solution.

Comparison of credit union financials and usage of banking correspondents over the period from 2012 to 2014 gave indications that correspondents are generally adopted by the largest, most profitable and most efficient credit unions. In this respect, it appears that correspondents play a role in the process of *rationalization* of the credit union sector in Brazil, whereby credit unions seek ways to ensure their survival through the improvement of efficiency and increase in scale. In this process, correspondents are seemingly a way to streamline credit unions' processes, and

the fact that most profitable credit unions use them implies that they are viewed as an important tool for improving efficiency.

The answer to the first research question is that using correspondents *is* useful for credit unions, in particular for the largest ones, as a means to improve operational efficiency and profitability. Simultaneously, smaller credit unions may not see the benefits in using correspondents. Nevertheless, those credit unions may also not be able to use correspondents due to technological constrains, or they may not face the same challenges as larger credit unions in terms of operational capacity.

6.2.   **Credit Union Correspondents and Financial Inclusion**

When it comes to the second research question, the answer is somewhat ambiguous. In the newest related report of the Central Bank of Brazil (2015a), financial inclusion is observed over three dimensions: *availability* (or access), *usage* and *adequacy* (influence on quality of life) of financial services. This framework can be adapted to assess the contribution of credit union correspondents to financial inclusion.

In relation to the access to financial services, credit union correspondents mostly provide access to bill payment services, and to a lesser extent to car financing. Furthermore, credit union correspondents are mostly located in the South region of Brazil, and partly in the Center-West and Southeast regions. The North and Northeast regions, which generally encompass the least developed and most financially excluded areas of Brazil, together have less than three percent of all correspondents. It may thus be said that credit union correspondents are limited both in scope and geographic reach when compared to traditional banking correspondents, and are thus definitely not *better* than traditional banking correspondents in any way. The competence of credit unions in finance of proximity did not manifest itself in the usage of correspondents, at least not as of 2014. However, it may be noted that the distribution channel shows some potential for future development.

While credit union correspondents generally represented less than two percent of all banking correspondents in 2014, in terms of bill payment they had reached certain importance. There

were in general over 1,000 municipalities in Brazil with credit union correspondents in 2014. Over half of all municipalities of the South region had credit union correspondents with payment services in that year, and they represented over 25% of all correspondents with this service in 41% of municipalities of the region. Overall, there were 692 such municipalities in Brazil, 200 of which had low financial depth in 2014. The analysis also demonstrated that in around 300 municipalities, half or more of BCs with payment service were operated by credit unions. The population reached by these access points may be counted in millions, although further research is needed.

The analysis also showed that the number of municipalities with an important share of credit union correspondents had been increasing over the period from 2012 to 2014, and it has potentially continued doing so over subsequent years.

Overall, it can be said that relative to their size, credit union correspondents had a rather important role in improving access to payment services in *certain regions* of Brazil, managing to reach also the most financially deprived municipalities of the South and Central-West regions.

When it comes to correspondents with credit proposal services, despite their rapid growth over the period from 2011 to 2014, they remained a very marginal phenomenon. These correspondents were mostly constrained to the municipalities of the South region with the highest financial depth, and appeared to provide only personal vehicle finance for existing members of Sicredi.

This research did not yield or have access to quantitative data allowing to assess the level of *usage* of the financial services provided by credit union correspondents. Nevertheless, the interviews conducted in Panambi, as well as the sheer growth in usage of financial services give indications that there is a large demand for payment services in Brazilian municipalities. This follows from the fact that the majority of the population does not use internet banking, which would allow easily performing such transactions.

In terms of *adequacy* of financial services (and their impact on quality of life), it is clear that the limited scope of services of credit union correspondents restrains their contribution to the provision of relevant services to citizens. However, as the interviews conducted in Panambi

revealed, people generally found the availability of payment services to increase their quality of life through added convenience and decreased travel times. Certainly, in municipalities where CU BCs have an important share of BCs for payment services, credit union correspondents provide some level of improvement to quality of life.

Credit union correspondents with credit proposal services, in turn, provide a very limited service that is adequate only for people willing to get credit for purchasing a car. While this may be relevant at the individual level, it offers a very small improvement of quality of life overall, particularly since credit is granted to existing CU members only. These BCs do not provide microcredit to small scale entrepreneurs in Brazil, a service that could truly improve the quality of life of many people.

To resume the answer to the second research question of this thesis – as of 2014, credit union correspondents, despite limitations in scope and geographic reach, could be seen to improve financial inclusion to some extent. This improvement was limited to bill payment, but was likely to be relevant to the everyday life of citizens of several hundred Brazilian municipalities. However, due to their limitations, credit union correspondents could not be said to be better than their commercial bank counterparts in any way, quite to the contrary.

Furthermore, it is clear that most credit unions, particularly the Sicredi and Sicoob-affiliated ones, do not contract correspondents in order to improve financial inclusion of the population, but rather in order to improve their own efficiency. The limited improvement of financial inclusion ensuing from this practice is simply a by-product of the search for efficiency. Credit unions most concerned about economic development and financial inclusion, such as the ones pertaining to the Ancosol network, did not use correspondents at all as of 2014, for reasons that were not researched in this thesis.

6.3.   **Final Considerations**

An interesting issue noted in the case study in Panambi was the fact that technology was a major bottleneck in the development of the credit union correspondent network. However, the

interviews conducted in Panambi gave reason to believe that the scope of services could be enlarged in the near future.

Correspondents could be used to attract new members in the future. At least in theory, credit union correspondents have shared interests with credit unions to promote relational financial products. This is due to the fact that, as credit union members, correspondents can get their share of the surplus generated by the union, which is not the case for regular banking correspondents. If credit unions manage to surpass technological and educational bottlenecks, this could be an interesting growth path for credit unions in the future, particularly for free admission ones.

However, it needs to be noted that credit union correspondents might see their services become obsolete through the proliferation of online and mobile banking solutions in Brazil, particularly if scopes of services are not enlarged to include more complex, relational services, such as (productive) credit and insurance. Furthermore, if the service quality of credit union correspondents does not reach higher levels than those of bank BCs, they might always remain "the second best option" for customers, as regular BCs appear to be. Additionally, credit union correspondents may be difficult to educate well enough to be able to overcome the information asymmetry inherent to financial services directed at low-income population groups.

6.4. Limitations of the Research

Seven limitations of this thesis may be identified, some of which have already been introduced throughout the thesis. The first and perhaps most important one is the potential inaccuracy of correspondent registration information in the database obtained for the research. This limits the relevance of longitudinal analysis of the BC data, and casts some doubt over the accuracy of results obtained, even for 2014.

The second limitation is related to the fact that credit union affiliation was only considered for 2014, meaning that longitudinal analysis of banking correspondents by affiliation may be somewhat inaccurate.

The third limitation is related to the Panambi- case study. The interviews conducted for the study were limited to one credit union, active in a micro-region with relatively high financial depth.

This may limit the generalizability of results. Nevertheless, it is important to note that this credit union represented Sicredi, the network with the highest number of banking correspondents over the past years. However, the extent to which the network affects credit union policies regarding BCs remains unclear.

The fourth limitation, still related to the interviews, is the fact that they were analyzed based on audio recordings and notes, which makes it challenging to interpret non-verbal communication and context. Moreover, the truthfulness of interviewed credit union managers cannot be confirmed, as they certainly have incentives to embellish the aspirations underlying their strategic decisions.

The fifth limitation is related to the correlation analysis of credit union data, in particular to the potential lack of independence of observed variables. As the variable used for correlations was "BC Intensity" [$n_{BC}/\log(\text{assets})$] and not simply the number of correspondents, the variables are not entirely independent, particularly when observing the relation between BC Intensity and CU Size. Nevertheless, the relations obtained seemed to be similar when using only the number of BCs. Using BC Intensity instead of the absolute number of BCs was judged relevant in order to take the size of the CU into account, as 10 correspondents could be a lot for a small CU, while being little for a large one.

The sixth limitation is related to the municipal IFI score computed in the framework of this research. This model does not allow comparisons between years, due to the methodology used to correct municipal values of credit and deposits. In addition, the weights assigned for the IFI strongly affect the results. Notwithstanding, the index allowed comparing Brazilian municipalities in relation to each other, which gave valuable information when comparing the location of BCs.

The seventh limitation of this study is the fact that the exact locations of credit union correspondents within municipalities were not assessed, which does not give an accurate image of the true saving in transactional costs brought to the population by the correspondents.

6.5.   Avenues for Future Research

Several potential paths could be explored in order to deepen understanding of credit union correspondents and overcome limitations of this thesis.

A future research could reach more pertinent results by engaging in a case study of multiple credit unions in different regions of Brazil, using internal BC registration data and financials over a longer period. This sort of study could involve credit unions of different affiliations and types with and without correspondents. A case study based on surveys, focus groups and analyses of financials with such a sample could be particularly pertinent to reveal the reasons that lead to the adoption of correspondents by credit unions, as well as to the usefulness of correspondents to the institutions. Such a study could also reveal the role that technological platforms play in the decision of credit unions to open banking correspondents. Furthermore, it would be interesting to understand how the practicalities of the "BC contract" differ between different types of credit unions – such as between rural and free admission ones.

Another interesting type of study would be to follow the way Sicredi "develops" its relationship with its correspondents, and whether or not they manage to build an effective distribution channel for promoting relational services through the BC. A topic of interest would be to assess the level of shared profits potentially gained by the BC member, in order to evaluate whether this sort of partnership truly has better potential for aligning incentives of the institution and the correspondent, as was claimed by the CU managers interviewed in the framework of this thesis.

An third, minor type of study could involve a survey of credit unions to find out reasons for the closing of correspondents. Since 2003, 20% of all opened credit union correspondents have been closed for reasons unspecified in the registry database. This information could yield valuable information on the nature of partnerships between credit unions and retailers or other actors operating as correspondents.

A fourth type of study could improve the understanding of the impact of credit union correspondents with payment services through a detailed study of the location of BCs. This could be done using geocoded data, and would entail assessing the proximity of these banking correspondents to financial infrastructure with similar services. Such an analysis would allow

identifying the areas in which credit union correspondents are truly decreasing distance to payment services for the population.

All in all, it may be said that there is still room for increasing knowledge of this little understood phenomenon of the Brazilian correspondent network. The general importance of branchless banking and the promise of the credit union sector for financial inclusion in the world's fifth largest country make credit union correspondents a valuable topic for further studies.

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Appendices

Appendix 1: Index of Financial Inclusion (IFI) formula by Sarma (2012)

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i} \qquad (1)$$

where

w_i = weight attached to the dimension i, $0 \le w_i \le 1$

A_i = actual value of dimension i

m_i = lower limit on the value of dimension i, fixed by some pre-specified rule.

M_i = upper limit on the value of dimension i, fixed by some pre-specified rule.

$$X_1 = \frac{\sqrt{d_1^2 + d_2^2 + .. + d_n^2}}{\sqrt{(w_1^2 + w_2^2 + ... + w_n^2)}} \qquad (2)$$

$$X_2 = 1 - \frac{\sqrt{(w_1 - d_1)^2 + (w_2 - d_2)^2 + .. + (w_n - d_n)^2}}{\sqrt{(w_1^2 + w_2^2 + ... + w_n^2)}} \qquad (3)$$

$$IFI = \frac{1}{2}\left[X_1 + X_2\right] \qquad (4)$$

Appendix 2: Definitions of different Points of Access (POA) (Banco Central do Brasil, 2015a)

Advanced Service Point (PAA): Simplified bank branch office
ATM: Automatic Teller Machine, self-service point of access for a limited amount of services
Branch: cannot be mobile or temporary – offers the largest variety of banking services
Banking Correspondent (BC): Third parties contracted by financial institutions or other institutions to offer a predetermined amount of services in the name of the institution
Credit Union Service Point (PAC): Can be a credit union seat or credit union service point
Electronic Service Point (PAE): a range of ATMs for self-service
Point of Service (POS): Smaller electronic installation used by commercial places to receive payments by card
Service point (PAB): can be mobile, services selected by the financial institution

Appendix 3: Types of Services offered by banking correspondents (Banco Central do Brasil, 2011b)

I: Opening of accounts (deposit, term and savings)
II: Receipts and payments relative to accounts as well as application and discharges of investment funds
III: Receipt of payments and similar transactions
IV: Execution of payment orders for the contractor
V: Reception and forwarding of loan and financing requests
VI: Analysis of credit and registration
VII: Execution of collection services (Revoked in 2011)
VIII: Reception and forwarding of credit card emission requests
IX: Foreign exchange operations
X: Other activities at the discretion of the Central Bank of Brazil

Appendix 4: Evolution of the density of bank branches by municipality in Brazil (Banco Central do Brasil, 2015a)
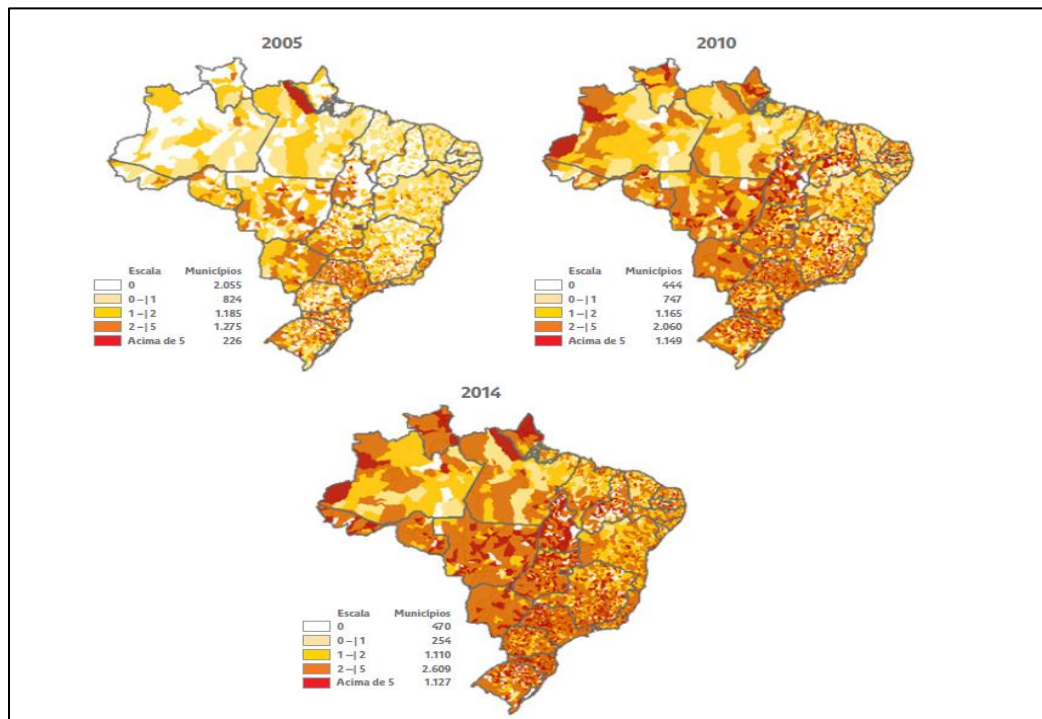
Appendix 5: Growth rate of bank branches in Brazilian regions 1991-2000 (Banco Central do Brasil, 2015c)
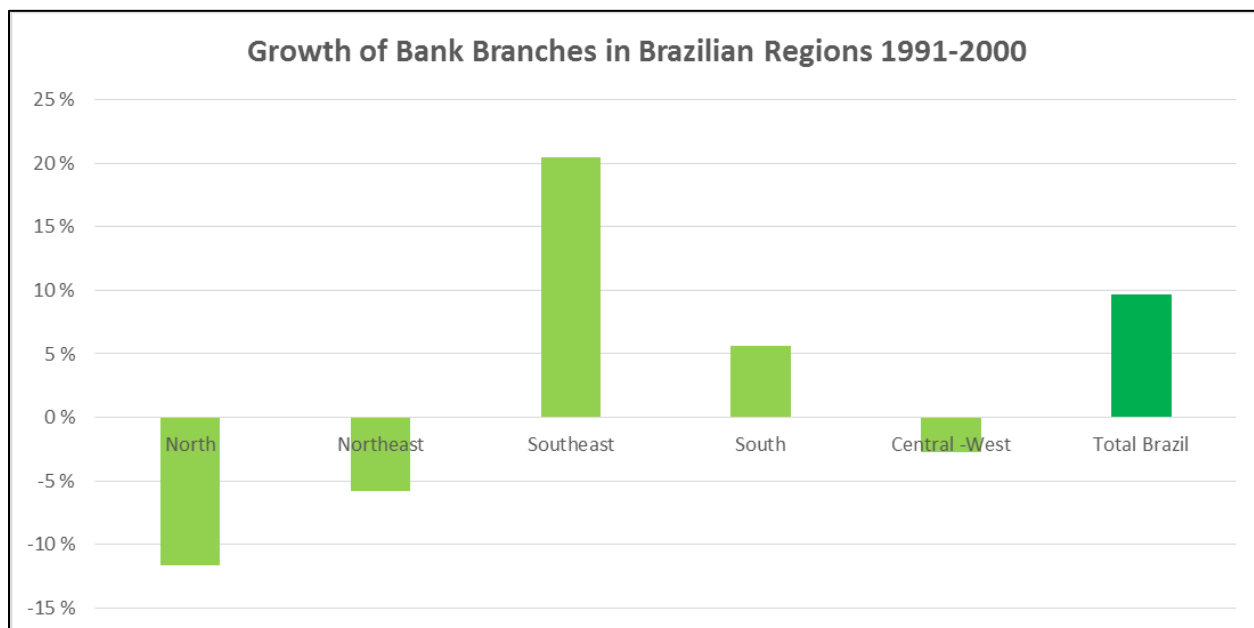
Appendix 6: Evolution of Points of Access (POA) to banking services in Brazil 2010-2014

(Based on Banco Central do Brasil, 2015a)
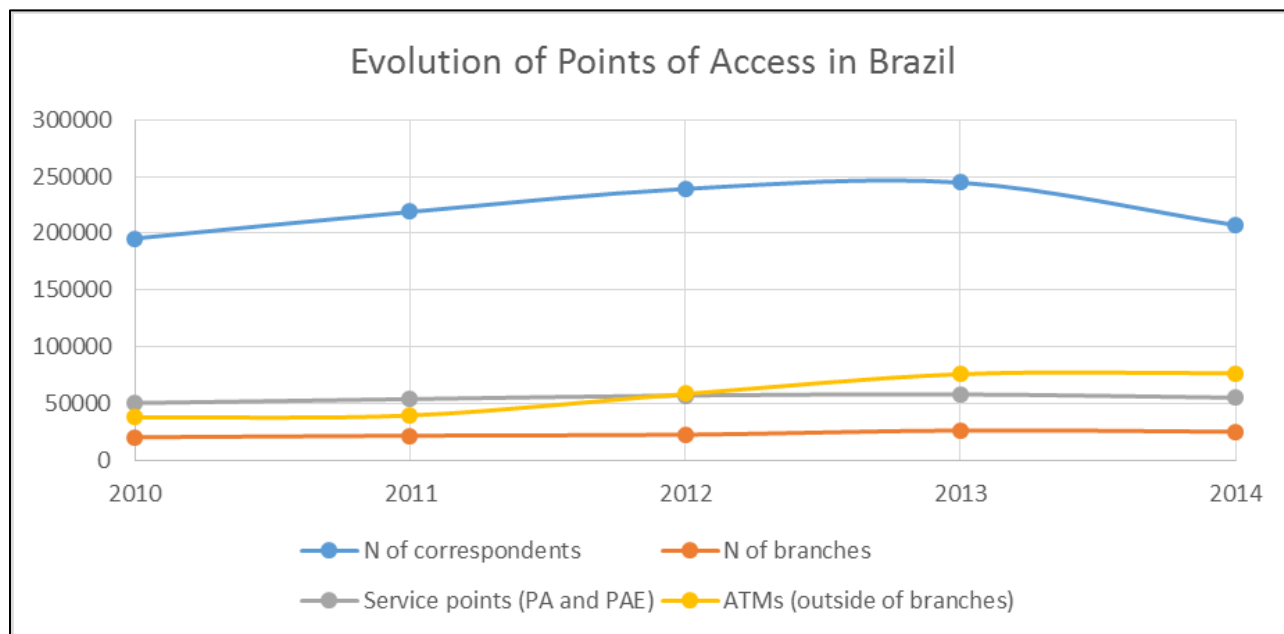
Appendix 7: Density of Points of Access (POA) [except ATMs] (per 10 000 people) by region in Brazil 2010-2014 (Based on Banco Central do Brasil, 2015a)
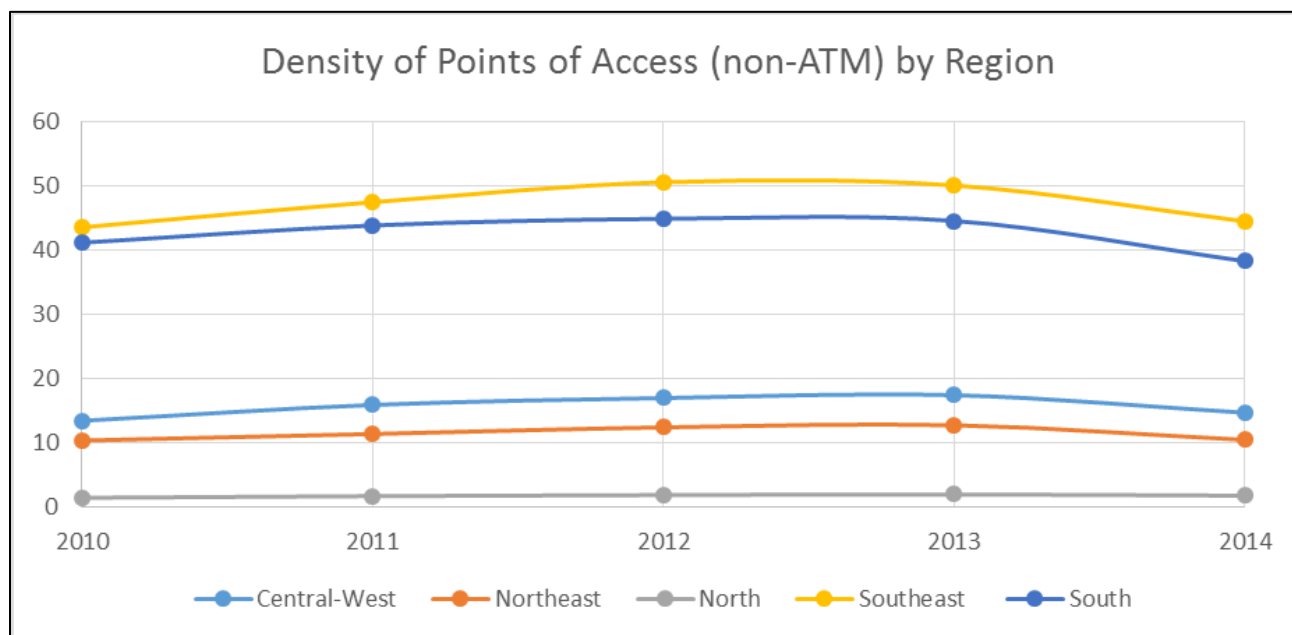
Appendix 8: Growth of the number of Points of Access (POA) [except ATMs] by region in Brazil 2010-2014 (Based on Banco Central do Brasil, 2015a)
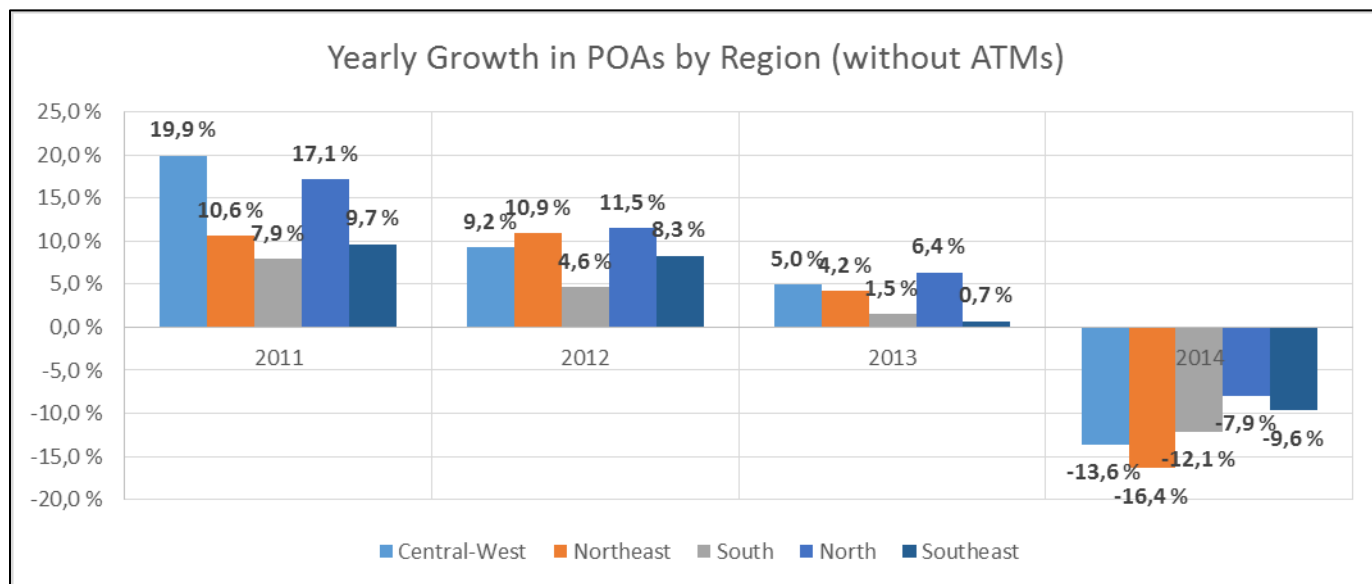
Appendix 9: Comparison of credit unions and other financial institutions (based on World Council of Credit Unions, 2014)

	Credit Unions	Commercial Banks	Other Microfinance Institutions (MFIs)
Structure	Not-for-profit, member-owned financial cooperatives funded largely by voluntary member deposits	For-profit institutions owned by stockholders	Institutions typically funded by external loans, grants and/or investors
Clientele	Members share a common bond, such as where they live, work or worship. Service to the poor is blended with service to a broader spectrum of the population, which allows credit unions to offer competitive rates and fees.	Typically serve middle-to-high income clients. No restrictions on clientele.	Target low-income members/clients, mostly women, who belong to the same community.
Governance	Credit union members elect a volunteer board of directors from their membership. Members each have one vote in board elections, regardless of their amount of savings or shares in the credit union.	Stockholders vote for a paid board of directors who may not be from the community or use the bank's services. Votes are weighted based on the amount of stock owned.	Institutions are run by an appointed board of directors or salaried staff.
Earnings	Net income is applied to lower interest on loans, higher interest on savings or new product and service development.	Stockholders receive a pro-rata share of profits.	Net income builds reserves or is divided among investors.
Products & Services	Full range of financial services, primarily savings, credit, remittances and insurance.	Full range of financial services, including investment opportunities.	Focus on microcredit. Some MFIs offer savings products and remittance services.
Service Delivery	Main office, shared branching, ATMs, POS devices, PDAs, cell phones, Internet	Main office, shared branching, ATMs, POS devices, PDAs, cell phones, Internet	Regular visits to the community group

Appendix 10: Comparison of credit unions and banks (Translated from Soares & Sobrinho, 2008)

Banks	Credit Unions
Ownership is private and aims at maximizing profit	Ownership is social and does not seek profit
May sell equity to third parties	May not tranfser ownership to third parties
Members of the Board of Directors are owners or hired from the market	Members of the Board are credit union members
The user is just a client	The user is an owner of the company and has decision making power in the operationa policy and has to be treated equitably
In the relation with the clients, priority is in cost reduction	The investment and payment capacity of the credit union members is analyzed
Prioritize large urban centers	Also act in more remote communities
Impersonal service, based on financial reciprocity, and focus only on the economic dimension	Mostly personal service to the member, with more social relationships between directors, workers and members. The socio-economic aspect dominates
Fragile link with the society	Link with the society, where attracted ressources are applied
Focus on market competition	Develop through cooperation
The remuneration of shareholders is proportional to their share of equity	The surplus of the fiscal year can be distributed between members based on the proportion of services used, or reinvested in cooperative funds
Are a potential source of systemic risk to the financial sector	The risks and losses are borne by the members

Appendix 11: Credit union membership penetration in Latin America in 2014 (Based on WOCCU, 2014)

Appendix 12: Credit union penetration by region in Brazil (Based on Banco Central do Brasil, 2015a)
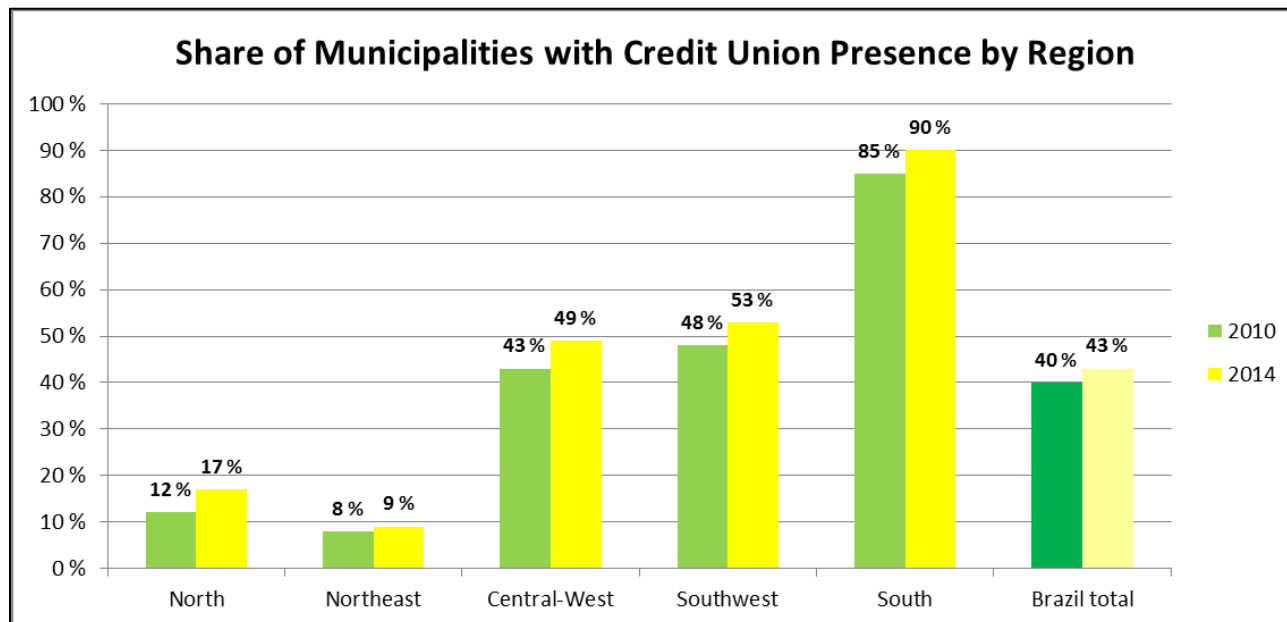
Appendix 13: Credit unions: share of total credit to physical persons by region in Brazil (Based on Banco Central do Brasil, 2015a)
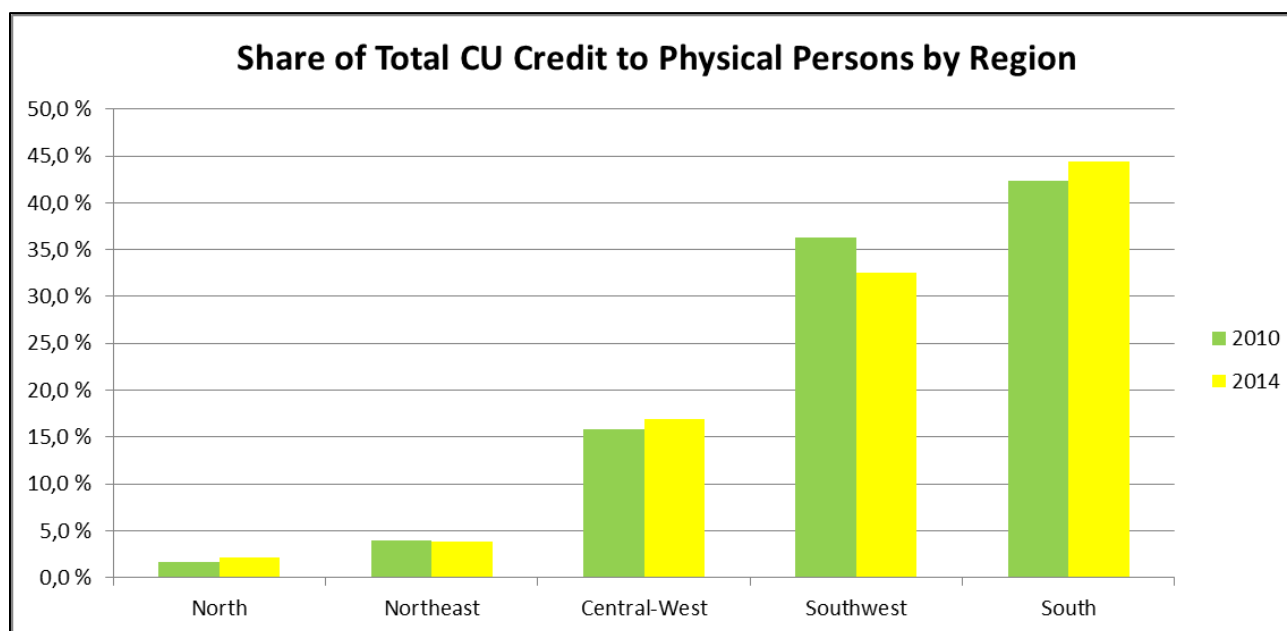
Appendix 14: Penetration rate of credit unions by region in 2012 – Share of population that is member of a credit union (Based on Banco Central do Brasil, 2015a)
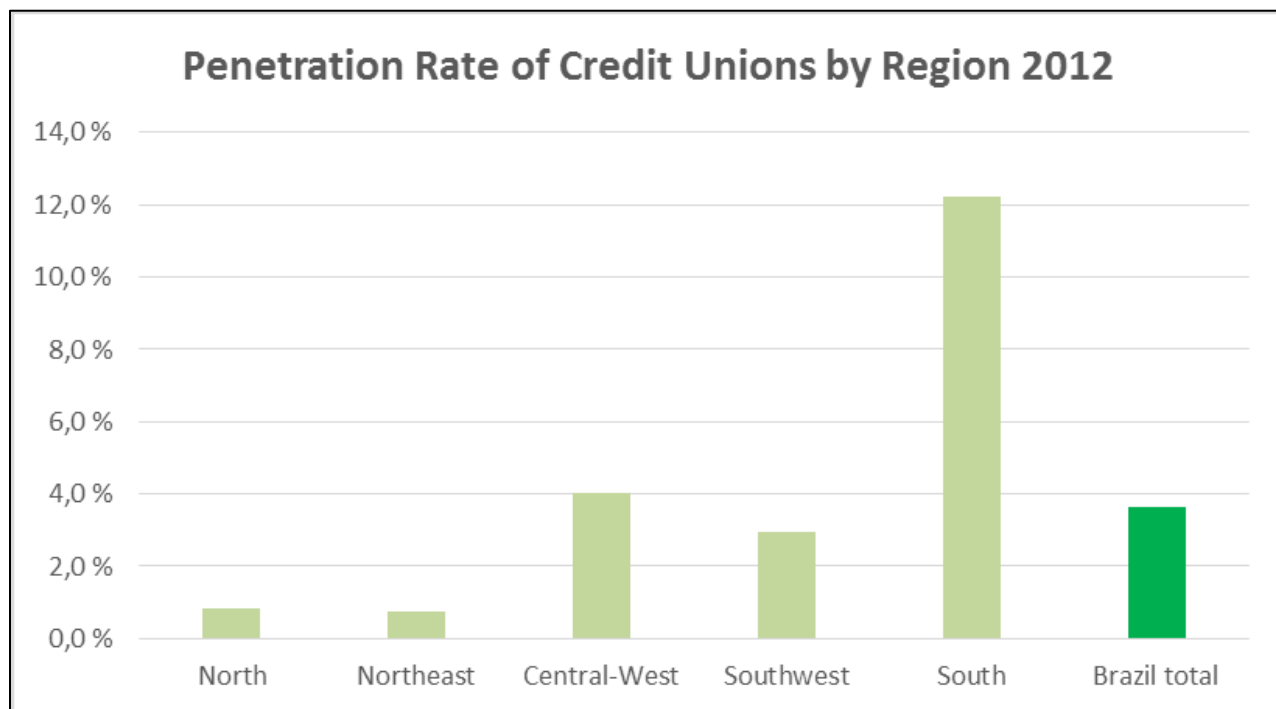
Appendix 15: Brazilian credit union system structure (Based on Marques Soares and Duarte de Melo Sobrinho, 2008)
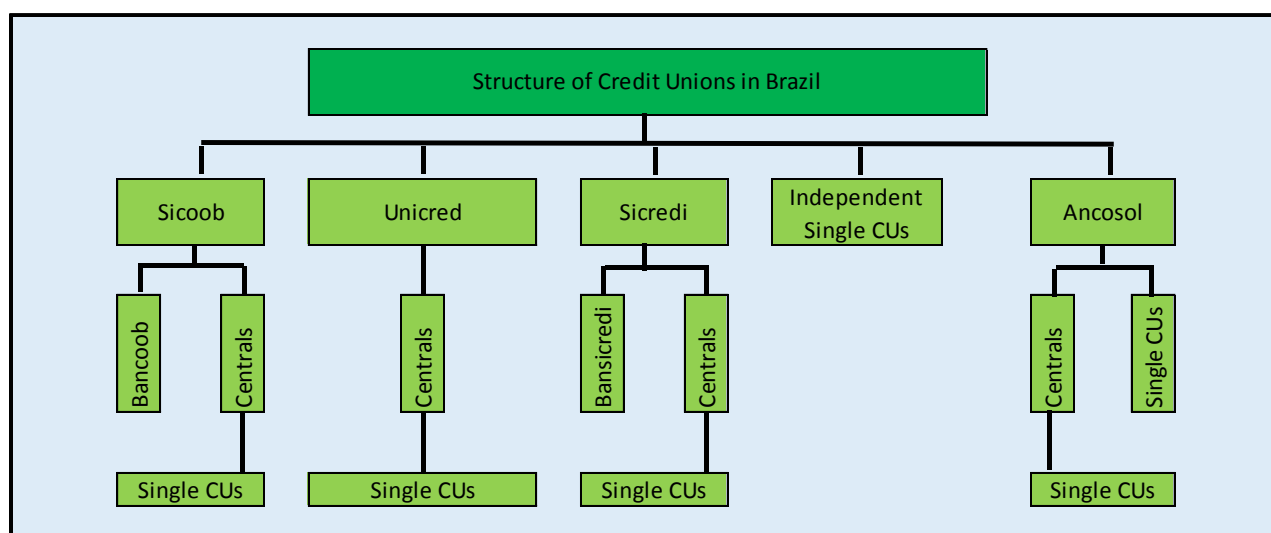
Appendix 16: Formulas used for financial ratios of credit unions (De Carvalho et al., 2011)

Ratio	Calculation Method	Correlation with survival of CU
Investments in Credit Operations	Credit assets / Operating Assets	Positive
Treasury Investments	Treasury / Operating Assets	Positive
Banking Profitability	Operating Income/Operating Expenses	
Coverage with Services	Services Revenue / Structural Expenses	
Operational Efficiency	Operating Profit / Administrative Expenses	
Banking Margin	Operating Profit / Total Revenue	
Other Revenue Share	Other Operating Revenue / Total revenue	Negative
Service Revenue Share	Service Revenue / Total revenue	Negative
Credit Volume	Credit Operations / Equity	
Size	logarithm of Total Assets	Positive
Return on Assets (ROA)*	Net Profit/(Total Assets$_n$ + Total Assets$_{n-1}$)/2	
Return on Equity (ROE)*	Net Profit/(Equity$_n$ + Equity$_{n-1}$)/2	
Funding by Long-Term Deposits**	Long-Term Deposits / Total Deposits	Positive

* ROA and ROE formulas changed from De Carvalho et al (2011) to use the average of Assets and Equity (respectively) for the period observed instead of the value at the end of the period solely

** Funding by Long-Term Deposits used instead of Funding by Time Deposits and Funding by Demand Deposits, due to data availability

Appendix 17: Methodology for redistribution of debit and credit by municipality

It is assumed that banking actors distribute a certain percentage of their credit and attract a certain percentage of their deposits through the PAAs, PABs and PAEs and BCs they operate. This percentage is set at 20% for credit, and 15% for deposits. The total amount of credit and deposits in the country remains the same, only its distribution among municipalities changed.

Of all credit distributed through other channels, it is assumed that 80% is distributed through PABs and PAAs together, 10% through PAEs and 10% through BCs with service V. Similarly, for deposits, 90% are distributed through PABs and PAAs, 5% through PAEs and 5% through BCs with either service I or II. This difference aims at reflecting the relative difficulty of banks to attract deposits, as well as their willingness to promote payroll credit through all channels.

For each mesoregion, an average number of credit and deposits to be distributed through other channels is calculated for each channel type (PAB and PAA, PAE & BC). Only financial services channels of commercial banks are considered, as the statistics of deposits and credit by municipality only contain this data. Finally, for each municipality the resulting amount of credit and deposit is calculated in the following manner:

Credit by municipality $= 80\% * C_0 + C_{PAB/PAA} * n_{PAB/PAA} + C_{PAE} * n_{PAE} + C_{BC} * n_{BCInc.V}$

C_0 = Original amount of credit in municipality
$C_{PAB/PAA} = C_x * 80\%$ / All PAB & PAA in the Mesoregion
$C_{PAE} = C_x * 10\%$ / All PAE in the Mesoregion
$C_{BC} = C_x * 10\%$ / All BC with Inc. V in the Mesoregion
$C_x = 20\%$ * Sum of Credit in Mesoregion
$n_{PAB/PAA}$ = Number of commercial bank PAB/PAA in the municipality
n_{PAE} = Number of commercial bank PAE in the municipality
$n_{BCInc.V}$ = Number of commercial bank BC with service V in the municipality

Deposits by municipality $= 80\% * D_0 + D_{PAB/PAA} * n_{PAB/PAA} + D_{PAE} * n_{PAE} + D_{BC} * n_{BCInc.I \& II0}$

$D0$ = Original amount of deposits in municipality
$D_{PAB/PAA} = D_x * 90\%$ / All PAB & PAA in the Mesoregion
$D_{PAE} = D_x * 5\%$ / All PAE in the Mesoregion
$D_{BC} = D_x * 5\%$ / All BC with Inc. V in the Mesoregion
$D_x = 15\%$ * Sum of Credit in Mesoregion
$n_{PAB/PAA}$ = Number of commercial bank PAB/PAA in the municipality
n_{PAE} = Number of commercial bank PAE in the municipality
$n_{BCInc.I\&II}$ = Number of commercial bank BC with services I or II in the municipality

Appendix 18: Timeline plan of interviews in Panambi (Interviews performed by Leonardo Fujisima Yada and Melina Chen Padoin)

Timeline of Panambi Project, 2015	D1 5/7	D2 6/7	D3 7/7	D4 8/7	D5 9/7	D6 10/7	D7 11/7	D8 12/7	D9 13/7	D10 14/7	D11 15/7	D12 16/7	D13 17/7	D14 18/7	D15 19/7	D16 20/7	D17 21/7	D18 22/7	D19 23/7	D20 24/7	D21 25/7
Phase 1: Trip and field inspection	■																				
Travel to Panambi		■																			
Contact with Sicredi			■																		
Contact with City Hall - Interview with Mayor			■																		
Transcript of interview with Mayor				■																	
Contact with banks					■																
Contact with banks and Trade Association					■																
Travel to Sicredi Ijuí						■															
Interview with directors of Sicredi						■															
Interview with correspondent at the Labor Union						■															
Interview with three users of the Labor Union correspondent									■												
Ask regulatory and charter documents from Aline (Sicredi)									■												
Return to Banco de Brasil									■												
Visit to Bozano - 2 people										■											
Visit of correspondents in Panambi - 2 people											■										
Plan interviews with car dealers with Everton											■										
See agenda with Everton for interviews											■										
Second visit of correspondents in Panambi (6 users)												■									
Interview with Mr. Elmo													■								
Interview with Everton													■								
Plan of visit to São Valério													■								
Interviews with two car dealers																■					
Visit of São Valério (Interview of correspondent and 2 users)																	■				
Schedule a visit to two more correspondents																		■			
Second visit to correspondents																			■		

Appendix 19: Interviewed people and questions prepared for interviews in Panambi

(Interviews performed by Leonardo Fujisima Yada and Melina Chen Padoin)

Stakeholders	• Mayor of Panambi • Head of local Chamber of Commerce
Sicredi	• President in Ijuí and Counsellor • Vice-President (ex-President)
Correspondents	• Rural Worker's Union Ijuí • Jewelry Store • Farming Store
Users of Correspondents	• 7 users at the Worker's Union (Four women and three men) • 4 users at the Jewelry Store (Three women, one man)
Bank managers	• Banrisul Manager • Santander Manager • Bradesco Manager • Caixa Manager

Questions for the project "Local Connection" (Original questions in Portuguese follow)

Credit Unions

1. Could you tell us about the history of the credit union (foundation, who took part)?
2. What was the purpose of creation of the credit union?
3. How is the credit union structured (employees, members, branches)?
4. What is the area of activity of the credit union?
5. What services does the credit union offer?
6. When did the credit union decide to open correspondents?
7. What were the motives that led to the use of banking correspondents?
8. What are the services most used by the customers of the correspondents?
9. How is the relation between the credit union and the banking correspondents?
10. How did the opening of banking correspondents affect the credit union?
11. Does the credit union have a strategy regarding the expansion of the correspondent network?
12. What platform and technology is used to connect the credit union with the correspondents?
13. Who is responsible for support to the correspondents? How does this work?
14. Is it necessary to be a member to receive credit from the credit union?
15. How can one become a member of the credit union?
16. Where specific credit models developed for banking correspondents?

17. What is the volume of credit distributed through the correspondents? Did the volume of credit generally increase through the adoption of correspondents?
18. Is there training for the correspondents to promote credit?

Correspondents

1. Since when do you act as a banking correspondent?
2. Why did you choose to become a banking correspondent?
3. What are the perceived advantages in being a banking correspondent?
4. What are the daily difficulties that you face as a banking correspondent?
5. What kind of relationship do you maintain with your customers?
6. What banking correspondent service are you authorized to do?
7. What are the most used services? Why do people use correspondents?
8. Do people come to the correspondent to apply for loans?
9. What are generally the reasons that lead people to apply for a loan? ¨
10. Did you notice any change in the number of people visiting your facility since you became a banking correspondent?
11. Are you a correspondent of more than one bank or credit union? Which ones?
12. What support do the banks or credit unions provide for your daily operations?
13. Do you receive some type of training?
14. Who provides support when you have problems with the equipment?
15. Do you hire people for promotion of loans outside your facility (so called *pastinhas)?*
16. How much is your working capital per month, approximately?

Banks

1. Does your bank have banking correspondents in the region?
2. What is your perception of credit unions?
3. Credit unions recently started operating banking correspondents. Did this affect your bank in any way?
4. Is there a strategy of the bank in the region regarding the use of banking correspondents?

People on the streets and at correspondent outlets

1. Do you know what banking correspondents are?
2. Do you use the services of banking correspondents?
3. Why do you use the services of the correspondent?
4. Do you receive any sort of government transfers (Bolsa Família, retirement, unemployment compensation)?
5. Do you feel that a local business or familiar person acting as a correspondent is more trustworthy?
6. Do you consider this system efficient? Are there any flaws?
7. How were the same operations done before the appearance of banking correspondents?

8. What did the correspondents change in your daily lives (shorter distances, faster service…)?
9. Are you a member of any credit union? Why?
10. Can you notice any difference between the correspondents of banks and credit unions?
11. Have you already gotten a loan from a credit union through a correspondent? Why? For what purpose?
12. Which credit unions are you familiar with in your region?

Public administration bodies

1. What is the history of the municipality of Panambi?
2. What difficulties does the administration of the municipality face?
3. What is the socioeconomic profile of the municipality?
4. What are the major financial difficulties of the citizens of Panambi?
5. In your view, what is the role of credit unions in the municipality?
6. In your view, what is the role of banking correspondents in the municipality?

Perguntas para o Projeto Conexão Local

Cooperativas

1. Você pode contar a história de cooperativa (fundação, quem participou)?
2. Qual foi o proposito da criação da cooperativa?
3. Como a cooperativa está estruturada (funcionários, sócios, pontos de atendimento)?
4. Qual é a área de atuação da cooperativa?
5. Quais são os serviços oferecidos pela cooperativa?
6. Quando a cooperativa decidiu por abrir correspondentes bancários?
7. Quais motivos levaram à cooperativa abrir correspondentes?
8. Quais são os serviços mais usados pelos clientes dos correspondentes?
9. Como é a relação entre a cooperativa e os correspondentes bancários?
10. Qual foi o impacto percebido para a cooperativa com a abertura dos correspondentes bancários?
11. Há alguma estratégia da cooperativa em relação à ampliação da rede de correspondentes bancários?
12. Qual plataforma e tecnologia são utilizadas para conectar a cooperativa com os correspondentes?
13. Quem é responsável pelo suporte aos correspondentes? Como funciona?
14. É necessário ser sócio para conseguir crédito na cooperativa?
15. Como uma pessoa pode ficar sócia da cooperativa?
16. Foram desenvolvidos modelos específicos de crédito para os correspondentes bancários?
17. Qual é o volume de crédito disponibilizado via correspondente? Aumentou com a utilizam dos correspondes?
18. Há treinamento para os correspondentes venderem crédito?

Correspondentes

1- Desde quando é um correspondente bancário?
2- Por que escolheu ser um correspondente bancário?
3- Quais são as vantagens percebidas por ser um correspondente bancários?
4- Quais são as dificuldades no dia-a-dia de um correspondente bancário?
5- Como é a relação com os seus clientes?
6- Qual serviço de correspondente bancário você está autorizado a fazer?
7- Quais são os serviços que as pessoas mais utilizam? Para que as pessoas utilizam o correspondente?
8- As pessoas procuram o correspondente para fazer empréstimos?
9- Quais são, em geral, os motivos que fazem as pessoas pegar um empréstimo?
10- Você percebeu alguma alteração no número de pessoas que vem ao estabelecimento após ser um correspondente bancário?
11- Você é correspondente de mais de um banco ou cooperativa de crédito? Quais?
12- Qual o apoio fornecido pelos bancos/cooperativas no seu dia-a-dia?
13- Você recebe algum tipo de treinamento?
14- Quem dá suporte quando você tem problemas com os equipamentos?
15- Possuem alguma pessoa terceirizada para venda de emprestimos ("pastinha")?
16- De quanto aproximadamente é o capital de giro por mes?

Bancos
1. O Banco possui correspondentes bancários associados na região?
2. Qual é a visão do banco em relação às cooperativas de crédito?
3. As cooperativas passaram a ter correspondentes bancários ha pouco tempo, isto impactou de alguma forma o banco?
4. Há alguma estratégia do banco na região quando ao uso de correspondentes bancários?

Pessoas da Cidade

1- Sabe o que são os correspondentes bancários?
2- Você utiliza os serviços do correspondente bancário?
3- Por quê você usa os serviços do correspondente?
4- Recebe algum tipo de auxilio governamental (bolsa família, aposentadoria, seguro desemprego)?
5- Considera mais confiável o correspondente ser um comércio da regiao ou uma pessoa conhecida?
6- Considera o sistema eficiente? Há alguma falha?
7- Como eles faziam as mesmas operações antes de usar o correspondente?
8- O que o correspondente mudou no seu dia-a-dia (distância menor, serviço mais rápido)?
9- Você é associado de alguma cooperativa de crédito? Por quê?
10- Você percebe alguma diferença entre as correspondentes das cooperativas e dos bancos?
11- Você já contratou crédito da cooperativa pelo correspondente? Por quê? Para quê?
12- Quais cooperativas de credito conhece na sua região?

Perguntas para Administração pública

1. Qual é a história do município de Panambi?
2. Quais as dificuldades enfrentadas pela administração do município?
3. Qual é o perfil socioeconômico do município?
4. Quais são as maiores dificuldades financeiras dos habitantes de Panambi?
5. Na visão da administração pública, qual é o papel das cooperativas de crédito do município?
6. Na visão da administração pública, qual é o papel das cooperativas de crédito no município?
7. Na visão da administração pública, qual é o papel dos correspondentes bancários no município?

Appendix 20: Descriptive statistics of the distribution of CU BCs among Credit Unions, as well as on the Municipal level (Based on Banco Central do Brasil, 2015g)

Descriptive Statistics for CU BCs by Credit Union

Descriptive statistical figures for BCs by credit union													
Year	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
n of CU BC	12	17	17	20	33	103	1 002	1 651	2 105	3 525	3 891	4 089	4 198	6,0 %
n of CU with BC	3	5	5	7	18	41	95	103	115	191	194	198	200	1,5 %
Average of BC/CU	4,0	3,4	3,4	2,9	1,8	2,5	10,5	16,0	18,3	18,5	20,1	20,7	21,0	4,4 %
Std. Dev	0,5	0,6	0,6	0,7	0,7	1,5	7,2	11,8	15,2	24,1	25,9	26,7	27,8	4,8 %
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0,0 %
Max	8	9	9	9	9	16	45	69	96	246	246	247	247	0,1 %
n CUs that closed all BCs	0	0	0	0	0	2	6	8	10	9	10	12	12	10,1 %

Descriptive statistical figures for exclusive BCs by credit union													
	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
n of exclusive CU BC	12	17	17	20	28	93	782	1 232	1 588	2 585	2 737	2 822	2 974	4,8 %
n of CU with exclusive BC	3	5	5	7	15	35	90	99	108	164	166	173	177	2,6 %
Average of exclusive BC/CU	4,0	3,4	3,4	2,9	1,9	2,7	8,7	12,4	14,7	15,8	16,5	16,3	16,8	2,2 %
Std. Dev	0,5	0,6	0,6	0,7	0,7	1,5	5,8	9,1	11,8	20,2	21,1	21,1	22,3	3,3 %
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0,0 %
Max	8	9	9	9	9	16	35	52	70	231	231	232	232	0,1 %
n CUs that closed all BCs	0	0	0	0	0	0	0	128	96	0	1	0	0	0,0 %

Descriptive Statistics for CU BCs by Municipality

Descriptive statistical figures for all CU BCs by municipality													
Year	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0,0 %
Max	4	4	4	4	4	5	17	25	33	33	36	34	34	1,0 %
Average	0,0	0,0	0,0	0,0	0,0	0,1	0,8	1,3	1,7	2,8	3,1	3,2	3,3	5,9 %
Std. Dev	0,2	0,2	0,2	0,2	0,2	0,4	1,5	2,2	2,8	3,8	4,0	4,0	4,1	2,7 %

Descriptive statistical figures for exclusive CU BCs by municipality													
Year	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0,0 %
Max	4	4	4	4	4	5	13	18	23	27	28	29	29	2,4 %
Average	0,0	0,0	0,0	0,0	0,0	0,1	0,7	1,0	1,3	2,2	2,3	2,4	2,5	4,8 %
Std. Dev	0,2	0,2	0,2	0,2	0,2	0,4	1,2	1,7	2,1	3,0	3,1	3,1	3,2	2,7 %

Appendix 21: Number of municipalities with operational credit union correspondents by region

Credit Union Correspondents with more than one assigned service in 2014									
Region	Correspondent ID code	Service offered							
		I	II	III	IV	V	VII	VIII	IX
Southeast	3143401/21310222			x	x				
Southeast	3170107/8685007		x	x					
South	4201406/5703047			x			x		
South	4204608/2012195			x			x		
South	4205456/73720484			x			x		
South	4314076/91039198		x	x					
Central-West	5000708/7003543			x					x
Central-West	5106216/9559502			x		x			
Central-West	5300108/0		x	x		x			x

Appendix 22: Number of operational credit union correspondents by region (Based on Banco Central do Brasil, 2015g)

Number of operational CU BC per region														
Region	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
North n of CU BCs	0	0	0	0	0	1	3	5	6	38	60	67	68	21,4 %
North n of exclusive CU BCs	0	0	0	0	0	1	1	2	4	26	47	53	54	27,6 %
North % of exclusive	0 %	0 %	0 %	0 %	0 %	100 %	33 %	40 %	67 %	68 %	78 %	79 %	79 %	5,1 %
Northeast n of CU BCs	0	0	0	0	0	0	0	1	2	39	40	41	41	1,7 %
Northeast n of exclusive CU BCs	0	0	0	0	0	0	0	0	1	25	23	24	25	0,0 %
Northeast % of exclusive	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	50 %	64 %	58 %	59 %	61 %	-1,7 %
Southeast n of CU BCs	3	6	6	7	18	68	100	122	154	592	631	658	661	3,7 %
Southeast n of exclusive CU BCs	3	6	6	7	13	61	88	111	140	493	504	519	528	2,3 %
Southeast % of exclusive	100 %	100 %	100 %	100 %	72 %	90 %	88 %	91 %	91 %	83 %	80 %	79 %	80 %	-1,4 %
South n of CU BCs	9	11	11	12	12	27	680	1 243	1 636	2 388	2 631	2 777	2 851	6,1 %
South n of exclusive CU BCs	9	11	11	12	12	27	566	966	1 268	1 830	1 936	1 994	2 115	4,9 %
South % of exclusive	100 %	100 %	100 %	100 %	100 %	100 %	83 %	78 %	78 %	77 %	74 %	72 %	74 %	-1,1 %
Center-West n of CU BCs	0	0	0	1	3	6	192	244	265	362	402	411	435	6,3 %
Center-West n of exclusive CU BCs	0	0	0	1	3	5	150	181	207	282	307	311	332	5,6 %
Center-West % of exclusive	0 %	0 %	0 %	100 %	100 %	83 %	78 %	74 %	78 %	78 %	76 %	76 %	76 %	-0,7 %
Brazil n of CU BCs	12	17	17	20	33	102	975	1 615	2 063	3 419	3 764	3 954	4 056	5,9 %
Brazil n of exclusive CU BCs	12	17	17	20	28	94	805	1 260	1 620	2 656	2 817	2 901	3 054	4,8 %
Brazil % of total	100 %	100 %	100 %	100 %	85 %	92 %	83 %	78 %	79 %	78 %	75 %	73 %	75 %	-1,0 %

Appendix 23: Municipalities covered by CU BCs by region (Based on Banco Central do Brasil, 2015g)

Number of municipalities covered by region

Number of municipalities with operational CU BC														
Region	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
North mun. with CU BCs	0	0	0	0	0	1	2	4	5	16	21	23	24	14,5 %
North mun. with exclusive CU BCs	0	0	0	0	0	1	1	2	4	13	18	20	20	15,4 %
North % of exclusive	0 %	0 %	0 %	0 %	0 %	100 %	50 %	50 %	80 %	81 %	86 %	87 %	83 %	0,8 %
Northeast mun. with CU BCs	0	0	0	0	0	0	0	1	2	23	24	24	24	1,4 %
Northeast mun. with exclusive CU BCs	0	0	0	0	0	0	0	0	1	19	17	17	17	-3,6 %
Northeast % of exclusive	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	50 %	83 %	71 %	71 %	71 %	-5,0 %
Southeast mun. with CU BCs	1	2	2	2	13	45	57	67	89	193	194	201	205	2,0 %
Southeast mun. with exclusive CU BCs	1	2	2	2	8	40	50	63	84	171	170	172	174	0,6 %
Southeast % of exclusive	100 %	100 %	100 %	100 %	62 %	89 %	88 %	94 %	94 %	89 %	88 %	86 %	85 %	-1,4 %
South mun. with CU BCs	6	8	8	9	9	21	371	534	583	716	730	749	756	1,8 %
South mun. with exclusive CU BCs	6	8	8	9	9	21	340	487	539	652	657	679	691	2,0 %
South % of exclusive	100 %	100 %	100 %	100 %	100 %	100 %	92 %	91 %	92 %	91 %	90 %	91 %	91 %	0,1 %
Center-West mun. with CU BCs	0	0	0	1	3	5	92	98	109	126	131	132	136	2,6 %
Center-West mun. with exclusive CU BCs	0	0	0	1	3	4	84	90	103	116	119	121	123	2,0 %
Center-West % of exclusive	0 %	0 %	0 %	100 %	100 %	80 %	91 %	92 %	94 %	92 %	91 %	92 %	90 %	-0,6 %
Brazil mun. with CU BCs	7	10	10	12	25	72	522	704	788	1 074	1 100	1 129	1 145	2,2 %
Brazil mun. with exclusive CU BCs	7	10	10	12	20	66	475	642	731	971	981	1 009	1 025	1,8 %
Brazil % of total	100 %	100 %	100 %	100 %	80 %	92 %	91 %	91 %	93 %	90 %	89 %	89 %	90 %	-0,3 %

Share of all municipalities of the region covered

Share of municipalities of the region with CU BCs														
Region	<2003	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
North - share of mun. with CU BC	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,2 %	0,4 %	0,9 %	1,1 %	3,6 %	4,7 %	5,1 %	5,3 %	14,5 %
North - share of mun. with exclusive CU BC	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,2 %	0,2 %	0,4 %	0,9 %	2,9 %	4,0 %	4,5 %	4,5 %	15,4 %
Northeast - share of mun. with CU BC	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,1 %	0,1 %	1,3 %	1,3 %	1,3 %	1,3 %	1,4 %
Northeast - share of mun. with exclusive CU BC	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,1 %	1,1 %	0,9 %	0,9 %	0,9 %	-3,6 %
Southeast - share of mun. with CU BC	0,1 %	0,1 %	0,1 %	0,1 %	0,8 %	2,7 %	3,4 %	4,0 %	5,3 %	11,6 %	11,6 %	12,1 %	12,3 %	2,0 %
Southeast - share of mun. with exclusive CU BC	0,1 %	0,1 %	0,1 %	0,1 %	0,5 %	2,4 %	3,0 %	3,8 %	5,0 %	10,3 %	10,2 %	10,3 %	10,4 %	0,6 %
South - share of mun. with CU BC	0,5 %	0,7 %	0,7 %	0,8 %	0,8 %	1,8 %	31,2 %	44,9 %	49,1 %	60,3 %	61,4 %	63,0 %	63,6 %	1,8 %
South - share of mun. with exclusive CU BC	0,5 %	0,7 %	0,7 %	0,8 %	0,8 %	1,8 %	28,6 %	41,0 %	45,4 %	54,9 %	55,3 %	57,2 %	58,2 %	2,0 %
Center-West - share of mun. with CU BC	0,0 %	0,0 %	0,0 %	0,2 %	0,6 %	1,1 %	19,7 %	21,0 %	23,4 %	27,0 %	28,1 %	28,3 %	29,2 %	2,6 %
Center-West - share of mun. with exclusive CU BC	0,0 %	0,0 %	0,0 %	0,2 %	0,6 %	0,9 %	18,0 %	19,3 %	22,1 %	24,9 %	25,5 %	26,0 %	26,4 %	2,0 %
Brazil - share of mun. with CU BC	0,1 %	0,2 %	0,2 %	0,2 %	0,4 %	1,3 %	9,4 %	12,7 %	14,2 %	19,3 %	19,8 %	20,3 %	20,6 %	2,2 %
Brazil - share of mun. with exclusive CU BC	0,1 %	0,2 %	0,2 %	0,2 %	0,4 %	1,2 %	8,5 %	11,5 %	13,1 %	17,4 %	17,6 %	18,1 %	18,4 %	1,8 %

Appendix 24: Credit Union type and affiliation 2008 – 2014 (Based on Banco Central do Brasil, 2015c)

Types of credit union by affiliation 2008							
Situation in 2008	Unicred	Sicoob	Independent	Ancosol	Sicredi	Total	% of total
Rural Credit	0	30	101	158	2	**291**	20 %
Mutual Credit	58	135	590	6	36	**825**	58 %
Free Admission	12	156	44	0	89	**301**	21 %
Luzzatti	0	1	6	0	2	**9**	1 %
Total	**70**	**322**	**741**	**164**	**129**	**1426**	**100 %**
% of total	5 %	23 %	52 %	12 %	9 %	**100 %**	

Types of credit union by affiliation 2014							
Situation in 2014	Unicred	Sicoob	Independent	Ancosol	Sicredi	**Total**	% of total
Rural Credit	0	22	44	159	0	**225**	20 %
Mutual Credit	47	118	424	7	21	**617**	54 %
Free Admission	12	156	43	0	80	**291**	26 %
Luzzatti	0	1	2	0	2	**5**	0 %
Total	**59**	**297**	**513**	**166**	**103**	**1138**	**100 %**
% of total	5 %	26 %	45 %	15 %	9 %	**100 %**	

Variation of types and affiliations of credit unions, 2008 - 2014						
Change 2008-2014	Unicred	Sicoob	Independent	Ancosol	Sicredi	All
Rural Credit	N/A	-27 %	-56 %	1 %	-100 %	-23 %
Mutual Credit	-19 %	-13 %	-28 %	17 %	-42 %	-25 %
Free Admission	0 %	0 %	-2 %	N/A	-10 %	-3 %
Luzzatti	N/A	0 %	-67 %	N/A	0 %	-44 %
All	-16 %	-8 %	-31 %	1 %	-20 %	-20 %

Distribution of CU types 2008 and 2014

Change in Number of Credit Unions by Type 08-14
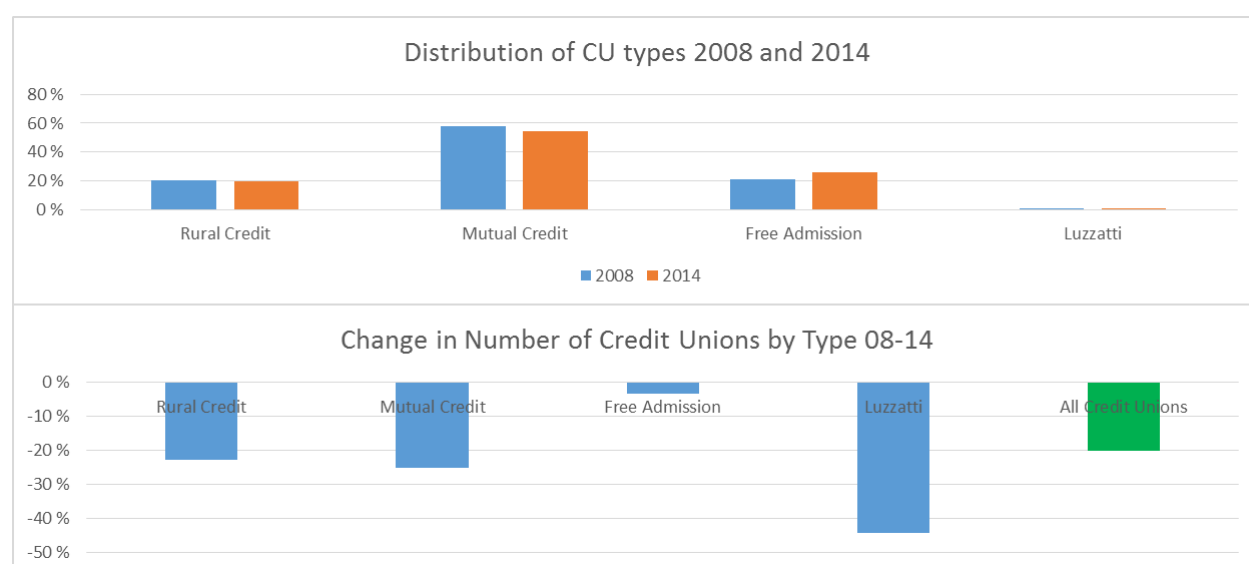
Distribution of CU Types by region, 2014					
Region	Figure	Free Admission	Mutual Credit	Luzzatti	Rural Credit	Total
North	Number of Cus	14	34	0	10	58
	Share of total	24,1 %	58,6 %	0,0 %	17,2 %	100 %
Northeast	Number of Cus	13	54	0	29	96
	Share of total	13,5 %	56,3 %	0,0 %	30,2 %	100 %
Southeast	Number of Cus	122	376	2	36	536
	Share of total	22,8 %	70,1 %	0,4 %	6,7 %	100 %
South	Number of Cus	98	110	3	145	356
	Share of total	27,5 %	30,9 %	0,8 %	40,7 %	100 %
Central-West	Number of Cus	44	43	0	5	92
	Share of total	47,8 %	46,7 %	0,0 %	5,4 %	100 %
Total	Number of Cus	291	617	5	225	1138
	Share of total	25,6 %	54,2 %	0,4 %	19,8 %	100 %
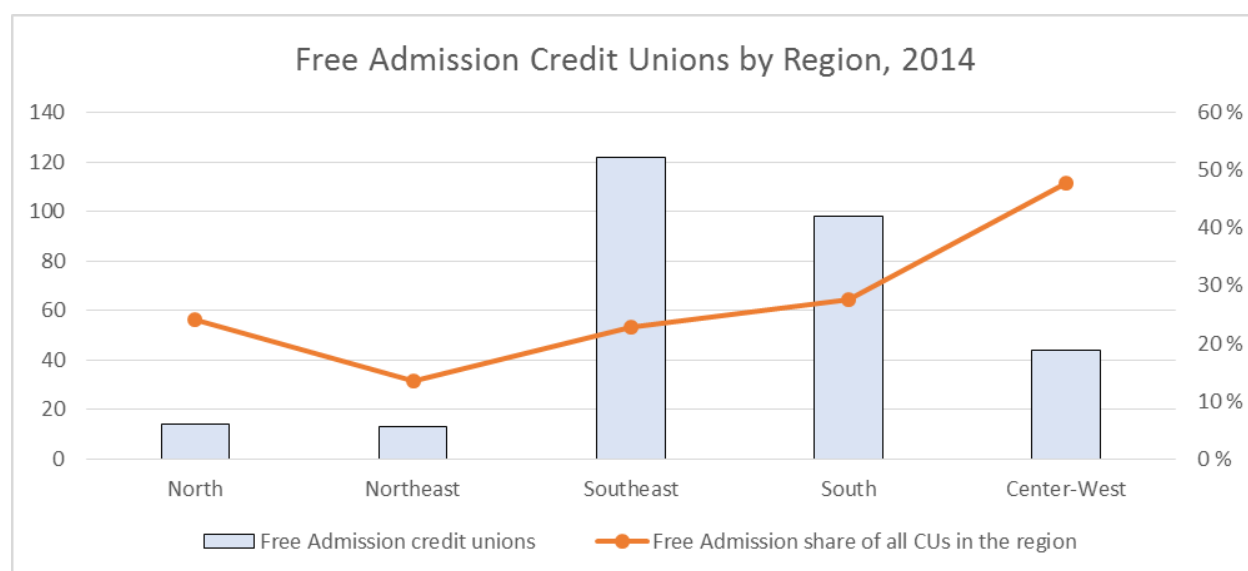
Correlation between Free Trade Admission CUs by mesoregion and CU BCs by mesoregion				
Region	N mesoregions	Correlation	Strength	Significance
North	12	0.92	Very Strong	<0.01
Northeast	32	0.47	Moderate	<0.01
Southeast	36	0.52	Moderate	<0.01
South	23	0.86	Very Strong	<0.01
Center-West	13	-0.11	Very Weak	>0.05
Overall	**116**	**0.55**	**Moderate**	**<0.01**

Appendix 25: Credit Union Correspondents by type and affiliation (Based on Banco Central do Brasil (2015g and 2015c)

Type and affiliation of credit union		Number of different CU types							Share of different CU types							Number of CU with BC							Share of active CU with BC						
		2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
Unicred	Rural Credit	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Mutual Credit	58	57	55	52	49	47	47	83 %	83 %	82 %	81 %	80 %	80 %	80 %	0	0	1	2	2	1	1	0 %	0 %	2 %	4 %	4 %	2 %	2 %
	Free Admission	12	12	12	12	12	12	12	17 %	17 %	18 %	19 %	20 %	20 %	20 %	0	0	0	1	1	1	1	0 %	0 %	0 %	8 %	8 %	8 %	8 %
	Luzzatti	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Total	**70**	**69**	**67**	**64**	**61**	**59**	**59**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**0**	**0**	**1**	**3**	**3**	**2**	**2**	**0 %**	**0 %**	**1 %**	**5 %**	**5 %**	**3 %**	**3 %**
Sicoob	Rural Credit	30	26	24	22	22	22	22	9 %	8 %	8 %	7 %	7 %	7 %	7 %	1	1	1	6	7	7	7	3 %	4 %	4 %	27 %	32 %	32 %	32 %
	Mutual Credit	135	131	129	127	126	122	118	42 %	42 %	42 %	41 %	41 %	41 %	40 %	2	2	4	14	15	15	15	1 %	2 %	3 %	11 %	12 %	12 %	13 %
	Free Admission	156	156	156	157	157	156	156	48 %	50 %	50 %	51 %	51 %	52 %	53 %	23	26	31	77	79	78	80	15 %	17 %	20 %	49 %	50 %	50 %	51 %
	Luzzatti	1	1	1	1	1	1	1	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Total	**322**	**314**	**310**	**307**	**306**	**301**	**297**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**26**	**29**	**36**	**97**	**101**	**100**	**102**	**8 %**	**9 %**	**12 %**	**32 %**	**33 %**	**33 %**	**34 %**
Independent	Rural Credit	101	88	78	67	60	54	44	14 %	13 %	12 %	11 %	10 %	10 %	9 %	2	1	2	7	6	4	3	2 %	1 %	3 %	10 %	10 %	7 %	7 %
	Mutual Credit	590	554	536	505	480	448	424	80 %	80 %	81 %	82 %	82 %	82 %	83 %	0	1	2	8	8	6	6	0 %	0 %	0 %	2 %	2 %	1 %	1 %
	Free Admission	44	45	44	43	44	43	43	6 %	7 %	7 %	7 %	7 %	8 %	8 %	5	6	5	5	5	5	5	11 %	13 %	11 %	12 %	11 %	12 %	12 %
	Luzzatti	6	5	5	4	4	2	2	1 %	1 %	1 %	1 %	1 %	0 %	0 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Total	**741**	**692**	**663**	**619**	**588**	**547**	**513**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**7**	**8**	**9**	**20**	**19**	**15**	**14**	**1 %**	**1 %**	**1 %**	**3 %**	**3 %**	**3 %**	**3 %**
Ancosol	Rural Credit	158	164	163	162	161	160	159	96 %	96 %	96 %	96 %	96 %	96 %	96 %	0	0	0	6	6	6	6	0 %	0 %	0 %	4 %	4 %	4 %	4 %
	Mutual Credit	6	7	7	7	6	6	7	4 %	4 %	4 %	4 %	4 %	4 %	4 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Free Admission	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Luzzatti	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0	0	0	0	0	0	0	0 %	0 %	0 %	0 %	0 %	0 %	0 %
	Total	**164**	**171**	**170**	**169**	**167**	**166**	**166**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**0**	**0**	**0**	**6**	**6**	**6**	**6**	**0 %**	**0 %**	**0 %**	**4 %**	**4 %**	**4 %**	**4 %**
Sicredi	Rural Credit	2	2	1	1	0	0	0	2 %	2 %	1 %	1 %	0 %	0 %	0 %	1	1	1	1	0	0	0	50 %	50 %	100 %	100 %	0 %	0 %	0 %
	Mutual Credit	36	35	31	29	27	22	21	28 %	27 %	25 %	24 %	23 %	20 %	20 %	4	7	4	5	4	1	1	11 %	20 %	13 %	17 %	15 %	5 %	5 %
	Free Admission	89	92	90	89	89	84	80	69 %	70 %	73 %	74 %	75 %	78 %	78 %	74	78	80	79	79	77	73	83 %	85 %	89 %	89 %	89 %	92 %	91 %
	Luzzatti	2	2	2	2	2	2	2	2 %	2 %	2 %	2 %	2 %	2 %	2 %	1	1	1	1	1	2	2	50 %	50 %	50 %	50 %	50 %	100 %	100 %
	Total	**129**	**131**	**124**	**121**	**118**	**108**	**103**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**80**	**87**	**86**	**86**	**84**	**80**	**76**	**62 %**	**66 %**	**69 %**	**71 %**	**71 %**	**74 %**	**74 %**

Appendix 26: Share of opened correspondents closed, by affiliation (Based on Banco Central do Brasil (2015g and 2015c)

Share of opened BCs closed												
Affiliation of CU	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Unicred	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	33 %	33 %
Sicoob	25 %	25 %	20 %	10 %	7 %	10 %	10 %	11 %	3 %	5 %	7 %	10 %
Independent	0 %	0 %	0 %	0 %	9 %	17 %	23 %	30 %	22 %	23 %	39 %	41 %
Ancosol	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Sicredi	0 %	0 %	0 %	0 %	3 %	5 %	7 %	10 %	13 %	17 %	24 %	27 %

Share of all opened BCs closed, by affiliation, 2003 - 2014

Appendix 27: BC evolution by type of credit union, 2008 – 2014 (Based on Banco Central do Brasil, 2015c and 2015g)

Unicred	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Opened BC	0	0	1	2	0	0	0	-100 %
Closed BC	0	0	0	0	0	1	0	0 %
Operational BC	0	0	1	2	2	2	2	0 %
Exlusive operational BC	0	0	1	0	0	0	1	0 %
PAE	0	0	0	2	2	2	0	-100 %

Sicoob	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Opened BC	42	66	50	867	91	155	20	-72 %
Closed BC	6	7	6	9	21	41	35	57 %
Operational BC	87	146	190	1034	1102	1215	1202	5 %
Exlusive operational BC	76	125	170	875	906	988	998	4 %
PAE	0	0	8	206	324	504	660	47 %

Independent	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Opened BC	41	40	22	90	26	11	6	-59 %
Closed BC	9	13	13	11	7	43	7	-14 %
Operational BC	52	79	88	164	183	153	152	-3 %
Exlusive operational BC	41	61	72	120	130	102	108	-3 %
PAE	0	0	4	4	4	17	24	82 %

Ancosol	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Opened BC	0	0	0	2	1	0	0	-100 %
Closed BC	0	0	0	0	0	0	0	0 %
Operational BC	0	0	0	2	3	3	3	14 %
Exlusive operational BC	0	0	0	0	1	1	1	0 %
PAE	0	0	0	0	0	0	0	0 %

Sicredi	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Opened BC	850	619	476	589	411	426	312	-19 %
Closed BC	43	67	85	147	151	314	190	9 %
Operational BC	843	1398	1789	2220	2479	2593	2704	7 %
Exlusive operational BC	682	1067	1373	1638	1757	1781	1922	5 %
PAE	0	0	0	0	0	0	0	0 %

Appendix 28: Sicoob-affiliated credit unions, BCs and PAEs, 2008 - 2014 (Based on Banco Central do Brasil, 2015c, 2015f and 2015g)

Sicoob - credit unions with BC versus PAE								
Indicator	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14
Active credit unions	322	314	310	307	306	301	297	-1,1 %
CU with only BC	26	29	34	78	76	68	65	-5,9 %
CU with only PAE	0	0	3	28	33	37	39	11,7 %
Cu with PAE and BC	0	0	2	22	28	36	41	23,1 %

Appendix 29: Credit Unions with BCs by affiliation and region (Based on Banco Central do Brasil, 2015c and 2015g)

Affiliation by region	Number of Credit unions							Number of CU with BC							Share of all active						
Unicred	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
North	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%
Northeast	22	22	22	21	20	19	19	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%
Southeast	32	32	30	29	28	28	28	0	0	1	3	3	2	2	0%	0%	3%	10%	11%	7%	7%
South	12	11	11	10	9	8	8	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%
Central-West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-
Total	70	69	67	64	61	59	59	0	0	1	3	3	2	2	0%	0%	1%	5%	5%	3%	3%

Affiliation by region	Number of Credit unions							Number of CU with BC							Share of all active						
Sicoob	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
North	20	21	21	22	21	19	19	1	1	1	2	2	2	2	5%	5%	5%	9%	10%	11%	11%
Northeast	27	27	27	25	25	26	25	0	1	1	3	4	4	4	0%	4%	4%	12%	16%	15%	16%
Southeast	191	186	181	183	184	182	179	23	23	29	63	65	63	63	12%	12%	16%	34%	35%	35%	35%
South	58	55	56	54	53	51	51	2	4	5	25	26	27	29	3%	7%	9%	46%	49%	53%	57%
Central-West	26	25	25	23	23	23	23	0	0	0	4	4	4	4	0%	0%	0%	17%	17%	17%	17%
Total	322	314	310	307	306	301	297	26	29	36	97	101	100	102	8%	9%	12%	32%	33%	33%	34%

Affiliation by region	Number of Credit unions							Number of CU with BC							Share of all active						
Independent	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
North	48	44	43	37	37	35	29	0	1	0	0	0	0	0	0%	2%	0%	0%	0%	0%	0%
Northeast	81	73	68	57	50	44	36	0	0	0	5	5	3	2	0%	0%	0%	9%	10%	7%	6%
Southeast	428	399	380	363	345	323	311	3	4	4	5	5	4	4	1%	1%	1%	1%	1%	1%	1%
South	109	106	104	101	100	93	88	3	2	4	9	8	8	8	3%	2%	4%	9%	8%	9%	9%
Central-West	75	70	68	61	56	52	49	1	1	1	1	1	0	0	1%	1%	1%	2%	2%	0%	0%
Total	741	692	663	619	588	547	513	7	8	9	20	19	15	14	1%	1%	1%	3%	3%	3%	3%

Affiliation by region	Number of Credit unions							Number of CU with BC							Share of all active						
Ancosol	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
North	1	3	3	3	3	3	3	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%
Northeast	19	20	18	17	16	16	16	0	0	0	2	2	2	2	0%	0%	0%	12%	13%	13%	13%
Southeast	8	8	8	8	7	7	7	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%
South	136	140	141	141	141	140	140	0	0	0	4	4	4	4	0%	0%	0%	3%	3%	3%	3%
Central-West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-
Total	164	171	170	169	167	166	166	0	0	0	6	6	6	6	0%	0%	0%	4%	4%	4%	4%

Affiliation by region	Number of Credit unions							Number of CU with BC							Share of all active						
Sicredi	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
North	4	5	4	4	3	3	3	1	2	2	2	2	2	2	25%	40%	50%	50%	67%	67%	67%
Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-
Southeast	17	17	17	16	16	13	11	0	1	1	2	2	3	3	0%	6%	6%	13%	13%	23%	27%
South	85	85	81	79	79	72	69	60	65	64	63	63	59	55	71%	76%	79%	80%	80%	82%	80%
Central-West	23	24	22	22	20	20	20	19	19	19	19	17	16	16	83%	79%	86%	86%	85%	80%	80%
Total	129	131	124	121	118	108	103	80	87	86	86	84	80	76	62%	66%	69%	71%	71%	74%	74%

Appendix 30: Credit Union BCs by affiliation and region (Based on Banco Central do Brasil, 2015c and 2015g)

Number of BCs by affiliation by region									
Unicred	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
North	0	0	0	0	0	0	0	0,0 %	4
Northeast	0	0	0	0	0	0	0	0,0 %	19
Southeast	0	0	0	1	1	1	1	0,0 %	28
South	0	0	0	0	0	0	0	0,0 %	8
Central-West	0	0	1	1	1	1	1	0,0 %	0
Total	0	0	1	2	2	2	2	0,0 %	59

Number of BCs by affiliation by region									
Sicoob	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
North	1	1	1	30	51	58	58	24,6 %	19
Northeast	0	1	2	18	19	20	20	3,6 %	25
Southeast	75	92	121	539	573	585	580	2,5 %	179
South	11	52	66	443	455	548	540	6,8 %	51
Central-West	0	0	0	4	4	4	4	0,0 %	23
Total	87	146	190	1034	1102	1215	1202	5,1 %	297

Number of BCs by affiliation by region									
Independent	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
North	0	1	1	0	0	0	0	0,0 %	29
Northeast	0	0	0	5	5	5	5	0,0 %	36
Southeast	25	29	31	46	49	55	58	8,0 %	311
South	10	32	40	84	95	69	65	-8,2 %	88
Central-West	17	17	16	29	34	24	24	-6,1 %	49
Total	52	79	88	164	183	153	152	-2,5 %	513

Number of BCs by affiliation by region									
Ancosol	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
North	0	0	0	0	0	0	0	0,0 %	3
Northeast	0	0	0	0	0	0	0	0,0 %	16
Southeast	0	0	0	0	0	0	0	0,0 %	7
South	0	0	0	1	2	2	2	26,0 %	140
Central-West	0	0	0	1	1	1	1	0,0 %	0
Total	0	0	0	2	3	3	3	14,5 %	166

Number of BCs by affiliation by region									
Sicredi	2008	2009	2010	2011	2012	2013	2014	CAGR 11-14	n of CU 2014
North	2	3	4	8	9	9	10	7,7 %	3
Northeast	0	0	0	0	0	0	0	0,0 %	0
Southeast	0	1	2	7	9	18	23	48,7 %	11
South	662	1163	1531	1868	2086	2169	2254	6,5 %	69
Central-West	179	231	252	337	375	397	417	7,4 %	20
Total	843	1398	1789	2220	2479	2593	2704	6,8 %	103

Appendix 31: Codes and grouping used for the analysis of Panambi interviews

Group	Code
General	Panambi general (PG)
	Panambi Development (PD)
	Panambi Financial Inclusion (PBFI)
	Sicredi History (SC)
Sicredi BC	Sicredi on Banking Correspondents (SoBC)
	Sicredi Banking Correspondent Registration (SBCR)
	Sicredi Banking Correspondent Technology (SBCT)
	Sicredi Banking Correspondent Location (SBCL)
	Sicredi on Usefulness of Banking Correspondents (SoUBC)
	Sicredi on Banking Correspondent Problems (SoBCP)
	Sicredi on Banking Correspondents with Inc V (SoBCI5)
	Multi-Bank Banking Correspondents (MBBC)
	Sicredi Future Plans for Banking Correspondents – (SFPfBC)
Banks BC	Commercial Banks on Banking Correspondents (CBoBC)
Opinions of Stakeholders	Opinion on Sicredi (OoS)
	Opinion on Banking Correspondents (OoBC)
	Banking Correspondents on Usefulness (BcoU)
	Banking Correspondents on Challenges (BCoC)

Appendix 32: Examples of initial search for relationships between CU BCs and CU financials (Based on Banco Central do Brasil, 2015b, 2015g)

All credit unions active in 2014, all regions (Pearson Correlations)

1138	n	Opened	Cumul Opened	Closed	Cumul Closed	% closed	Operational	Opened Inc V	Operational Inc V	Opened	Cumul Opened	Closed	Cumul Closed	Operational	Opened Inc V	Operational Inc V
All Credit Unions all regions (active 2014)		2008	2014	2013	2014	2014	2014	2012	2014	2008	2014	2013	2014	2014	2012	2014
	n	78	204	75	108	108	200	3	9	78	204	75	108	200	3	9
Active	2015	0,04	0,05	0,04	0,04	0,05	0,05	0,01	0,01	0,05	0,05	0,04	0,04	0,05	0,01	0,01
PABs	2014	-0,04	0,04	0,03	0,01	0,16	0,04	-0,01	-0,01	-0,04	0,04	0,03	0,02	0,05	-0,01	-0,01
Inv. In Credit operations	2011	-0,01	-0,02	-0,01	-0,02	0,01	-0,02	0,00	-0,02	-0,01	-0,02	-0,01	-0,02	-0,02	0,00	-0,02
	2015sep	-0,03	-0,03	-0,03	-0,03	-0,02	-0,03	-0,01	-0,02	-0,03	-0,03	-0,03	-0,03	-0,03	-0,01	-0,02
	%Change	-0,02	-0,02	-0,03	-0,02	-0,03	-0,02	-0,01	-0,01	-0,02	-0,02	-0,03	-0,02	-0,02	-0,01	-0,01
Treasury investments	2011	0,04	-0,01	-0,03	-0,04	-0,04	0,00	-0,01	-0,01	0,04	-0,00	-0,03	-0,04	0,01	0,01	-0,01
	2015sep	0,04	0,03	-0,03	-0,04	-0,05	0,06	-0,01	-0,02	0,04	0,05	-0,03	-0,04	0,07	0,01	-0,02
	%Change	0,02	-0,02	-0,01	-0,01	-0,01	0,02	-0,00	0,00	0,02	-0,02	-0,01	-0,01	0,02	0,00	-0,00
Funding by LT deposits	2011	0,10	0,11	0,07	0,08	0,11	0,10	0,03	0,02	0,11	0,11	0,07	0,08	0,10	0,03	0,02
	2015sep	0,08	0,09	0,05	0,06	0,11	0,08	0,01	0,01	0,08	0,09	0,05	0,06	0,08	0,01	0,01
	%Change	-0,02	-0,02	-0,01	-0,02	-0,02	-0,02	-0,00	-0,01	-0,02	-0,02	-0,01	-0,02	-0,02	-0,00	-0,01
Coverage with services	2011	0,19	0,28	0,15	0,17	0,18	0,28	0,05	0,06	0,19	0,28	0,16	0,17	0,29	0,05	0,06
	2015sep	0,16	0,25	0,12	0,15	0,16	0,25	0,03	0,04	0,16	0,26	0,12	0,15	0,26	0,03	0,04
	%Change	0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,00	-0,00	0,01	-0,01	-0,01	-0,01	0,01	-0,00	-0,00
Operational Efficiency	2011	0,03	0,03	0,02	0,03	0,02	0,03	0,00	0,00	0,03	0,03	0,02	0,03	0,03	0,00	0,00
	2015sep	0,04	0,04	0,03	0,04	0,04	0,04	0,01	0,01	0,04	0,04	0,03	0,04	0,03	0,01	0,01
	%Change	0,01	0,01	0,00	0,00	0,00	0,01	0,00	0,00	0,01	0,01	0,00	0,00	0,01	0,00	0,00
Banking Margin	2011	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,00	0,00
	2015sep	0,04	0,04	0,02	0,04	0,04	0,04	0,01	0,01	0,04	0,04	0,02	0,04	0,04	0,01	0,01
	%Change	0,00	-0,00	-0,00	-0,00	-0,00	0,00	-0,00	-0,00	0,00	-0,00	-0,00	-0,00	0,00	0,00	-0,00
Other revenue share	2011	0,22	0,18	0,15	0,18	0,17	0,16	0,03	0,05	0,22	0,18	0,14	0,18	0,16	0,03	0,05
	2015sep	0,28	0,23	0,19	0,23	0,22	0,20	0,06	0,09	0,28	0,22	0,19	0,23	0,20	0,06	0,09
	%Change	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,00	-0,00	-0,01	-0,01	-0,01	-0,01	0,01	-0,00	-0,00
Service Revenue Share	2011	0,15	0,23	0,12	0,13	0,14	0,24	0,04	0,05	0,15	0,24	0,12	0,13	0,25	0,04	0,05
	2015sep	0,09	0,17	0,07	0,08	0,09	0,18	0,02	0,02	0,09	0,18	0,07	0,08	0,19	0,02	0,02
	%Change	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,00	-0,00	-0,01	-0,01	-0,01	-0,01	0,01	-0,00	-0,00
Credit Volume	2011	0,10	0,11	0,08	0,09	0,10	0,10	0,02	0,03	0,10	0,11	0,08	0,09	0,10	0,02	0,03
	2015sep	0,09	0,11	0,07	0,08	0,11	0,11	0,01	0,02	0,09	0,11	0,07	0,08	0,10	0,01	0,02
	%Change	-0,05	-0,05	-0,05	-0,05	-0,04	-0,04	-0,02	-0,02	-0,05	-0,05	-0,05	-0,05	0,04	-0,02	-0,02
Assets size	2011	0,23	0,26	0,19	0,22	0,23	0,24	0,04	0,07	0,23	0,25	0,19	0,22	0,23	0,04	0,07
	2015sep	0,19	0,21	0,15	0,18	0,19	0,20	0,04	0,06	0,19	0,21	0,15	0,18	0,19	0,04	0,06
	2011-2015	0,05	0,06	0,04	0,05	0,06	0,06	0,02	0,02	0,06	0,06	0,04	0,05	0,06	0,02	0,02
ROA	2011	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,00	0,00
	2015sep	0,12	0,12	0,08	0,11	0,09	0,11	0,02	0,03	0,12	0,12	0,08	0,12	0,10	0,02	0,03
	%Change	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,00	0,00
ROE	2011	0,17	0,19	0,14	0,17	0,16	0,17	0,01	0,04	0,17	0,18	0,14	0,17	0,17	0,01	0,03
	2015sep	0,25	0,28	0,19	0,25	0,22	0,25	0,05	0,08	0,25	0,27	0,19	0,25	0,25	0,05	0,08
	%Change	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,00	0,01
Banking Profitability	2011	0,01	0,01	0,01	0,02	0,02	0,01	0,00	0,00	0,01	0,01	0,01	0,02	0,01	0,00	0,00
	2015sep	0,02	0,01	0,00	0,01	0,01	0,01	0,00	0,00	0,02	0,01	0,00	0,01	0,01	0,00	0,00
	%Change	-0,01	-0,01	-0,01	-0,01	-0,01	-0,01	-0,00	-0,00	-0,01	-0,01	-0,01	-0,01	0,01	-0,00	-0,00

All credit unions in the South region (Pearson Correlations)

All Credit Unions South region (active 2014)	n = 356	Opened	Cumul Opened	Closed	Cumul Closed	% closed	Operational	Opened Inc V	Operational Inc V	Opened	Cumul Opened	Closed	Cumul Closed	Operational	Opened Inc V	Operational Inc V
	n	52	97	51	62	62	96	3	7	52	97	51	62	96	3	7
	year	2008	2014	2013	2014	2014	2014	2012	2014	2008	2014	2013	2014	2014	2012	2014
Active	2015	0,04	0,04	0,03	0,04	0,04	0,04	0,01	0,01	0,04	0,04	0,03	0,04	0,04	0,01	0,01
PABs	2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inv. In Credit operations	2011	-0,07	-0,08	0,05	-0,07	-0,08	-0,08	0,01	-0,03	-0,07	-0,08	0,05	-0,07	-0,08	0,01	-0,03
	2015sep	-0,12	-0,12	0,09	-0,10	-0,11	-0,11	0,02	-0,05	-0,12	-0,12	0,09	-0,10	-0,11	0,02	-0,05
	%Change	-0,07	-0,05	0,05	-0,05	-0,04	-0,05	0,03	-0,04	-0,07	-0,05	0,05	-0,05	-0,05	0,03	-0,04
Treasury investments	2011	0,01	0,29	0,02	-0,01	-0,03	0,35	-0,01	-0,02	0,01	0,33	0,02	-0,01	0,39	-0,01	-0,02
	2015sep	0,02	0,27	0,00	-0,02	-0,04	0,33	-0,00	-0,01	0,02	0,31	0,01	-0,02	0,37	-0,00	-0,01
	%Change	-0,05	-0,05	-0,04	-0,04	-0,05	-0,05	-0,01	-0,01	-0,05	-0,05	-0,04	-0,04	-0,05	-0,01	-0,01
Funding by LT deposits	2011	0,15	0,12	0,09	0,09	0,09	0,11	0,07	0,06	0,15	0,12	0,09	0,09	0,11	0,07	0,06
	2015sep	0,09	0,08	0,05	0,05	0,07	0,08	0,04	0,02	0,09	0,08	0,05	0,05	0,08	0,04	0,03
	%Change	-0,03	-0,03	-0,02	-0,02	-0,03	-0,03	-0,01	-0,01	-0,03	-0,03	-0,02	-0,02	-0,03	-0,01	-0,01
Coverage with services	2011	0,27	0,42	0,21	0,23	0,22	0,44	0,08	0,09	0,27	0,44	0,21	0,23	0,45	0,08	0,09
	2015sep	0,14	0,27	0,10	0,11	0,11	0,29	0,04	0,04	0,14	0,28	0,10	0,11	0,30	0,04	0,04
	%Change	-0,08	-0,08	-0,06	-0,07	-0,08	-0,08	-0,02	-0,02	-0,08	-0,08	-0,06	-0,07	-0,07	-0,02	-0,02
Operational Efficiency	2011	0,10	0,09	0,07	0,09	0,07	0,08	0,02	0,02	0,10	0,09	0,07	0,09	0,08	0,02	0,02
	2015sep	0,13	0,11	0,09	0,11	0,12	0,10	0,03	0,03	0,13	0,11	0,09	0,11	0,09	0,03	0,03
	%Change	0,02	0,01	0,01	0,01	0,01	0,01	0,00	0,00	0,02	0,01	0,01	0,01	0,01	0,00	0,00
Banking Margin	2011	0,04	0,04	0,03	0,04	0,04	0,04	0,01	0,00	0,04	0,04	0,03	0,04	0,04	0,01	0,00
	2015sep	0,20	0,17	0,13	0,17	0,17	0,15	0,05	0,06	0,20	0,16	0,13	0,17	0,14	0,05	0,06
	%Change	0,01	0,00	-0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	-0,00	0,00	0,00	0,00	0,00
Other revenue share	2011	0,33	0,21	0,17	0,23	0,22	0,18	0,04	0,07	0,33	0,20	0,17	0,23	0,17	0,04	0,07
	2015sep	0,44	0,32	0,26	0,34	0,32	0,28	0,09	0,14	0,45	0,31	0,26	0,34	0,26	0,09	0,14
	%Change	0,04	0,02	0,02	0,03	0,04	0,02	0,02	0,02	0,04	0,02	0,02	0,03	0,02	0,02	0,02
Service Revenue Share	2011	0,18	0,33	0,14	0,15	0,13	0,35	0,06	0,07	0,18	0,35	0,14	0,15	0,37	0,06	0,07
	2015sep	0,03	0,17	0,02	0,02	-0,01	0,20	0,01	0,01	0,03	0,19	0,02	0,02	0,21	0,01	0,01
	%Change	-0,08	-0,09	-0,06	-0,07	-0,08	-0,08	-0,02	-0,02	-0,08	-0,08	-0,06	-0,07	-0,08	-0,02	-0,02
Credit Volume	2011	-0,03	-0,04	0,03	-0,03	-0,06	-0,04	-0,00	-0,01	-0,03	-0,05	0,03	-0,03	-0,04	-0,00	-0,01
	2015sep	-0,08	-0,10	0,08	-0,08	-0,10	-0,09	-0,03	-0,04	-0,08	-0,10	0,08	-0,08	-0,09	-0,03	-0,04
	%Change	-0,09	-0,08	0,08	-0,09	-0,07	-0,07	-0,04	-0,04	-0,09	-0,08	0,08	-0,09	-0,07	-0,04	-0,04
Assets size	2011	0,32	0,31	0,24	0,28	0,30	0,28	0,06	0,09	0,32	0,30	0,24	0,28	0,27	0,06	0,09
	2015sep	0,32	0,31	0,24	0,28	0,30	0,28	0,06	0,10	0,32	0,30	0,24	0,28	0,27	0,06	0,10
	2011-2015	0,03	0,03	0,01	0,01	0,03	0,04	0,04	0,04	0,03	0,03	0,01	0,01	0,03	0,04	0,04
ROA	2011	0,26	0,31	0,24	0,29	0,31	0,28	0,03	0,05	0,26	0,31	0,24	0,29	0,27	0,03	0,05
	2015sep	0,34	0,33	0,28	0,34	0,41	0,28	0,09	0,12	0,33	0,32	0,28	0,34	0,27	0,09	0,12
	%Change	0,09	0,08	0,05	0,06	0,10	0,07	0,02	0,04	0,09	0,08	0,05	0,06	0,07	0,02	0,04
ROE	2011	0,31	0,36	0,28	0,35	0,32	0,33	0,03	0,08	0,31	0,35	0,28	0,35	0,31	0,03	0,08
	2015sep	0,35	0,34	0,28	0,35	0,39	0,30	0,08	0,13	0,35	0,33	0,28	0,35	0,29	0,08	0,13
	%Change	0,08	0,07	0,05	0,06	0,10	0,07	0,02	0,04	0,08	0,07	0,05	0,06	0,07	0,02	0,04
Banking Profitability	2011	0,12	0,12	0,09	0,11	0,09	0,11	0,03	0,03	0,12	0,12	0,09	0,11	0,11	0,03	0,03
	2015sep	0,15	0,12	0,10	0,13	0,13	0,11	0,04	0,05	0,15	0,12	0,09	0,13	0,10	0,04	0,05
	%Change	0,09	0,05	0,04	0,07	0,10	0,04	0,02	0,03	0,09	0,05	0,04	0,07	0,04	0,02	0,03

Free Admission credit unions active in 2014, all regions (Pearson Correlations)

291 n		76	160	71	102	102	159	3	6	76	160	71	102	159	3	6
Free Admission Credit Unions all regions (active 2014)		Opened	Cumul Opened	Closed	Cumul Closed	% closed	Operational	Opened Inc V	Operational Inc V	Opened	Cumul Opened	Closed	Cumul Closed	Operational	Opened Inc V	Operational Inc V
		2008	2014	2013	2014	2014	2014	2012	2014	2008	2014	2013	2014	2014	2012	2014
Active	2015	0,04	0,05	0,03	0,03	0,05	0,05	0,01	0,01	0,04	0,05	0,03	0,03	0,05	0,01	0,01
PABs	2014	-0,17	-0,11	-0,07	-0,10	0,07	-0,10	-0,03	-0,04	-0,17	-0,10	-0,07	-0,10	0,09	-0,03	-0,04
Inv. In Credit operations	2011	-0,09	-0,08	-0,07	-0,10	-0,04	-0,07	0,01	-0,05	-0,09	-0,08	-0,07	-0,10	0,06	0,00	-0,05
	2015sep	-0,10	-0,08	-0,10	-0,08	-0,04	-0,07	-0,02	-0,07	-0,09	-0,08	-0,10	-0,08	0,07	-0,02	-0,07
	%Change	-0,02	-0,02	-0,04	-0,01	-0,02	-0,03	-0,03	-0,02	-0,02	-0,02	-0,04	-0,01	0,03	-0,03	-0,02
Treasury investments	2011	0,05	0,01	0,02	-0,00	0,14	0,02	-0,02	-0,03	0,06	0,02	0,02	0,00	0,03	-0,02	-0,03
	2015sep	0,03	-0,03	-0,01	-0,06	-0,04	-0,02	-0,01	-0,04	0,02	-0,03	-0,01	-0,05	-0,02	-0,01	-0,04
	%Change	-0,16	-0,14	0,09	-0,12	-0,14	-0,13	-0,02	-0,03	-0,16	-0,14	0,09	-0,12	0,13	-0,02	-0,02
Funding by LT deposits	2011	-0,05	-0,11	-0,09	-0,09	-0,03	-0,10	0,01	-0,02	-0,04	-0,11	-0,09	-0,09	0,10	0,01	-0,02
	2015sep	0,14	-0,18	0,15	-0,16	-0,06	0,17	-0,03	-0,07	0,13	-0,18	0,14	-0,16	0,16	-0,03	-0,07
	%Change	0,19	-0,19	0,12	-0,16	-0,07	0,18	-0,08	-0,09	0,20	-0,19	0,12	-0,16	0,18	-0,08	-0,09
Coverage with services	2011	0,26	0,29	0,20	0,22	0,23	0,28	0,09	0,09	0,27	0,29	0,20	0,22	0,28	0,09	0,09
	2015sep	0,10	0,12	0,05	0,09	0,12	0,12	0,02	0,02	0,10	0,12	0,05	0,09	0,12	0,02	0,02
	%Change	0,23	-0,23	0,19	-0,20	-0,21	0,22	-0,06	-0,08	0,23	-0,24	0,19	-0,20	0,22	-0,06	-0,08
Operational Efficiency	2011	0,04	0,02	0,02	0,04	0,04	0,01	-0,00	-0,00	0,04	0,02	0,01	0,04	0,01	-0,00	-0,00
	2015sep	0,13	0,10	0,04	0,12	0,09	0,08	0,01	0,02	0,13	0,10	0,04	0,11	0,08	0,01	0,02
	%Change	0,04	0,05	0,02	0,03	0,01	0,05	-0,00	0,01	0,04	0,05	0,02	0,03	0,05	-0,00	0,01
Banking Margin	2011	0,06	0,06	0,04	0,06	0,08	0,05	0,01	0,01	0,06	0,06	0,04	0,06	0,05	0,01	0,01
	2015sep	0,02	-0,00	0,05	0,02	-0,01	0,01	0,00	0,01	0,02	-0,01	0,05	0,01	0,01	0,00	0,01
	%Change	-0,02	-0,01	-0,06	-0,03	-0,03	-0,00	-0,01	-0,00	-0,02	-0,01	-0,06	-0,03	-0,00	-0,01	-0,00
Other revenue share	2011	0,39	0,32	0,22	0,28	0,27	0,29	0,04	0,08	0,39	0,32	0,21	0,28	0,29	0,04	0,08
	2015sep	0,44	0,36	0,26	0,32	0,28	0,33	0,09	0,13	0,44	0,36	0,26	0,32	0,33	0,09	0,13
	%Change	0,04	0,01	0,01	0,02	-0,01	0,00	0,02	0,03	0,04	0,01	0,01	0,02	0,00	0,02	0,03
Service Revenue Share	2011	0,17	0,19	0,13	0,14	0,16	0,19	0,07	0,07	0,18	0,19	0,13	0,14	0,19	0,07	0,07
	2015sep	0,01	0,00	0,02	-0,02	0,03	0,01	0,01	-0,00	0,01	0,00	0,02	-0,02	0,01	0,01	-0,00
	%Change	0,26	-0,27	0,20	-0,23	-0,23	0,25	-0,07	-0,08	0,26	-0,27	0,20	-0,23	0,25	-0,07	-0,08
Credit Volume	2011	0,17	0,24	0,15	0,15	0,17	0,25	0,04	0,04	0,17	0,24	0,15	0,15	0,25	0,04	0,04
	2015sep	0,04	0,11	0,02	0,03	0,06	0,13	-0,01	-0,00	0,05	0,11	0,02	0,03	0,13	-0,01	-0,00
	%Change	-0,13	-0,15	-0,13	-0,13	-0,12	-0,13	-0,04	-0,04	-0,13	-0,15	-0,13	-0,13	-0,14	-0,04	-0,04
Assets size	2011	0,34	0,40	0,26	0,32	0,26	0,39	0,05	0,09	0,34	0,40	0,26	0,32	0,38	0,05	0,09
	2015sep	0,33	0,39	0,24	0,30	0,25	0,38	0,06	0,09	0,33	0,39	0,24	0,30	0,38	0,06	0,09
	2011-2015	0,01	0,01	0,04	-0,02	0,01	0,02	0,05	0,04	0,01	0,01	0,04	-0,02	0,02	0,05	0,04
ROA	2011	0,17	0,20	0,12	0,20	0,11	0,17	-0,02	-0,01	0,16	0,19	0,12	0,19	0,16	-0,02	-0,01
	2015sep	0,26	0,28	0,16	0,27	0,16	0,25	0,05	0,07	0,26	0,28	0,16	0,27	0,25	0,05	0,07
	%Change	0,09	0,11	0,03	0,06	0,05	0,12	0,04	0,04	0,09	0,11	0,03	0,06	0,12	0,04	0,04
ROE	2011	0,31	0,40	0,27	0,36	0,24	0,37	-0,01	0,04	0,31	0,40	0,27	0,36	0,36	-0,01	0,04
	2015sep	0,32	0,38	0,22	0,33	0,21	0,36	0,06	0,11	0,31	0,38	0,22	0,33	0,35	0,06	0,11
	%Change	0,05	0,07	0,01	0,02	0,03	0,09	0,03	0,03	0,06	0,08	0,01	0,03	0,09	0,03	0,03
Banking Profitability	2011	0,04	-0,04	0,03	-0,02	0,00	0,05	-0,00	-0,01	0,04	-0,04	0,04	-0,02	0,05	-0,00	-0,01
	2015sep	0,00	-0,02	0,05	-0,01	-0,02	0,02	-0,01	-0,01	0,01	-0,02	0,05	-0,01	0,02	-0,00	-0,01
	%Change	-0,02	0,00	-0,04	0,00	-0,03	-0,00	-0,00	0,00	-0,02	0,00	-0,04	0,00	0,00	-0,00	0,00

Sicredi-affiliated credit unions active in 2014, all regions (Pearson Correlations)

103 (n)		Opened 2008	Cumul Opened 2014	Closed 2013	Cumul Closed 2014	% closed 2014	Operational 2014	Opened Inc V 2012	Operational Inc V 2014	Opened 2008	Cumul Opened 2014	Closed 2013	Cumul Closed 2014	Operational 2014	Opened Inc V 2012	Operational Inc V 2014
Sicredi all regions (active 2014)	n	64	76	51	62	62	76	3	7	64	76	51	62	76	3	7
Active	2015	0,15	0,16	0,10	0,11	0,15	0,15	0,02	0,03	0,15	0,16	0,10	0,12	0,15	0,02	0,03
PABs	2014	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inv. In Credit operations	2011	0,21	0,23	0,13	0,13	0,24	0,23	0,07	0,01	0,22	0,24	0,13	0,13	0,24	0,07	0,01
	2015sep	0,33	0,31	0,19	0,24	0,37	0,29	0,06	0,02	0,34	0,32	0,19	0,24	0,30	0,06	0,02
	%Change	0,12	0,07	0,05	0,11	0,13	0,05	-0,01	0,00	0,12	0,07	0,05	0,11	0,04	-0,01	0,00
Treasury investments	2011	0,05	-0,01	-0,05	-0,04	0,17	0,01	-0,03	-0,05	0,06	0,00	-0,05	-0,04	0,02	-0,03	-0,05
	2015sep	0,05	-0,04	-0,04	-0,06	-0,09	-0,03	-0,01	-0,03	-0,05	-0,04	-0,04	-0,06	-0,02	-0,01	-0,03
	%Change	0,11	-0,09	0,05	-0,07	-0,10	-0,08	-0,01	-0,02	0,11	-0,09	0,05	-0,07	0,08	-0,01	-0,02
Funding by LT deposits	2011	0,15	0,07	0,04	0,04	0,12	0,07	0,06	0,02	0,16	0,08	0,04	0,04	0,08	0,06	0,02
	2015sep	0,19	0,14	0,04	0,08	0,24	0,14	0,02	-0,02	0,20	0,14	0,05	0,09	0,14	0,02	-0,02
	%Change	-0,10	-0,08	0,08	-0,07	0,03	0,07	-0,07	-0,08	0,10	-0,08	0,08	-0,07	0,07	-0,07	-0,08
Coverage with services	2011	0,34	0,41	0,25	0,25	0,22	0,42	0,12	0,11	0,34	0,42	0,25	0,25	0,42	0,12	0,11
	2015sep	0,42	0,43	0,25	0,32	0,29	0,40	0,08	0,09	0,43	0,43	0,26	0,32	0,41	0,08	0,10
	%Change	0,11	0,02	0,02	0,08	0,11	-0,02	-0,05	-0,03	0,10	0,02	0,02	0,09	-0,02	-0,05	-0,03
Operational Efficiency	2011	0,17	0,17	0,12	0,14	0,19	0,15	0,02	0,03	0,17	0,17	0,12	0,15	0,15	0,02	0,03
	2015sep	0,22	0,22	0,15	0,19	0,25	0,19	0,03	0,05	0,22	0,22	0,15	0,20	0,19	0,03	0,05
	%Change	0,04	0,03	0,02	0,04	-0,01	0,02	-0,00	0,00	0,03	0,03	0,02	0,04	0,02	-0,00	0,00
Banking Margin	2011	0,10	0,11	0,07	0,08	0,10	0,10	0,02	0,02	0,10	0,11	0,07	0,08	0,10	0,02	0,02
	2015sep	0,32	0,31	0,22	0,29	0,33	0,27	0,06	0,08	0,32	0,31	0,22	0,29	0,27	0,06	0,08
	%Change	0,06	0,05	0,04	0,05	0,00	0,04	0,01	0,01	0,06	0,05	0,04	0,05	0,04	0,01	0,01
Other revenue share	2011	0,18	0,16	0,12	0,14	0,26	0,14	-0,05	-0,01	0,18	0,15	0,12	0,14	0,13	-0,05	-0,02
	2015sep	0,14	0,16	0,12	0,13	0,23	0,14	0,01	0,04	0,14	0,16	0,12	0,13	0,14	0,01	0,04
	%Change	-0,02	0,02	0,01	0,01	0,01	0,02	0,06	0,05	-0,01	0,02	0,01	0,01	0,02	0,06	0,06
Service Revenue Share	2011	0,30	0,38	0,21	0,21	0,16	0,39	0,12	0,11	0,31	0,39	0,21	0,21	0,40	0,12	0,11
	2015sep	0,33	0,36	0,19	0,21	0,16	0,36	0,08	0,08	0,34	0,36	0,19	0,22	0,37	0,08	0,08
	%Change	0,00	-0,07	-0,06	-0,03	-0,02	-0,08	-0,06	-0,06	0,01	-0,08	-0,06	-0,03	-0,08	-0,06	-0,06
Credit Volume	2011	0,08	0,18	0,11	0,07	0,12	0,20	0,03	0,02	0,09	0,19	0,11	0,08	0,20	0,03	0,02
	2015sep	0,18	0,24	0,08	0,10	0,16	0,27	0,01	0,02	0,19	0,25	0,08	0,10	0,27	0,01	0,02
	%Change	0,02	-0,04	0,08	-0,05	-0,03	0,03	-0,02	-0,01	0,02	-0,04	0,08	-0,05	0,03	-0,02	-0,01
Assets size	2011	0,31	0,35	0,23	0,27	0,27	0,32	0,03	0,07	0,30	0,35	0,23	0,27	0,32	0,03	0,07
	2015sep	0,29	0,33	0,21	0,25	0,26	0,31	0,04	0,07	0,29	0,33	0,20	0,25	0,31	0,04	0,07
	2011-2015	0,11	0,12	0,01	0,05	0,11	0,13	0,07	0,07	0,11	0,12	0,01	0,05	0,13	0,07	0,07
ROA	2011	0,36	0,40	0,31	0,39	0,37	0,33	-0,04	-0,02	0,35	0,39	0,31	0,39	0,32	-0,04	-0,02
	2015sep	0,41	0,39	0,28	0,41	0,40	0,31	0,08	0,11	0,41	0,39	0,29	0,41	0,31	0,08	0,11
	%Change	-0,02	-0,03	-0,04	-0,03	0,03	-0,03	0,01	0,03	-0,02	-0,03	-0,04	-0,03	-0,02	0,01	0,03
ROE	2011	0,29	0,42	0,34	0,40	0,33	0,35	-0,05	0,01	0,28	0,41	0,33	0,39	0,34	-0,05	0,01
	2015sep	0,42	0,45	0,30	0,43	0,37	0,38	0,07	0,15	0,41	0,45	0,30	0,44	0,38	0,07	0,14
	%Change	0,03	-0,04	0,05	-0,04	0,02	0,04	-0,00	0,03	0,03	-0,04	0,05	-0,04	0,03	-0,00	0,03
Banking Profitability	2011	0,24	0,26	0,17	0,21	0,25	0,23	0,05	0,05	0,24	0,26	0,17	0,21	0,23	0,05	0,05
	2015sep	0,34	0,33	0,23	0,29	0,36	0,29	0,06	0,08	0,34	0,33		0,30	0,29	0,06	0,08
	%Change	0,25	0,23	0,16	0,22	0,27	0,20	0,04	0,06	0,25	0,23	0,17	0,22	0,20	0,04	0,06

Appendix 33: Examples of more detailed search for relationships between CU BCs and CU financials (Based on Banco Central do Brasil, 2015c and 2015g)

CU BC intensity vs. Return on Equity

n = 1089	Correlation BC intensity - ROE for Credit Unions operational in 2015							
n (>0)	All CUs operational in 2015	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,11	0,15	0,17	0,22	0,38	0,26	0,27
103	2009	0,13	0,17	0,19	0,23	0,39	0,26	0,26
115	2010	0,13	0,17	0,19	0,23	0,39	0,26	0,26
189	2011	0,15	0,17	0,16	0,20	0,33	0,22	0,23
193	2012	0,15	0,17	0,16	0,21	0,35	0,23	0,24
197	2013	0,15	0,17	0,17	0,22	0,35	0,24	0,25
199	2014	0,14	0,17	0,17	0,22	0,35	0,24	0,24

n = 203	Correlation BC intensity - ROE for Credit Unions operational in 2015							
n (>0)	All CUs with BCs	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,13	0,20	0,30	0,38	0,45	0,19	0,29
103	2009	0,19	0,25	0,37	0,43	0,47	0,19	0,28
115	2010	0,19	0,26	0,37	0,44	0,47	0,19	0,28
189	2011	0,24	0,24	0,23	0,31	0,33	0,14	0,21
193	2012	0,23	0,24	0,24	0,34	0,35	0,15	0,22
197	2013	0,23	0,24	0,25	0,36	0,36	0,15	0,23
199	2014	0,22	0,24	0,25	0,37	0,37	0,15	0,22

CU BC intensity vs. Size

n = 1089	Correlation BC intensity - Asset Size for Credit Unions operational in 2015								
n (>0)	All CUs operational in 2015	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,21	0,21	0,23	0,25	0,26	0,30	0,31	0,33
103	2009	0,21	0,22	0,24	0,26	0,27	0,31	0,32	0,34
115	2010	0,21	0,22	0,24	0,26	0,27	0,31	0,32	0,34
189	2011	0,18	0,19	0,21	0,23	0,24	0,27	0,28	0,30
193	2012	0,19	0,20	0,22	0,23	0,25	0,28	0,29	0,31
197	2013	0,19	0,20	0,22	0,24	0,25	0,28	0,30	0,31
199	2014	0,19	0,20	0,22	0,24	0,25	0,28	0,30	0,31

n = 203	Correlation BC intensity - Asset Size for Credit Unions operational in 2015								
n (>0)	All CUs with BCs	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,29	0,30	0,37	0,37	0,48	0,47	0,46	0,46
103	2009	0,31	0,33	0,40	0,40	0,52	0,51	0,50	0,49
115	2010	0,30	0,32	0,41	0,40	0,53	0,52	0,50	0,50
189	2011	0,22	0,22	0,27	0,27	0,34	0,32	0,32	0,32
193	2012	0,23	0,23	0,28	0,28	0,36	0,35	0,34	0,34
197	2013	0,23	0,24	0,29	0,29	0,37	0,36	0,35	0,35
199	2014	0,23	0,24	0,30	0,30	0,38	0,37	0,36	0,36

CU Intensity vs. Other Revenue Share

n = 1089	Correlation BC intensity - Other Revenue Share for Credit Unions operational in 2015							
n (>0)	All CUs operational in 2015	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,21	0,19	0,24	0,22	0,19	0,17	0,20	0,27
103	2009	0,22	0,19	0,24	0,22	0,19	0,16	0,20	0,27
115	2010	0,22	0,19	0,24	0,21	0,19	0,16	0,19	0,27
189	2011	0,19	0,12	0,16	0,15	0,12	0,10	0,15	0,18
193	2012	0,20	0,13	0,17	0,15	0,13	0,11	0,15	0,19
197	2013	0,20	0,13	0,17	0,15	0,13	0,11	0,15	0,18
199	2014	0,20	0,13	0,17	0,16	0,13	0,11	0,15	0,19

n = 203	Correlation BC intensity - Other Revenue Share for Credit Unions operational in 2015							
n (>0)	All CUs with BCs	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,39	0,41	0,43	0,37	0,38	0,34	0,27	0,43
103	2009	0,42	0,41	0,43	0,36	0,38	0,32	0,24	0,42
115	2010	0,42	0,40	0,42	0,35	0,38	0,31	0,23	0,42
189	2011	0,34	0,16	0,17	0,13	0,15	0,11	0,08	0,17
193	2012	0,35	0,18	0,18	0,14	0,16	0,12	0,09	0,19
197	2013	0,35	0,19	0,19	0,14	0,16	0,12	0,08	0,18
199	2014	0,36	0,19	0,20	0,15	0,18	0,14	0,09	0,19

CU Intensity vs Return on Assets

n = 1089	Correlation BC intensity - Return on Assets for Credit Unions operational in 2015						
n (>0)	All CUs operational in 2015	2009	2010	2011	2012	2013	2014	2015sep
95	2008	- 0,00	0,03	0,01	0,01	0,19	0,26	0,12
103	2009	0,00	0,03	0,01	0,01	0,19	0,24	0,11
115	2010	0,00	0,03	0,01	0,01	0,18	0,23	0,11
189	2011	0,03	0,05	0,01	0,01	0,16	0,21	0,10
193	2012	0,03	0,05	0,01	0,01	0,17	0,21	0,10
197	2013	0,03	0,05	0,01	0,01	0,17	0,22	0,10
199	2014	0,03	0,04	0,01	0,01	0,17	0,22	0,10

n = 203	Correlation BC intensity - Return on Assets for Credit Unions operational in 2015						
n (>0)	All CUs with BCs	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,05	0,13	0,27	0,34	0,43	0,39	0,33
103	2009	0,08	0,14	0,29	0,34	0,41	0,34	0,28
115	2010	0,07	0,14	0,27	0,33	0,40	0,31	0,27
189	2011	0,28	0,25	0,20	0,27	0,32	0,25	0,21
193	2012	0,26	0,24	0,20	0,30	0,33	0,26	0,22
197	2013	0,25	0,23	0,21	0,31	0,34	0,27	0,23
199	2014	0,24	0,22	0,20	0,32	0,34	0,27	0,22

CU Intensity vs. Coverage with Services

n = 1089	Correlation BC intensity - Coverage with Services for Credit Unions operational in 2015							
n (>0)	All CUs operational in 2015	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,15	0,18	0,20	0,21	0,25	0,23	0,21	0,17
103	2009	0,15	0,18	0,20	0,21	0,26	0,24	0,21	0,17
115	2010	0,15	0,18	0,21	0,21	0,25	0,24	0,21	0,16
189	2011	0,18	0,34	0,35	0,30	0,35	0,34	0,28	0,26
193	2012	0,18	0,33	0,34	0,30	0,35	0,34	0,28	0,26
197	2013	0,18	0,33	0,34	0,30	0,35	0,34	0,28	0,26
199	2014	0,18	0,33	0,34	0,29	0,35	0,33	0,28	0,26

n = 203	Correlation BC intensity - Coverage with Services for Credit Unions operational in 2015							
n (>0)	All CUs with BCs	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,04	0,03	0,07	0,19	0,18	0,19	0,21	0,10
103	2009	0,02	0,04	0,08	0,20	0,18	0,20	0,21	0,07
115	2010	0,02	0,04	0,09	0,20	0,18	0,21	0,20	0,07
189	2011	0,12	0,47	0,51	0,51	0,47	0,51	0,48	0,40
193	2012	0,12	0,44	0,48	0,49	0,46	0,50	0,46	0,38
197	2013	0,11	0,42	0,47	0,48	0,45	0,48	0,45	0,37
199	2014	0,12	0,42	0,46	0,47	0,44	0,47	0,44	0,37

CU Intensity vs. Banking Profitability

n = 1089	Correlation BC intensity - Banking Profitability for Credit Unions operational in 2015							
n (>0)	All CUs operational in 2015	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	- 0,05	- 0,04	- 0,02	0,01	0,01	0,04	0,06	0,00
103	2009	- 0,05	- 0,04	- 0,02	0,01	0,01	0,04	0,05	- 0,01
115	2010	- 0,05	- 0,04	- 0,02	0,01	0,00	0,04	0,04	- 0,01
189	2011	- 0,04	- 0,03	- 0,01	0,01	0,01	0,04	0,05	- 0,01
193	2012	- 0,04	- 0,03	- 0,01	0,01	0,01	0,04	0,05	- 0,01
197	2013	- 0,05	- 0,03	- 0,01	0,01	0,01	0,04	0,04	- 0,01
199	2014	- 0,05	- 0,03	- 0,01	0,01	0,01	0,04	0,04	- 0,01

n = 203	Correlation BC intensity - Banking Profitability for Credit Unions operational in 2015							
n (>0)	All CUs with BCs	2008	2009	2010	2011	2012	2013	2014	2015sep
95	2008	0,03	- 0,01	0,02	0,10	0,12	0,20	0,16	0,20
103	2009	0,02	- 0,01	0,01	0,08	0,11	0,18	0,12	0,14
115	2010	0,01	- 0,02	0,01	0,07	0,10	0,17	0,10	0,13
189	2011	0,10	0,08	0,09	0,09	0,13	0,17	0,11	0,13
193	2012	0,09	0,07	0,09	0,09	0,14	0,18	0,11	0,13
197	2013	0,09	0,07	0,08	0,08	0,13	0,17	0,10	0,12
199	2014	0,08	0,07	0,08	0,08	0,13	0,16	0,10	0,12

Appendix 34: Illustration of some relationships between CU BCs and CU financials, average from 2012 to 2014 (Based on Banco Central do Brasil, 2015c and 2015g)

BC Intensity vs. Return on Equity

All credit unions

Relation between BC Intensity and ROE, Average from 2012 to 2014
[Pearson = 0.33, n = 1130, Sig. (2-tailed) <0.01]
Bubble size represents the CU's average assets in 2012-2014

By type of credit union

Relation between BC Intensity and ROE, Breakdown by Type of CU, Average from 2012 to 2014
[Pearson = 0.33, n = 1130, Sig. (2-tailed) <0.01]
Bubble size represents the CU's average assets in 2012-2014

Rural Credit - Pearson = -0.04, Sig. (2-tailed)>0.05   Mutual Credit - Pearson = 0.04, Sig. (2-tailed)>0.05   Free Admission - Pearson = 0.57, Sig. (2-tailed)<0.01
Luzzatti - Pearson = 0.26, Sig. (2-tailed)>0.05

By affiliation

Relation between BC Intensity and ROE, Breakdown by Affiliation, Average from 2012 to 2014
[Pearson = 0.32, n = 1130, Sig. 2(tailed) <0.01]
Bubble size represents the CU's average assets in 2012-2014

By region

Relation between BC Intensity and ROE, Breakdown by Region, Average from 2012 to 2014
[Pearson = 0.32, n = 1130, Sig. 2(tailed) <0.01]
Bubble size represents the CU's average assets in 2012-2014

BC Intensity vs. Asset Size

All credit unions

Relation between BC Intensity and CU size, Average from 2012 to 2014
[Pearson = 0.30, n = 1130, Sig. at the 0.01-level]

By type of credit union

Relation between BC Intensity and CU size, Breakdown by Type of CU, Average from 2012 to 2014
[Pearson = 0.30, n = 1186, Sig. at the 0.01-level]

Rural Credit - Pearson = 0.02, Sig. (2-tailed)>0.05   Mutual Credit - Pearson = 0.03, Sig. (2-tailed)>0.05
Free Admission - Pearson = 0.6, Sig. (2-tailed)<0.01   Luzzatti - Pearson = 0.34, Sig. (2-tailed)>0.05

By affiliation

Relation between BC Intensity and CU size, Breakdown by Affiliation , Average from 2012 to 2014
[Pearson = 0.30, n = 1130, Sig. at the 0.01-level]

By Region

Relation between BC Intensity and CU size, Breakdown by Region, Average from 2012 to 2014
[Pearson = 0.30, n = 1130, Sig. at the 0.01-level]

BC Intensity vs. Other Revenue Share

All credit unions

Relation between BC Intensity and Other Revenue Share, Average from 2012 to 2014
[Pearson = 0.14, n = 1130, Sig. at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

By type of credit union

Relation between BC Intensity and Other Revenue Share, Breakdown by Type of CU, Average from 2012 to 2014
[Pearson = 0.14, n = 1130, Sig. at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

Rural Credit - Pearson = -0.06, Sig. (2-tailed)>0.05   Mutual Credit - Pearson = -0.01, Sig. (2-tailed)>0.05   Free Admission - Pearson = 0.28, Sig. (2-tailed)<0.01
Luzzatti - Pearson = 0.52, Sig. (2-tailed)>0.05

By affiliation

Relation between BC Intensity and Other Revenue Share, Breakdown by Affiliation, Average from 2012 to 2014
[Pearson = 0.14, n = 1130, Sig. at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

- Sicredi - Pearson = 0.01, Sig. (2-tailed)>0.05
- Sicoob - Pearson = -0.08, Sig. (2-tailed)>0.05
- Independent - Pearson = 0, Sig. (2-tailed)>0.05
- Unicred - Pearson = 0.06, Sig. (2-tailed)>0.05
- Ancosol - Pearson = -0.19, Sig. (2-tailed)<0.05

By region

Relation between BC Intensity and Other Revenue Share, Breakdown by Region, Average from 2012 to 2014
[Pearson = 0.14, n = 1130, Sig. at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

- North - Pearson = 0.01, Sig. (2-tailed)>0.05
- Northeast - Pearson = 0.2, Sig. (2-tailed)>0.05
- Southeast - Pearson = 0.07, Sig. (2-tailed)>0.05
- South - Pearson = 0.14, Sig. (2-tailed)<0.01
- Central-West - Pearson = 0.34, Sig. (2-tailed)<0.01

BC Intensity vs. Return on Assets

All credit unions

Relation between BC Intensity and ROA, Average from 2012 to 2014
[Pearson = 0.01, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

By type of Credit union

Relation between BC Intensity and ROA, Breakdown by type of CU, Average from 2012 to 2014
[Pearson = 0.01, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

Rural Credit - Pearson = 0.02, Sig. (2-tailed)>0.05   Mutual Credit - Pearson = 0.02, Sig. (2-tailed)>0.05   Free Admission - Pearson = 0.38, Sig. (2-tailed)<0.01
Luzzatti - Pearson = 0.04, Sig. (2-tailed)>0.05

By affiliation

Relation between BC Intensity and ROA, Breakdown by Region Average from 2012 to 2014
[Pearson = 0.01, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

By region

Relation between BC Intensity and ROA, Breakdown by Region Average from 2012 to 2014
[Pearson = 0.01, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

BC Intensity vs. Coverage with Services

All credit unions

Relation between BC Intensity and Coverage with Services, Average from 2012 to 2014
[Pearson = 0.32, n = 1130, significant at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

By type of credit union

Relation between BC Intensity and Coverage with Services, Breakdown by Type of CU, Average from 2012 to 2014
[Pearson = 0.32, n = 1130, significant at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

Rural Credit - Pearson = 0.26, Sig. (2-tailed)<0.01   Mutual Credit - Pearson = 0.27, Sig. (2-tailed)<0.01   Free Admission - Pearson = 0.31, Sig. (2-tailed)<0.01
Luzzatti - Pearson = 0.52, Sig. (2-tailed)>0.05

By affiliation

Relation between BC Intensity and Coverage with Services, Breakdown by Affiliation, Average from 2012 to 2014
[Pearson = 0.32, n = 1130, significant at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

By region

Relation between BC Intensity and Coverage with Services, Breakdown by Region, Average from 2012 to 2014
[Pearson = 0.32, n = 1130, significant at the 0.01-level]
Bubble size represents the CU's average assets from 2012 to 2014

BC Intensity vs. Banking Profitability

All credit unions

Relation between BC Intensity and Banking Profitability, Average from 2012 to 2014
[Pearson = 0.03, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

By type of credit union

Relation between BC Intensity and Banking Profitability, Breakdown by CU Type, Average from 2012 to 2014
[Pearson = 0.03, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

● Rural Credit - Pearson = -0.01, Sig. (2-tailed)>0.05   ● Mutual Credit - Pearson = 0, Sig. (2-tailed)>0.05   ● Free Admission - Pearson = -0.04, Sig. (2-tailed)>0.05
● Luzzatti - Pearson = 0.02, Sig. (2-tailed)>0.05

By affiliation

Relation between BC Intensity and Banking Profitability, Breakdown by Affiliation, Average from 2012 to 2014
[Pearson = 0.03, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

- Sicredi - Pearson = 0.3, Sig. (2-tailed)<0.01
- Sicoob - Pearson = 0.07, Sig. (2-tailed)>0.05
- Independent - Pearson = -0.01, Sig. (2-tailed)>0.05
- Unicred - Pearson = 0.08, Sig. (2-tailed)>0.05
- Ancosol - Pearson = -0.05, Sig. (2-tailed)>0.05

By region

Relation between BC Intensity and Banking Profitability, Breakdown by Region, Average from 2012 to 2014
[Pearson = 0.03, n = 1130, NOT significant at the 0.05-level]
Bubble size represents the CU's average assets from 2012 to 2014

- North - Pearson = 0.02, Sig. (2-tailed)>0.05
- Northeast - Pearson = 0.08, Sig. (2-tailed)>0.05
- Southeast - Pearson = 0.05, Sig. (2-tailed)>0.05
- South - Pearson = 0.13, Sig. (2-tailed)<0.05
- Central-West - Pearson = 0.09, Sig. (2-tailed)>0.05

Appendix 35: Search for potential hidden variables explaining the observed relationships

(Based on Banco Central do Brasil, 2015c and 2015g)

All Credit Unions

All		Avg. BC Intensity 2012-14	Avg. ROE 2012-14	Avg. Size 2012-2014	Avg. Other Revenue Share 2012-14	Avg. ROA 2012-14	Avg. Coverage with Services 2012-2014	Avg. Banking Profitability 2012-14
Avg. BC Intensity 2012-14	Pearson Correlation	1	,323**	,298**	,145**	,012	,318**	,031
	Sig. (2-tailed)		,000	,000	,000	,679	,000	,292
	N	1130	1130	1130	1130	1130	1130	1130
Avg. ROE 2012-14	Pearson Correlation	,323**	1	,528**	,085**	,421**	,184**	,290**
	Sig. (2-tailed)	,000		,000	,004	,000	,000	,000
	N	1130	1130	1130	1130	1130	1130	1130
Avg. Size 2012-2014	Pearson Correlation	,298**	,528**	1	,209**	,159**	,203**	-,013
	Sig. (2-tailed)	,000	,000		,000	,000	,000	,666
	N	1130	1130	1130	1130	1130	1130	1130
Avg. Other Revenue Share 2012-14	Pearson Correlation	,145**	,085**	,209**	1	-,027	,173**	-,068*
	Sig. (2-tailed)	,000	,004	,000		,361	,000	,022
	N	1130	1130	1130	1130	1130	1130	1130
Avg. ROA 2012-14	Pearson Correlation	,012	,421**	,159**	-,027	1	,007	,078**
	Sig. (2-tailed)	,679	,000	,000	,361		,810	,009
	N	1130	1130	1130	1130	1130	1130	1130
Avg. Coverage with Services 2012-2014	Pearson Correlation	,318**	,184**	,203**	,173**	,007	1	-,016
	Sig. (2-tailed)	,000	,000	,000	,000	,810		,582
	N	1130	1130	1130	1130	1130	1130	1130
Avg. Banking Profitability 2012-14	Pearson Correlation	,031	,290**	-,013	-,068*	,078**	-,016	1
	Sig. (2-tailed)	,292	,000	,666	,022	,009	,582	
	N	1130	1130	1130	1130	1130	1130	1130

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Type: Free Admission Credit Unions

		Avg. BC Intensity 2012-14	Avg. ROE 2012-14	Avg. Size 2012-2014	Avg. Other Revenue Share 2012-14	Avg. ROA 2012-14	Avg. Coverage with Services 2012-2014	Avg. Banking Profitability 2012-14
Free Admission								
Avg. BC Intensity 2012-14	Pearson Correlation	1	,569**	,597**	,277**	,381**	,307**	-,040
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,493
	N	290	290	290	290	290	290	290
Avg. ROE 2012-14	Pearson Correlation	,569**	1	,706**	,161**	,856**	,204**	,220**
	Sig. (2-tailed)	,000		,000	,006	,000	,000	,000
	N	290	290	290	290	290	290	290
Avg. Size 2012-2014	Pearson Correlation	,597**	,706**	1	,280**	,549**	,024	,015
	Sig. (2-tailed)	,000	,000		,000	,000	,682	,801
	N	290	290	290	290	290	290	290
Avg. Other Revenue Share 2012-14	Pearson Correlation	,277**	,161**	,280**	1	,090	,045	,051
	Sig. (2-tailed)	,000	,006	,000		,126	,443	,387
	N	290	290	290	290	290	290	290
Avg. ROA 2012-14	Pearson Correlation	,381**	,856**	,549**	,090	1	,061	,547**
	Sig. (2-tailed)	,000	,000	,000	,126		,300	,000
	N	290	290	290	290	290	290	290
Avg. Coverage with Services 2012-2014	Pearson Correlation	,307**	,204**	,024	,045	,061	1	-,053
	Sig. (2-tailed)	,000	,000	,682	,443	,300		,371
	N	290	290	290	290	290	290	290
Avg. Banking Profitability 2012-14	Pearson Correlation	-,040	,220**	,015	,051	,547**	-,053	1
	Sig. (2-tailed)	,493	,000	,801	,387	,000	,371	
	N	290	290	290	290	290	290	290

**. Correlation is significant at the 0.01 level (2-tailed).

Affiliation: Sicredi

Sicredi		Avg. BC Intensity 2012-14	Avg. ROE 2012-14	Avg. Size 2012-2014	Avg. Other Revenue Share 2012-14	Avg. ROA 2012-14	Avg. Coverage with Services 2012-2014	Avg. Banking Profitability 2012-14
Avg. BC Intensity 2012-14	Pearson Correlation	1	,573**	,497**	,012	,492**	,444**	,298**
	Sig. (2-tailed)		,000	,000	,906	,000	,000	,002
	N	101	101	101	101	101	101	101
Avg. ROE 2012-14	Pearson Correlation	,573**	1	,509**	,118	,934**	,523**	,575**
	Sig. (2-tailed)	,000		,000	,240	,000	,000	,000
	N	101	101	101	101	101	101	101
Avg. Size 2012-2014	Pearson Correlation	,497**	,509**	1	,212*	,450**	,005	-,154
	Sig. (2-tailed)	,000	,000		,034	,000	,964	,123
	N	101	101	101	101	101	101	101
Avg. Other Revenue Share 2012-14	Pearson Correlation	,012	,118	,212*	1	,071	-,129	,188
	Sig. (2-tailed)	,906	,240	,034		,478	,199	,060
	N	101	101	101	101	101	101	101
Avg. ROA 2012-14	Pearson Correlation	,492**	,934**	,450**	,071	1	,497**	,602**
	Sig. (2-tailed)	,000	,000	,000	,478		,000	,000
	N	101	101	101	101	101	101	101
Avg. Coverage with Services 2012-2014	Pearson Correlation	,444**	,523**	,005	-,129	,497**	1	,665**
	Sig. (2-tailed)	,000	,000	,964	,199	,000		,000
	N	101	101	101	101	101	101	101
Avg. Banking Profitability 2012-14	Pearson Correlation	,298**	,575**	-,154	,188	,602**	,665**	1
	Sig. (2-tailed)	,002	,000	,123	,060	,000	,000	
	N	101	101	101	101	101	101	101

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Affiliation: Sicoob

Sicoob		Avg. BC Intensity 2012-14	Avg. ROE 2012-14	Avg. Size 2012-2014	Avg. Other Revenue Share 2012-14	Avg. ROA 2012-14	Avg. Coverage with Services 2012-2014	Avg. Banking Profitability 2012-14
Avg. BC Intensity 2012-14	Pearson Correlation	1	,235**	,152**	-,079	,203**	,350**	,071
	Sig. (2-tailed)		,000	,009	,177	,000	,000	,225
	N	295	295	295	295	295	295	295
Avg. ROE 2012-14	Pearson Correlation	,235**	1	,514**	-,016	,845**	,127*	,366**
	Sig. (2-tailed)	,000		,000	,789	,000	,029	,000
	N	295	295	295	295	295	295	295
Avg. Size 2012-2014	Pearson Correlation	,152**	,514**	1	,041	,326**	-,233**	-,179**
	Sig. (2-tailed)	,009	,000		,485	,000	,000	,002
	N	295	295	295	295	295	295	295
Avg. Other Revenue Share 2012-14	Pearson Correlation	-,079	-,016	,041	1	-,047	-,108	,130*
	Sig. (2-tailed)	,177	,789	,485		,422	,065	,026
	N	295	295	295	295	295	295	295
Avg. ROA 2012-14	Pearson Correlation	,203**	,845**	,326**	-,047	1	,110	,569**
	Sig. (2-tailed)	,000	,000	,000	,422		,059	,000
	N	295	295	295	295	295	295	295
Avg. Coverage with Services 2012-2014	Pearson Correlation	,350**	,127*	-,233**	-,108	,110	1	,300**
	Sig. (2-tailed)	,000	,029	,000	,065	,059		,000
	N	295	295	295	295	295	295	295
Avg. Banking Profitability 2012-14	Pearson Correlation	,071	,366**	-,179**	,130*	,569**	,300**	1
	Sig. (2-tailed)	,225	,000	,002	,026	,000	,000	
	N	295	295	295	295	295	295	295

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Region: South

South		Avg. BC Intensity 2012-14	Avg. ROE 2012-14	Avg. Size 2012-2014	Avg. Other Revenue Share 2012-14	Avg. ROA 2012-14	Avg. Coverage with Services 2012-2014	Avg. Banking Profitability 2012-14
Avg. BC Intensity 2012-14	Pearson Correlation	1	,473**	,372**	,139**	,404**	,425**	,134*
	Sig. (2-tailed)		,000	,000	,009	,000	,000	,012
	N	352	352	352	352	352	352	352
Avg. ROE 2012-14	Pearson Correlation	,473**	1	,638**	,046	,877**	,269**	,360**
	Sig. (2-tailed)	,000		,000	,389	,000	,000	,000
	N	352	352	352	352	352	352	352
Avg. Size 2012-2014	Pearson Correlation	,372**	,638**	1	,170**	,519**	,086	-,125*
	Sig. (2-tailed)	,000	,000		,001	,000	,109	,019
	N	352	352	352	352	352	352	352
Avg. Other Revenue Share 2012-14	Pearson Correlation	,139**	,046	,170**	1	-,101	,051	,058
	Sig. (2-tailed)	,009	,389	,001		,058	,343	,282
	N	352	352	352	352	352	352	352
Avg. ROA 2012-14	Pearson Correlation	,404**	,877**	,519**	-,101	1	,199**	,498**
	Sig. (2-tailed)	,000	,000	,000	,058		,000	,000
	N	352	352	352	352	352	352	352
Avg. Coverage with Services 2012-2014	Pearson Correlation	,425**	,269**	,086	,051	,199**	1	,149**
	Sig. (2-tailed)	,000	,000	,109	,343	,000		,005
	N	352	352	352	352	352	352	352
Avg. Banking Profitability 2012-14	Pearson Correlation	,134*	,360**	-,125*	,058	,498**	,149**	1
	Sig. (2-tailed)	,012	,000	,019	,282	,000	,005	
	N	352	352	352	352	352	352	352

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Region: Central-West

Central-West		Avg. BC Intensity 2012-14	Avg. ROE 2012-14	Avg. Size 2012-2014	Avg. Other Revenue Share 2012-14	Avg. ROA 2012-14	Avg. Coverage with Services 2012-	Avg. Banking Profitability 2012-14
Avg. BC Intensity 2012-14	Pearson Correlation	1	,636**	,432**	,335**	,298**	,389**	,093
	Sig. (2-tailed)		,000	,000	,001	,004	,000	,379
	N	91	91	91	91	91	91	91
Avg. ROE 2012-14	Pearson Correlation	,636**	1	,614**	,251*	,827**	,164	,399**
	Sig. (2-tailed)	,000		,000	,016	,000	,121	,000
	N	91	91	91	91	91	91	91
Avg. Size 2012-2014	Pearson Correlation	,432**	,614**	1	,279**	,406**	-,059	-,031
	Sig. (2-tailed)	,000	,000		,007	,000	,577	,768
	N	91	91	91	91	91	91	91
Avg. Other Revenue Share 2012-14	Pearson Correlation	,335**	,251*	,279**	1	,030	,057	-,019
	Sig. (2-tailed)	,001	,016	,007		,775	,591	,858
	N	91	91	91	91	91	91	91
Avg. ROA 2012-14	Pearson Correlation	,298**	,827**	,406**	,030	1	,047	,526**
	Sig. (2-tailed)	,004	,000	,000	,775		,656	,000
	N	91	91	91	91	91	91	91
Avg. Coverage with Services 2012-2014	Pearson Correlation	,389**	,164	-,059	,057	,047	1	,111
	Sig. (2-tailed)	,000	,121	,577	,591	,656		,294
	N	91	91	91	91	91	91	91
Avg. Banking Profitability 2012-14	Pearson Correlation	,093	,399**	-,031	-,019	,526**	,111	1
	Sig. (2-tailed)	,379	,000	,768	,858	,000	,294	
	N	91	91	91	91	91	91	91

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 36: Interpretation of the value of the Pearson correlation (Based on Evans, 1996)

Pearson	Strength
I 0.00 - 0.19 I	very weak
I 0.20 - 0.39 I	weak
I 0.40 - 0.59 I	moderate
I 0.60 - 0.79 I	strong
I 0.80 - 1.00 I	very strong

Appendix 37: All credit union correspondents by IFI category, by region and affiliation

(Based on Banco Central do Brasil, 2015c-g)

Region	IFI class	Municipalities	Number of BCs				Municipalities covered				% of mun. covered			
			All	Sicredi	Sicoob	Independent	All	Sicredi	Sicoob	Independent	All	Sicredi	Sicoob	Independent
North	0 - 0,1	99	1	0	1	0	1	0	1	0	1%	0%	1%	0%
	0,1 - 0,2	94	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,2 - 0,3	86	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,3 - 0,4	62	24	0	24	0	9	0	9	0	15%	0%	15%	0%
	0,4 - 0,5	37	9	3	6	0	5	3	2	0	14%	8%	5%	0%
	0,5 - 0,6	32	27	7	20	0	6	2	4	0	19%	6%	13%	0%
	0,6 - 0,7	27	6	0	6	0	2	0	2	0	7%	0%	7%	0%
	0,7 - 0,8	10	1	0	1	0	1	0	1	0	10%	0%	10%	0%
	0,8 - 0,9	2	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,9 - 1	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A
	Subtotal	**449**	**68**	**10**	**58**	**0**	**24**	**5**	**19**	**0**	**5%**	**1%**	**4%**	**0%**
Northeast	0 - 0,1	306	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	711	9	0	6	2	8	0	5	2	1%	0%	1%	0%
	0,2 - 0,3	420	9	0	8	0	7	0	6	0	2%	0%	1%	0%
	0,3 - 0,4	208	7	0	5	1	4	0	2	1	2%	0%	1%	0%
	0,4 - 0,5	86	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,5 - 0,6	28	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,6 - 0,7	13	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,7 - 0,8	14	1	0	0	1	1	0	0	1	7%	0%	0%	7%
	0,8 - 0,9	7	15	0	1	1	4	0	1	1	57%	0%	14%	14%
	0,9 - 1	1	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	Subtotal	**1794**	**41**	**0**	**20**	**5**	**24**	**0**	**14**	**5**	**1%**	**0%**	**1%**	**0%**
Southeast	0 - 0,1	28	1	0	1	0	1	0	1	0	4%	0%	4%	0%
	0,1 - 0,2	106	8	0	8	0	7	0	7	0	7%	0%	7%	0%
	0,2 - 0,3	249	67	0	65	2	25	0	24	1	10%	0%	10%	0%
	0,3 - 0,4	259	68	0	61	7	29	0	27	3	11%	0%	10%	1%
	0,4 - 0,5	257	79	1	67	11	30	1	27	2	12%	0%	11%	1%
	0,5 - 0,6	239	185	0	180	5	30	0	28	3	13%	0%	12%	1%
	0,6 - 0,7	193	122	5	100	18	36	4	26	11	19%	2%	13%	6%
	0,7 - 0,8	200	81	6	67	8	31	4	24	3	16%	2%	12%	2%
	0,8 - 0,9	113	37	6	27	4	10	5	4	1	9%	4%	4%	1%
	0,9 - 1	24	13	5	4	3	6	4	4	2	25%	17%	17%	8%
	Subtotal	**1668**	**661**	**23**	**580**	**58**	**205**	**18**	**172**	**26**	**12%**	**1%**	**10%**	**2%**
South	0 - 0,1	4	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	95	80	73	7	0	48	44	4	0	51%	46%	4%	0%
	0,2 - 0,3	89	125	122	3	0	54	52	2	0	61%	58%	2%	0%
	0,3 - 0,4	104	186	152	28	6	72	52	20	2	69%	50%	19%	2%
	0,4 - 0,5	147	283	245	38	0	93	78	17	0	63%	53%	12%	0%
	0,5 - 0,6	155	336	282	42	15	101	84	21	3	65%	54%	14%	2%
	0,6 - 0,7	183	454	337	90	29	123	95	35	10	67%	52%	19%	5%
	0,7 - 0,8	208	400	312	82	7	114	94	28	1	55%	45%	13%	0%
	0,8 - 0,9	146	536	384	150	5	102	80	30	2	70%	55%	21%	1%
	0,9 - 1	57	451	347	100	3	49	45	11	2	86%	79%	19%	4%
	Subtotal	**1188**	**2851**	**2254**	**540**	**65**	**756**	**624**	**168**	**20**	**64%**	**53%**	**14%**	**2%**
Center-West	0 - 0,1	18	1	1	0	1	1	1	0	1	6%	6%	0%	6%
	0,1 - 0,2	21	10	9	0	1	6	5	0	1	29%	24%	0%	5%
	0,2 - 0,3	25	20	20	0	0	8	8	0	0	32%	32%	0%	0%
	0,3 - 0,4	44	22	22	0	0	6	6	0	0	14%	14%	0%	0%
	0,4 - 0,5	45	42	41	0	1	13	13	0	1	29%	29%	0%	2%
	0,5 - 0,6	67	68	64	0	6	24	23	0	3	36%	34%	0%	4%
	0,6 - 0,7	66	64	64	0	1	24	24	0	1	36%	36%	0%	2%
	0,7 - 0,8	156	168	162	0	13	46	45	0	4	29%	29%	0%	3%
	0,8 - 0,9	22	34	34	0	0	7	7	0	0	32%	32%	0%	0%
	0,9 - 1	2	6	0	4	1	1	0	1	1	50%	0%	50%	50%
	Subtotal	**466**	**435**	**417**	**4**	**24**	**136**	**132**	**1**	**12**	**29%**	**28%**	**0%**	**3%**
Total	0 - 0,1	455	3	1	2	1	3	1	2	1	1%	0%	0%	0%
	0,1 - 0,2	1027	107	82	21	3	69	49	16	3	7%	5%	2%	0%
	0,2 - 0,3	869	221	142	76	2	94	60	32	1	11%	7%	4%	0%
	0,3 - 0,4	677	307	174	118	14	120	58	58	6	18%	9%	9%	1%
	0,4 - 0,5	572	413	290	111	12	141	95	46	3	25%	17%	8%	1%
	0,5 - 0,6	521	616	353	242	26	161	109	53	9	31%	21%	10%	2%
	0,6 - 0,7	482	646	406	196	48	185	123	63	22	38%	26%	13%	5%
	0,7 - 0,8	588	651	480	150	29	193	143	53	9	33%	24%	9%	2%
	0,8 - 0,9	290	622	424	178	10	123	92	35	4	42%	32%	12%	1%
	0,9 - 1	84	470	352	108	7	56	49	16	5	67%	58%	19%	6%
	Subtotal	**5565**	**4056**	**2704**	**1202**	**152**	**1145**	**779**	**374**	**63**	**21%**	**14%**	**7%**	**1%**

Appendix 38: All exclusive credit union correspondents by IFI category, by region and affiliation (Based on Banco Central do Brasil, 2015c-g)

			All exclusive credit union correspondents by IFI category, by region, 2014											
			Number of BCs				Municipalities covered				% of mun. covered			
Region	IFI class	Municipalities	All	Sicredi	Sicoob	Independent	All	Sicredi	Sicoob	Independent	All	Sicredi	Sicoob	Independent
North	0 - 0,1	99	1	0	1	0	1	0	1	0	1%	0%	1%	0%
	0,1 - 0,2	94	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,2 - 0,3	86	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,3 - 0,4	62	22	0	22	0	9	0	9	0	15%	0%	15%	0%
	0,4 - 0,5	37	8	2	6	0	4	2	2	0	11%	5%	5%	0%
	0,5 - 0,6	32	18	4	14	0	4	1	3	0	13%	3%	9%	0%
	0,6 - 0,7	27	5	0	5	0	2	0	2	0	7%	0%	7%	0%
	0,7 - 0,8	10	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,8 - 0,9	2	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,9 - 1	0	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A
	Subtotal	**449**	**54**	**6**	**48**	**0**	**20**	**3**	**17**	**0**	**4%**	**1%**	**4%**	**0%**
Northeast	0 - 0,1	306	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	711	8	0	6	2	7	0	5	2	1%	0%	1%	0%
	0,2 - 0,3	420	4	0	4	0	3	0	3	0	1%	0%	1%	0%
	0,3 - 0,4	208	4	0	3	0	2	0	1	0	1%	0%	0%	0%
	0,4 - 0,5	86	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,5 - 0,6	28	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,6 - 0,7	13	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,7 - 0,8	14	1	0	0	1	1	0	0	1	7%	0%	0%	7%
	0,8 - 0,9	7	8	0	1	0	4	0	1	0	57%	0%	14%	0%
	0,9 - 1	1	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	Subtotal	**1794**	**25**	**0**	**14**	**3**	**17**	**0**	**10**	**3**	**1%**	**0%**	**1%**	**0%**
Southeast	0 - 0,1	28	1	0	1	0	1	0	1	0	4%	0%	4%	0%
	0,1 - 0,2	106	8	0	8	0	7	0	7	0	7%	0%	7%	0%
	0,2 - 0,3	249	57	0	55	2	22	0	21	1	9%	0%	8%	0%
	0,3 - 0,4	259	50	0	44	6	22	0	20	3	8%	0%	8%	1%
	0,4 - 0,5	257	55	1	45	9	25	1	22	2	10%	0%	9%	1%
	0,5 - 0,6	239	147	0	143	4	26	0	25	2	11%	0%	10%	1%
	0,6 - 0,7	193	103	2	87	14	32	2	25	9	17%	1%	13%	5%
	0,7 - 0,8	200	69	4	58	7	27	3	21	3	14%	2%	11%	2%
	0,8 - 0,9	113	30	2	24	4	7	2	4	1	6%	2%	4%	1%
	0,9 - 1	24	8	3	2	2	5	3	2	2	21%	13%	8%	8%
	Subtotal	**1668**	**528**	**12**	**467**	**48**	**174**	**11**	**148**	**23**	**10%**	**1%**	**9%**	**1%**
South	0 - 0,1	4	0	0	0	0	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	95	65	59	6	0	46	42	4	0	48%	44%	4%	0%
	0,2 - 0,3	89	100	97	3	0	49	47	2	0	55%	53%	2%	0%
	0,3 - 0,4	104	135	107	24	4	65	47	18	2	63%	45%	17%	2%
	0,4 - 0,5	147	217	183	34	0	83	68	17	0	56%	46%	12%	0%
	0,5 - 0,6	155	249	202	35	9	90	73	19	2	58%	47%	12%	1%
	0,6 - 0,7	183	343	243	75	24	113	87	32	8	62%	48%	17%	4%
	0,7 - 0,8	208	295	224	67	4	103	85	26	1	50%	41%	13%	0%
	0,8 - 0,9	146	409	279	123	4	96	74	29	1	66%	51%	20%	1%
	0,9 - 1	57	302	201	98	2	46	41	11	2	81%	72%	19%	4%
	Subtotal	**1188**	**2115**	**1595**	**465**	**47**	**691**	**564**	**158**	**16**	**58%**	**47%**	**13%**	**1%**
Center-West	0 - 0,1	18	1	0	0	0	1	0	0	0	6%	0%	0%	0%
	0,1 - 0,2	21	10	9	0	1	6	5	0	1	29%	24%	0%	5%
	0,2 - 0,3	25	13	13	0	0	6	6	0	0	24%	24%	0%	0%
	0,3 - 0,4	44	20	20	0	0	5	5	0	0	11%	11%	0%	0%
	0,4 - 0,5	45	30	30	0	0	13	13	0	0	29%	29%	0%	0%
	0,5 - 0,6	67	54	48	0	4	21	19	0	2	31%	28%	0%	3%
	0,6 - 0,7	66	50	50	0	0	21	21	0	0	32%	32%	0%	0%
	0,7 - 0,8	156	127	117	0	5	43	41	0	3	28%	26%	0%	2%
	0,8 - 0,9	22	22	22	0	0	6	6	0	0	27%	27%	0%	0%
	0,9 - 1	2	5	0	4	0	1	0	1	0	50%	0%	50%	0%
	Subtotal	**466**	**332**	**309**	**4**	**10**	**123**	**116**	**1**	**6**	**26%**	**25%**	**0%**	**1%**
Total	0 - 0,1	455	3	0	2	0	3	0	2	0	1%	0%	0%	0%
	0,1 - 0,2	1027	91	68	20	3	66	47	16	3	6%	5%	2%	0%
	0,2 - 0,3	869	174	110	62	2	80	53	26	1	9%	6%	3%	0%
	0,3 - 0,4	677	231	127	93	10	103	52	48	5	15%	8%	7%	1%
	0,4 - 0,5	572	310	216	85	9	125	84	41	2	22%	15%	7%	0%
	0,5 - 0,6	521	468	254	192	17	141	93	47	6	27%	18%	9%	1%
	0,6 - 0,7	482	501	295	167	38	168	110	59	17	35%	23%	12%	4%
	0,7 - 0,8	588	492	345	125	17	174	129	47	8	30%	22%	8%	1%
	0,8 - 0,9	290	469	303	148	8	113	82	34	2	39%	28%	12%	1%
	0,9 - 1	84	315	204	104	4	52	44	14	4	62%	52%	17%	5%
	Subtotal	**5565**	**3054**	**1922**	**998**	**108**	**1025**	**694**	**334**	**48**	**18%**	**12%**	**6%**	**1%**

Appendix 39: All BCs with Inc. III by category, comparison with exclusive CU BCs (Based on Banco Central do Brasil, 2015c-g)

Region	IFI class	Municipalities	All BC	All Cus	Sicredi	Sicoob	Independent	All Cus	Sicredi	Sicoob	Independent
All banking correspondents and exclusive CU BCs with service III by region and IFI category											
				Number of banking correspondents with Inc. III				CU % of all correspondents with Inc. III			
North	0 - 0,1	99	194	1	0	1	0	0,5 %	0,0 %	0,5 %	0,0 %
	0,1 - 0,2	94	381	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,2 - 0,3	86	312	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,3 - 0,4	62	308	22	0	22	0	7,1 %	0,0 %	7,1 %	0,0 %
	0,4 - 0,5	37	251	8	2	6	0	3,2 %	0,8 %	2,4 %	0,0 %
	0,5 - 0,6	32	301	21	4	17	0	7,0 %	1,3 %	5,6 %	0,0 %
	0,6 - 0,7	27	646	3	0	3	0	0,5 %	0,0 %	0,5 %	0,0 %
	0,7 - 0,8	10	91	1	0	1	0	1,1 %	0,0 %	1,1 %	0,0 %
	0,8 - 0,9	2	219	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,9 - 1	0	0	0	0	0	0	N/A	N/A	N/A	N/A
	Subtotal	**449**	**2703**	**56**	**6**	**50**	**0**	2,1 %	0,2 %	1,8 %	0,0 %
Northeast	0 - 0,1	306	716	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,1 - 0,2	711	3557	8	0	6	2	0,2 %	0,0 %	0,2 %	0,1 %
	0,2 - 0,3	420	2831	7	0	6	0	0,2 %	0,0 %	0,2 %	0,0 %
	0,3 - 0,4	208	2155	6	0	4	1	0,3 %	0,0 %	0,2 %	0,0 %
	0,4 - 0,5	86	973	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,5 - 0,6	28	545	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,6 - 0,7	13	163	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,7 - 0,8	14	571	1	0	0	1	0,2 %	0,0 %	0,0 %	0,2 %
	0,8 - 0,9	7	1455	13	0	1	0	0,9 %	0,0 %	0,1 %	0,0 %
	0,9 - 1	1	1	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	Subtotal	**1794**	**12967**	**35**	**0**	**17**	**4**	0,3 %	0,0 %	0,1 %	0,0 %
Southeast	0 - 0,1	28	39	1	0	1	0	2,6 %	0,0 %	2,6 %	0,0 %
	0,1 - 0,2	106	294	8	0	8	0	2,7 %	0,0 %	2,7 %	0,0 %
	0,2 - 0,3	249	1139	64	0	62	2	5,6 %	0,0 %	5,4 %	0,2 %
	0,3 - 0,4	259	1626	57	0	51	6	3,5 %	0,0 %	3,1 %	0,4 %
	0,4 - 0,5	257	2090	65	1	53	11	3,1 %	0,0 %	2,5 %	0,5 %
	0,5 - 0,6	239	2663	171	0	166	5	6,4 %	0,0 %	6,2 %	0,2 %
	0,6 - 0,7	193	2171	110	2	93	14	5,1 %	0,1 %	4,3 %	0,6 %
	0,7 - 0,8	200	2467	74	5	61	8	3,0 %	0,2 %	2,5 %	0,3 %
	0,8 - 0,9	113	3816	33	3	26	4	0,9 %	0,1 %	0,7 %	0,1 %
	0,9 - 1	24	3390	10	4	3	2	0,3 %	0,1 %	0,1 %	0,1 %
	Subtotal	**1668**	**19695**	**593**	**15**	**524**	**52**	3,0 %	0,1 %	2,7 %	0,3 %
South	0 - 0,1	4	2	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %
	0,1 - 0,2	95	239	74	68	6	0	31,0 %	28,5 %	2,5 %	0,0 %
	0,2 - 0,3	89	440	112	109	3	0	25,5 %	24,8 %	0,7 %	0,0 %
	0,3 - 0,4	104	660	154	126	24	4	23,3 %	19,1 %	3,6 %	0,6 %
	0,4 - 0,5	147	1027	243	210	33	0	23,7 %	20,4 %	3,2 %	0,0 %
	0,5 - 0,6	155	1193	289	238	37	11	24,2 %	19,9 %	3,1 %	0,9 %
	0,6 - 0,7	183	1566	391	284	80	25	25,0 %	18,1 %	5,1 %	1,6 %
	0,7 - 0,8	208	1840	330	250	74	5	17,9 %	13,6 %	4,0 %	0,3 %
	0,8 - 0,9	146	1926	449	313	129	4	23,3 %	16,3 %	6,7 %	0,2 %
	0,9 - 1	57	2318	341	240	98	1	14,7 %	10,4 %	4,2 %	0,0 %
	Subtotal	**1188**	**11211**	**2383**	**1838**	**484**	**50**	21,3 %	16,4 %	4,3 %	0,4 %
Center-West	0 - 0,1	18	37	1	0	0	0	2,7 %	0,0 %	0,0 %	0,0 %
	0,1 - 0,2	21	81	10	9	0	1	12,3 %	11,1 %	0,0 %	1,2 %
	0,2 - 0,3	25	141	17	17	0	0	12,1 %	12,1 %	0,0 %	0,0 %
	0,3 - 0,4	44	271	21	21	0	0	7,7 %	7,7 %	0,0 %	0,0 %
	0,4 - 0,5	45	387	34	33	0	1	8,8 %	8,5 %	0,0 %	0,3 %
	0,5 - 0,6	67	530	59	53	0	4	11,1 %	10,0 %	0,0 %	0,8 %
	0,6 - 0,7	66	597	58	57	0	0	9,7 %	9,5 %	0,0 %	0,0 %
	0,7 - 0,8	156	1270	147	135	0	5	11,6 %	10,6 %	0,0 %	0,4 %
	0,8 - 0,9	22	535	28	28	0	0	5,2 %	5,2 %	0,0 %	0,0 %
	0,9 - 1	2	716	3	0	2	0	0,4 %	0,0 %	0,3 %	0,0 %
	Subtotal	**466**	**4565**	**378**	**353**	**2**	**11**	8,3 %	7,7 %	0,0 %	0,2 %
Total	0 - 0,1	455	988	3	0	2	0	0,3 %	0,0 %	0,2 %	0,0 %
	0,1 - 0,2	1027	4552	100	77	20	3	2,2 %	1,7 %	0,4 %	0,1 %
	0,2 - 0,3	869	4863	200	126	71	2	4,1 %	2,6 %	1,5 %	0,0 %
	0,3 - 0,4	677	5020	260	147	101	11	5,2 %	2,9 %	2,0 %	0,2 %
	0,4 - 0,5	572	4728	350	246	92	12	7,4 %	5,2 %	1,9 %	0,3 %
	0,5 - 0,6	521	5232	540	295	220	20	10,3 %	5,6 %	4,2 %	0,4 %
	0,6 - 0,7	482	5143	562	343	176	39	10,9 %	6,7 %	3,4 %	0,8 %
	0,7 - 0,8	588	6239	553	390	136	19	8,9 %	6,3 %	2,2 %	0,3 %
	0,8 - 0,9	290	7951	523	344	156	8	6,6 %	4,3 %	2,0 %	0,1 %
	0,9 - 1	84	6425	354	244	103	3	5,5 %	3,8 %	1,6 %	0,0 %
	Subtotal	**5565**	**51141**	**3445**	**2212**	**1077**	**117**	6,7 %	4,3 %	2,1 %	0,2 %

Appendix 40: Number of municipalities with exclusive CU BC share of BCs with Inc. III over 25% and 50% (Based on Banco Central do Brasil, 2015c-g)

Number of municipalities with exclusive CU BC share over 25% and 50% of all BCs with Inc. III, by region and IFI category

Region	IFI class	Mun.	Mun. where CU BC ≥ 25% of Inc. III				Share of all municipalities				Mun. where CU BC ≥ 50% of Inc. III				Share of all municipalities			
			All	Sicr.	Sico.	Indep.	All	Sicr.	Sico.	Indep.	All	Sicr.	Sico.	Indep.	All	Sicr.	Sico.	Indep.
North	0 - 0,1	99	1	0	1	0	1%	0%	1%	0%	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	94	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,2 - 0,3	86	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,3 - 0,4	62	8	0	8	0	13%	0%	13%	0%	2	0	2	0	3%	0%	3%	0%
	0,4 - 0,5	37	1	0	1	0	3%	0%	3%	0%	1	0	1	0	3%	0%	3%	0%
	0,5 - 0,6	32	2	0	2	0	6%	0%	6%	0%	0	0	0	0	0%	0%	0%	0%
	0,6 - 0,7	27	1	0	1	0	4%	0%	4%	0%	1	0	1	0	4%	0%	4%	0%
	0,7 - 0,8	10	1	0	1	0	10%	0%	10%	0%	1	0	1	0	10%	0%	10%	0%
	0,8 - 0,9	2	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,9 - 1	0	0	0	0	0	N/A	N/A	N/A	N/A	0	0	0	0	N/A	N/A	N/A	N/A
	Subtotal	**449**	**14**	**0**	**14**	**0**	**3%**	**0%**	**3%**	**0%**	**5**	**0**	**5**	**0**	**1%**	**0%**	**1%**	**0%**
Northeast	0 - 0,1	306	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	711	2	0	2	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,2 - 0,3	420	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,3 - 0,4	208	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,4 - 0,5	86	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,5 - 0,6	28	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,6 - 0,7	13	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,7 - 0,8	14	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,8 - 0,9	7	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,9 - 1	1	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	Subtotal	**1794**	**2**	**0**	**2**	**0**	**0%**	**0%**	**0%**	**0%**	**0**	**0**	**0**	**0**	**0%**	**0%**	**0%**	**0%**
Southeast	0 - 0,1	28	1	0	1	0	4%	0%	4%	0%	1	0	1	0	4%	0%	4%	0%
	0,1 - 0,2	106	5	0	5	0	5%	0%	5%	0%	2	0	2	0	2%	0%	2%	0%
	0,2 - 0,3	249	19	0	18	1	8%	0%	7%	0%	12	0	12	0	5%	0%	5%	0%
	0,3 - 0,4	259	14	0	13	1	5%	0%	5%	0%	9	0	9	0	3%	0%	3%	0%
	0,4 - 0,5	257	16	0	14	2	6%	0%	5%	1%	6	0	4	2	2%	0%	2%	1%
	0,5 - 0,6	239	19	0	17	2	8%	0%	7%	1%	9	0	8	1	4%	0%	3%	0%
	0,6 - 0,7	193	15	0	13	1	8%	0%	7%	1%	6	0	6	0	3%	0%	3%	0%
	0,7 - 0,8	200	14	0	13	1	7%	0%	7%	1%	6	0	6	0	3%	0%	3%	0%
	0,8 - 0,9	113	2	0	1	1	2%	0%	1%	1%	0	0	0	0	0%	0%	0%	0%
	0,9 - 1	24	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	Subtotal	**1668**	**105**	**0**	**95**	**9**	**6%**	**0%**	**6%**	**1%**	**51**	**0**	**48**	**3**	**3%**	**0%**	**3%**	**0%**
South	0 - 0,1	4	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	95	44	40	4	0	46%	42%	4%	0%	29	28	1	0	31%	29%	1%	0%
	0,2 - 0,3	89	43	41	2	0	48%	46%	2%	0%	22	21	1	0	25%	24%	1%	0%
	0,3 - 0,4	104	50	37	12	1	48%	36%	12%	1%	22	15	6	0	21%	14%	6%	0%
	0,4 - 0,5	147	62	49	14	0	42%	33%	10%	0%	31	24	5	0	21%	16%	3%	0%
	0,5 - 0,6	155	62	48	11	2	40%	31%	7%	1%	25	16	7	1	16%	10%	5%	1%
	0,6 - 0,7	183	78	55	21	3	43%	30%	11%	2%	35	24	4	1	19%	13%	2%	1%
	0,7 - 0,8	208	68	56	12	1	33%	27%	6%	0%	30	22	4	0	14%	11%	2%	0%
	0,8 - 0,9	146	63	40	19	1	43%	27%	13%	1%	25	15	9	1	17%	10%	6%	1%
	0,9 - 1	57	22	16	4	0	39%	28%	7%	0%	5	4	1	0	9%	7%	2%	0%
	Subtotal	**1188**	**492**	**382**	**99**	**8**	**41%**	**32%**	**8%**	**1%**	**224**	**169**	**38**	**3**	**19%**	**14%**	**3%**	**0%**
Center-West	0 - 0,1	18	1	0	0	0	6%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	0,1 - 0,2	21	4	4	0	0	19%	19%	0%	0%	2	2	0	0	10%	10%	0%	0%
	0,2 - 0,3	25	5	5	0	0	20%	20%	0%	0%	1	1	0	0	4%	4%	0%	0%
	0,3 - 0,4	44	5	5	0	0	11%	11%	0%	0%	4	4	0	0	9%	9%	0%	0%
	0,4 - 0,5	45	9	9	0	0	20%	20%	0%	0%	6	5	0	0	13%	11%	0%	0%
	0,5 - 0,6	67	11	9	0	2	16%	13%	0%	3%	5	4	0	0	7%	6%	0%	0%
	0,6 - 0,7	66	14	13	0	0	21%	20%	0%	0%	6	5	0	0	9%	8%	0%	0%
	0,7 - 0,8	156	27	26	0	0	17%	17%	0%	0%	8	8	0	0	5%	5%	0%	0%
	0,8 - 0,9	22	3	3	0	0	14%	14%	0%	0%	1	1	0	0	5%	5%	0%	0%
	0,9 - 1	2	0	0	0	0	0%	0%	0%	0%	0	0	0	0	0%	0%	0%	0%
	Subtotal	**466**	**79**	**74**	**0**	**2**	**17%**	**16%**	**0%**	**0%**	**33**	**30**	**0**	**0**	**7%**	**6%**	**0%**	**0%**
Total	0 - 0,1	455	3	0	2	0	1%	0%	0%	0%	1	0	1	0	0%	0%	0%	0%
	0,1 - 0,2	1027	55	44	11	0	5%	4%	1%	0%	33	30	3	0	3%	3%	0%	0%
	0,2 - 0,3	869	67	46	20	1	8%	5%	2%	0%	35	22	13	0	4%	3%	1%	0%
	0,3 - 0,4	677	77	42	33	2	11%	6%	5%	0%	37	19	17	0	5%	3%	3%	0%
	0,4 - 0,5	572	88	58	29	2	15%	10%	5%	0%	44	29	10	2	8%	5%	2%	0%
	0,5 - 0,6	521	94	57	30	6	18%	11%	6%	1%	39	20	15	2	7%	4%	3%	0%
	0,6 - 0,7	482	108	68	35	4	22%	14%	7%	1%	48	29	11	1	10%	6%	2%	0%
	0,7 - 0,8	588	110	82	26	2	19%	14%	4%	0%	45	30	11	0	8%	5%	2%	0%
	0,8 - 0,9	290	68	43	20	2	23%	15%	7%	1%	26	16	9	1	9%	6%	3%	0%
	0,9 - 1	84	22	16	4	0	26%	19%	5%	0%	5	4	1	0	6%	5%	1%	0%
	Subtotal	**5565**	**692**	**456**	**210**	**19**	**12%**	**8%**	**4%**	**0%**	**313**	**199**	**91**	**6**	**6%**	**4%**	**2%**	**0%**

Appendix 41: Share of CU BCs out of total exclusive Inc. III BCs by municipality, by affiliation, 2014 [four IFI categories] (Based on Banco Central do Brasil, 2015c-g)

All credit unions:

Municipalities with CU BC by IFI category in 2014 - all credit unions												
			n of municipalities with CU BC share above…					n of municipalities with CU BC share above…% of total				
Region	IFI Class	Municipalities	≥0%	≥25%	≥50%	≥75%	100%	≥0%	≥25%	≥50%	≥75%	100%
North	0 - 0,24	239	1	1	0	0	0	0,4%	0,4%	0,0%	0,0%	0,0%
	0,25 - 0,49	139	13	9	3	0	0	9,4%	6,5%	2,2%	0,0%	0,0%
	0,50 - 0,74	62	7	3	1	0	0	11,3%	4,8%	1,6%	0,0%	0,0%
	0,75 - 100	9	1	1	1	1	1	11,1%	11,1%	11,1%	11,1%	11,1%
	Subtotal	449	22	14	5	1	1	4,9%	3,1%	1,1%	0,2%	0,2%
Northeast	0 - 0,24	1268	9	2	0	0	0	0,7%	0,2%	0,0%	0,0%	0,0%
	0,25 - 0,49	463	7	0	0	0	0	1,5%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	49	1	0	0	0	0	2,0%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	14	4	0	0	0	0	28,6%	0,0%	0,0%	0,0%	0,0%
	Subtotal	1794	21	2	0	0	0	1,2%	0,1%	0,0%	0,0%	0,0%
Southeast	0 - 0,24	243	18	14	7	1	0	7,4%	5,8%	2,9%	0,4%	0,0%
	0,25 - 0,49	656	64	41	23	7	3	9,8%	6,3%	3,5%	1,1%	0,5%
	0,50 - 0,74	524	74	39	17	3	1	14,1%	7,4%	3,2%	0,6%	0,2%
	0,75 - 100	245	31	11	4	0	0	12,7%	4,5%	1,6%	0,0%	0,0%
	Subtotal	1668	187	105	51	11	4	11,2%	6,3%	3,1%	0,7%	0,2%
South	0 - 0,24	146	74	66	39	6	5	50,7%	45,2%	26,7%	4,1%	3,4%
	0,25 - 0,49	293	179	133	65	14	8	61,1%	45,4%	22,2%	4,8%	2,7%
	0,50 - 0,74	430	268	173	73	11	6	62,3%	40,2%	17,0%	2,6%	1,4%
	0,75 - 100	319	203	120	47	8	4	63,6%	37,6%	14,7%	2,5%	1,3%
	Subtotal	1188	724	492	224	39	23	60,9%	41,4%	18,9%	3,3%	1,9%
Center-West	0 - 0,24	52	11	8	2	1	1	21,2%	15,4%	3,8%	1,9%	1,9%
	0,25 - 0,49	101	21	16	11	1	1	20,8%	15,8%	10,9%	1,0%	1,0%
	0,50 - 0,74	173	61	33	14	2	0	35,3%	19,1%	8,1%	1,2%	0,0%
	0,75 - 100	140	36	22	6	0	0	25,7%	15,7%	4,3%	0,0%	0,0%
	Subtotal	466	129	79	33	4	2	27,7%	17,0%	7,1%	0,9%	0,4%
Total		5565	1083	692	313	55	30	19,5%	12,4%	5,6%	1,0%	0,5%

Sicredi-affiliated credit unions:

Municipalities with CU BC by IFI category in 2014 - Sicredi												
			n of municipalities with CU BC share above…					n of municipalities with CU BC share above…% of total				
Region	IFI Class	Municipalities	≥0%	≥25%	≥50%	≥75%	100%	≥0%	≥25%	≥50%	≥75%	100%
North	0 - 0,24	239	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	139	2	0	0	0	0	1,4%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	62	1	0	0	0	0	1,6%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	9	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	Subtotal	449	3	0	0	0	0	0,7%	0,0%	0,0%	0,0%	0,0%
Northeast	0 - 0,24	1268	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	463	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	49	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	14	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	Subtotal	1794	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
Southeast	0 - 0,24	243	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	656	1	0	0	0	0	0,2%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	524	4	0	0	0	0	0,8%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	245	9	0	0	0	0	3,7%	0,0%	0,0%	0,0%	0,0%
	Subtotal	1668	14	0	0	0	0	0,8%	0,0%	0,0%	0,0%	0,0%
South	0 - 0,24	146	70	62	38	6	5	47,9%	42,5%	26,0%	4,1%	3,4%
	0,25 - 0,49	293	145	105	50	12	6	49,5%	35,8%	17,1%	4,1%	2,0%
	0,50 - 0,74	430	216	133	51	8	5	50,2%	30,9%	11,9%	1,9%	1,2%
	0,75 - 100	319	165	82	30	5	3	51,7%	25,7%	9,4%	1,6%	0,9%
	Subtotal	1188	596	382	169	31	19	50,2%	32,2%	14,2%	2,6%	1,6%
Center-West	0 - 0,24	52	9	7	2	1	1	17,3%	13,5%	3,8%	1,9%	1,9%
	0,25 - 0,49	101	21	16	10	1	1	20,8%	15,8%	9,9%	1,0%	1,0%
	0,50 - 0,74	173	58	30	12	2	0	33,5%	17,3%	6,9%	1,2%	0,0%
	0,75 - 100	140	33	21	6	0	0	23,6%	15,0%	4,3%	0,0%	0,0%
	Subtotal	466	121	74	30	4	2	26,0%	15,9%	6,4%	0,9%	0,4%
Total		5565	734	456	199	35	21	13,2%	8,2%	3,6%	0,6%	0,4%

Sicoob-affiliated credit unions:

Municipalities with CU BC by IFI category in 2014 - Sicoob													
Region	IFI Class	Municipalities	n of municipalities with CU BC share above…					n of municipalities with CU BC share above…% of total				
			>0%	>25%	>50%	>75%	100%	>0%	>25%	>50%	>75%	100%
North	0 - 0,24	239	1	1	0	0	0	0,4%	0,4%	0,0%	0,0%	0,0%
	0,25 - 0,49	139	11	9	3	0	0	7,9%	6,5%	2,2%	0,0%	0,0%
	0,50 - 0,74	62	6	3	1	0	0	9,7%	4,8%	1,6%	0,0%	0,0%
	0,75 - 100	9	1	1	1	1	1	11,1%	11,1%	11,1%	11,1%	11,1%
	Subtotal	449	19	14	5	1	1	4,2%	3,1%	1,1%	0,2%	0,2%
Northeast	0 - 0,24	1268	7	2	0	0	0	0,6%	0,2%	0,0%	0,0%	0,0%
	0,25 - 0,49	463	4	0	0	0	0	0,9%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	49	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	14	1	0	0	0	0	7,1%	0,0%	0,0%	0,0%	0,0%
	Subtotal	1794	12	2	0	0	0	0,7%	0,1%	0,0%	0,0%	0,0%
Southeast	0 - 0,24	243	17	13	7	1	0	7,0%	5,3%	2,9%	0,4%	0,0%
	0,25 - 0,49	656	59	38	21	7	3	9,0%	5,8%	3,2%	1,1%	0,5%
	0,50 - 0,74	524	61	35	16	3	1	11,6%	6,7%	3,1%	0,6%	0,2%
	0,75 - 100	245	19	9	4	0	0	7,8%	3,7%	1,6%	0,0%	0,0%
	Subtotal	1668	156	95	48	11	4	9,4%	5,7%	2,9%	0,7%	0,2%
South	0 - 0,24	146	4	4	1	0	0	2,7%	2,7%	0,7%	0,0%	0,0%
	0,25 - 0,49	293	36	28	12	2	2	12,3%	9,6%	4,1%	0,7%	0,7%
	0,50 - 0,74	430	61	34	12	1	1	14,2%	7,9%	2,8%	0,2%	0,2%
	0,75 - 100	319	57	33	13	2	1	17,9%	10,3%	4,1%	0,6%	0,3%
	Subtotal	1188	158	99	38	5	4	13,3%	8,3%	3,2%	0,4%	0,3%
Center-West	0 - 0,24	52	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	101	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	173	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	140	1	0	0	0	0	0,7%	0,0%	0,0%	0,0%	0,0%
	Subtotal	466	1	0	0	0	0	0,2%	0,0%	0,0%	0,0%	0,0%
Total		5565	346	210	91	17	9	6,2%	3,8%	1,6%	0,3%	0,2%

Independent credit unions:

Municipalities with CU BC in 2014 by IFI category - Independent Credit Unions													
Region	IFI Class	Municipalities	n of municipalities with CU BC share above…					n of municipalities with CU BC share above…% of total				
			>0%	>25%	>50%	>75%	100%	>0%	>25%	>50%	>75%	100%
North	0 - 0,24	239	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	139	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	62	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	9	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	Subtotal	449	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
Northeast	0 - 0,24	1268	2	0	0	0	0	0,2%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	463	1	0	0	0	0	0,2%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	49	1	0	0	0	0	2,0%	0,0%	0,0%	0,0%	0,0%
	0,75 - 100	14	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	Subtotal	1794	4	0	0	0	0	0,2%	0,0%	0,0%	0,0%	0,0%
Southeast	0 - 0,24	243	1	1	0	0	0	0,4%	0,4%	0,0%	0,0%	0,0%
	0,25 - 0,49	656	5	3	2	0	0	0,8%	0,5%	0,3%	0,0%	0,0%
	0,50 - 0,74	524	13	3	1	0	0	2,5%	0,6%	0,2%	0,0%	0,0%
	0,75 - 100	245	6	2	0	0	0	2,4%	0,8%	0,0%	0,0%	0,0%
	Subtotal	1668	25	9	3	0	0	1,5%	0,5%	0,2%	0,0%	0,0%
South	0 - 0,24	146	0	0	0	0	0	0,0%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	293	2	1	0	0	0	0,7%	0,3%	0,0%	0,0%	0,0%
	0,50 - 0,74	430	13	6	2	0	0	3,0%	1,4%	0,5%	0,0%	0,0%
	0,75 - 100	319	2	1	1	0	0	0,6%	0,3%	0,3%	0,0%	0,0%
	Subtotal	1188	17	8	3	0	0	1,4%	0,7%	0,3%	0,0%	0,0%
Center-West	0 - 0,24	52	1	0	0	0	0	1,9%	0,0%	0,0%	0,0%	0,0%
	0,25 - 0,49	101	1	0	0	0	0	1,0%	0,0%	0,0%	0,0%	0,0%
	0,50 - 0,74	173	3	2	0	0	0	1,7%	1,2%	0,0%	0,0%	0,0%
	0,75 - 100	140	2	0	0	0	0	1,4%	0,0%	0,0%	0,0%	0,0%
	Subtotal	466	7	2	0	0	0	1,5%	0,4%	0,0%	0,0%	0,0%
Total		5565	53	19	6	0	0	1,0%	0,3%	0,1%	0,0%	0,0%

Appendix 42: Credit union contribution to growth in banking correspondents, 2008-2014

(Based on Banco Central do Brasil, 2015c-g)

Region	IFI Class	Increase in BC	Increase in CU BCS				Share of total increase in BC			
			All CUs	Sicredi	Sicoob	Indep.	All CUs	Sicredi	Sicoob	Indep.
North	0 - 0,24	570	1	0	1	0	0,2 %	0,0 %	0,2 %	0,0 %
	0,25 - 0,49	430	30	2	28	0	7,0 %	0,5 %	6,5 %	0,0 %
	0,50 - 0,74	628	23	4	19	0	3,7 %	0,6 %	3,0 %	0,0 %
	0,75 - 100	218	1	0	1	0	0,5 %	0,0 %	0,5 %	0,0 %
	Subtotal	**1846**	**55**	**6**	**49**	**0**	**3,0 %**	**0,3 %**	**2,7 %**	**0,0 %**
Northeast	0 - 0,24	4416	11	0	9	2	0,2 %	0,0 %	0,2 %	0,0 %
	0,25 - 0,49	2974	10	0	7	1	0,3 %	0,0 %	0,2 %	0,0 %
	0,50 - 0,74	668	1	0	0	1	0,1 %	0,0 %	0,0 %	0,1 %
	0,75 - 100	1009	13	0	1	0	1,3 %	0,0 %	0,1 %	0,0 %
	Subtotal	**9067**	**35**	**0**	**17**	**4**	**0,4 %**	**0,0 %**	**0,2 %**	**0,0 %**
Southeast	0 - 0,24	568	31	0	29	2	5,5 %	0,0 %	5,1 %	0,4 %
	0,25 - 0,49	3086	143	1	131	11	4,6 %	0,0 %	4,2 %	0,4 %
	0,50 - 0,74	3637	286	5	266	14	7,9 %	0,1 %	7,3 %	0,4 %
	0,75 - 100	5099	66	9	49	7	1,3 %	0,2 %	1,0 %	0,1 %
	Subtotal	**12390**	**526**	**15**	**475**	**34**	**4,2 %**	**0,1 %**	**3,8 %**	**0,3 %**
South	0 - 0,24	363	123	117	6	0	33,9 %	32,2 %	1,7 %	0,0 %
	0,25 - 0,49	1450	454	390	60	4	31,3 %	26,9 %	4,1 %	0,3 %
	0,50 - 0,74	2588	856	665	145	40	33,1 %	25,7 %	5,6 %	1,5 %
	0,75 - 100	3463	923	641	272	5	26,7 %	18,5 %	7,9 %	0,1 %
	Subtotal	**7864**	**2356**	**1813**	**483**	**49**	**30,0 %**	**23,1 %**	**6,1 %**	**0,6 %**
Center-West	0 - 0,24	136	20	18	0	1	14,7 %	13,2 %	0,0 %	0,7 %
	0,25 - 0,49	530	62	61	0	1	11,7 %	11,5 %	0,0 %	0,2 %
	0,50 - 0,74	987	154	146	0	5	15,6 %	14,8 %	0,0 %	0,5 %
	0,75 - 100	1571	136	122	2	4	8,7 %	7,8 %	0,1 %	0,3 %
	Subtotal	**3224**	**372**	**347**	**2**	**11**	**11,5 %**	**10,8 %**	**0,1 %**	**0,3 %**
All regions	0 - 0,24	6053	186	135	45	5	3,1 %	2,2 %	0,7 %	0,1 %
	0,25 - 0,49	8470	699	454	226	17	8,3 %	5,4 %	2,7 %	0,2 %
	0,50 - 0,74	8508	1320	820	430	60	15,5 %	9,6 %	5,1 %	0,7 %
	0,75 - 100	11360	1139	772	325	16	10,0 %	6,8 %	2,9 %	0,1 %
	Total	**34391**	**3344**	**2181**	**1026**	**98**	**9,7 %**	**6,3 %**	**3,0 %**	**0,3 %**

Credit Union contribution to growth in Banking Correspondents 2007 - 2014 [All Cus]

Appendix 43: Credit union BCs by urbanization rate, 2014 (Based on Banco Central do Brasil, 2015c-g and IBGE, 2007, 2010 and 2013)

			Municipalities with CU BC in 2014 by urbanization rate [All CUs]									
Region	Urban population	Municipalities	n of municipalities with CU BC share above…					n of municipalities with CU BC share above…% of total				
			≥0%	≥25%	≥50%	≥75%	100 %	≥0%	≥25%	≥50%	≥75%	100 %
North	0 - 25%	19	1	1	1	0	0	5,3 %	5,3 %	5,3 %	0,0 %	0,0 %
	25 - 50%	135	8	6	2	0	0	5,9 %	4,4 %	1,5 %	0,0 %	0,0 %
	50 - 75%	192	5	4	2	1	1	2,6 %	2,1 %	1,0 %	0,5 %	0,5 %
	75%-100%	103	8	3	0	0	0	7,8 %	2,9 %	0,0 %	0,0 %	0,0 %
	Subtotal	**449**	**22**	**14**	**5**	**1**	**1**	**4,9 %**	**3,1 %**	**1,1 %**	**0,2 %**	**0,2 %**
Northeast	0 - 25%	88	0	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %
	25 - 50%	584	5	2	0	0	0	0,9 %	0,3 %	0,0 %	0,0 %	0,0 %
	50 - 75%	748	5	0	0	0	0	0,7 %	0,0 %	0,0 %	0,0 %	0,0 %
	75%-100%	374	11	0	0	0	0	2,9 %	0,0 %	0,0 %	0,0 %	0,0 %
	Subtotal	**1794**	**21**	**2**	**0**	**0**	**0**	**1,2 %**	**0,1 %**	**0,0 %**	**0,0 %**	**0,0 %**
Southeast	0 - 25%	6	1	1	1	0	0	16,7 %	16,7 %	16,7 %	0,0 %	0,0 %
	25 - 50%	178	29	22	11	2	0	16,3 %	12,4 %	6,2 %	1,1 %	0,0 %
	50 - 75%	458	58	33	19	6	3	12,7 %	7,2 %	4,1 %	1,3 %	0,7 %
	75%-100%	1026	99	49	20	3	1	9,6 %	4,8 %	1,9 %	0,3 %	0,1 %
	Subtotal	**1668**	**187**	**105**	**51**	**11**	**4**	**11,2 %**	**6,3 %**	**3,1 %**	**0,7 %**	**0,2 %**
South	0 - 25%	72	35	33	25	7	4	48,6 %	45,8 %	34,7 %	9,7 %	5,6 %
	25 - 50%	297	134	118	62	13	10	45,1 %	39,7 %	20,9 %	4,4 %	3,4 %
	50 - 75%	373	251	190	82	13	6	67,3 %	50,9 %	22,0 %	3,5 %	1,6 %
	75%-100%	446	304	151	55	6	3	68,2 %	33,9 %	12,3 %	1,3 %	0,7 %
	Subtotal	**1188**	**724**	**492**	**224**	**39**	**23**	**60,9 %**	**41,4 %**	**18,9 %**	**3,3 %**	**1,9 %**
Center-West	0 - 25%	2	0	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %
	25 - 50%	57	16	13	8	2	1	28,1 %	22,8 %	14,0 %	3,5 %	1,8 %
	50 - 75%	150	45	41	19	2	1	30,0 %	27,3 %	12,7 %	1,3 %	0,7 %
	75%-100%	257	68	25	6	0	0	26,5 %	9,7 %	2,3 %	0,0 %	0,0 %
	Subtotal	**466**	**129**	**79**	**33**	**4**	**2**	**27,7 %**	**17,0 %**	**7,1 %**	**0,9 %**	**0,4 %**
Total	0 - 25%	187	37	35	27	7	4	19,8 %	18,7 %	14,4 %	3,7 %	2,1 %
	25 - 50%	1251	192	161	83	17	11	15,3 %	12,9 %	6,6 %	1,4 %	0,9 %
	50 - 75%	1921	364	268	122	22	11	18,9 %	14,0 %	6,4 %	1,1 %	0,6 %
	75%-100%	2206	490	228	81	9	4	22,2 %	10,3 %	3,7 %	0,4 %	0,2 %
	Total	**5565**	**1083**	**692**	**313**	**55**	**30**	**19,5 %**	**12,4 %**	**5,6 %**	**1,0 %**	**0,5 %**

Appendix 44: Credit union BCs by municipal HDI, 2014 (Based on Banco Central do Brasil, 2015c-g and Atlas do Desenvolvimento Humano, 2013)

			Municipalities with CU BC in 2014 by HDI [All CUs]									
Region	Municipal HDI	Municipalities	n of municipalities with CU BC share above…					n of municipalities with CU BC share above…% of total				
			≥0%	≥25%	≥50%	≥75%	100 %	≥0%	≥25%	≥50%	≥75%	100 %
North	0 - 0,58	132	0	0	0	0	0	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %
	0,58 - 0,61	97	2	2	0	0	0	2,1 %	2,1 %	0,0 %	0,0 %	0,0 %
	0,61 - 0,65	108	11	8	4	0	0	10,2 %	7,4 %	3,7 %	0,0 %	0,0 %
	0,65 - 0,68	71	3	2	1	1	1	4,2 %	2,8 %	1,4 %	1,4 %	1,4 %
	0,68 - 0,72	27	5	2	0	0	0	18,5 %	7,4 %	0,0 %	0,0 %	0,0 %
	0,72 -	14	1	0	0	0	0	7,1 %	0,0 %	0,0 %	0,0 %	0,0 %
	Subtotal	**449**	**22**	**14**	**5**	**1**	**1**	**4,9 %**	**3,1 %**	**1,1 %**	**0,2 %**	**0,2 %**
Northeast	0 - 0,58	726	1	1	0	0	0	0,1 %	0,1 %	0,0 %	0,0 %	0,0 %
	0,58 - 0,61	529	6	1	0	0	0	1,1 %	0,2 %	0,0 %	0,0 %	0,0 %
	0,61 - 0,65	362	5	0	0	0	0	1,4 %	0,0 %	0,0 %	0,0 %	0,0 %
	0,65 - 0,68	93	1	0	0	0	0	1,1 %	0,0 %	0,0 %	0,0 %	0,0 %
	0,68 - 0,72	48	1	0	0	0	0	2,1 %	0,0 %	0,0 %	0,0 %	0,0 %
	0,72 -	36	7	0	0	0	0	19,4 %	0,0 %	0,0 %	0,0 %	0,0 %
	Subtotal	**1794**	**21**	**2**	**0**	**0**	**0**	**1,2 %**	**0,1 %**	**0,0 %**	**0,0 %**	**0,0 %**
Southeast	0 - 0,58	38	2	1	1	1	0	5,3 %	2,6 %	2,6 %	2,6 %	0,0 %
	0,58 - 0,61	74	6	5	3	0	0	8,1 %	6,8 %	4,1 %	0,0 %	0,0 %
	0,61 - 0,65	212	29	19	11	3	0	13,7 %	9,0 %	5,2 %	1,4 %	0,0 %
	0,65 - 0,68	256	41	27	15	4	4	16,0 %	10,5 %	5,9 %	1,6 %	1,6 %
	0,68 - 0,72	447	45	32	17	2	0	10,1 %	7,2 %	3,8 %	0,4 %	0,0 %
	0,72 -	641	64	21	4	1	0	10,0 %	3,3 %	0,6 %	0,2 %	0,0 %
	Subtotal	**1668**	**187**	**105**	**51**	**11**	**4**	**11,2 %**	**6,3 %**	**3,1 %**	**0,7 %**	**0,2 %**
South	0 - 0,58	7	2	1	1	0	0	28,6 %	14,3 %	14,3 %	0,0 %	0,0 %
	0,58 - 0,61	14	6	4	1	0	0	42,9 %	28,6 %	7,1 %	0,0 %	0,0 %
	0,61 - 0,65	69	32	26	18	4	3	46,4 %	37,7 %	26,1 %	5,8 %	4,3 %
	0,65 - 0,68	147	72	56	30	6	4	49,0 %	38,1 %	20,4 %	4,1 %	2,7 %
	0,68 - 0,72	401	241	173	82	12	7	60,1 %	43,1 %	20,4 %	3,0 %	1,7 %
	0,72 -	550	371	232	92	17	9	67,5 %	42,2 %	16,7 %	3,1 %	1,6 %
	Subtotal	**1188**	**724**	**492**	**224**	**39**	**23**	**60,9 %**	**41,4 %**	**18,9 %**	**3,3 %**	**1,9 %**
Center-West	0 - 0,58	8	4	2	0	0	0	50,0 %	25,0 %	0,0 %	0,0 %	0,0 %
	0,58 - 0,61	13	2	2	1	0	0	15,4 %	15,4 %	7,7 %	0,0 %	0,0 %
	0,61 - 0,65	40	9	8	6	0	0	22,5 %	20,0 %	15,0 %	0,0 %	0,0 %
	0,65 - 0,68	107	31	27	14	3	2	29,0 %	25,2 %	13,1 %	2,8 %	1,9 %
	0,68 - 0,72	208	54	30	11	1	0	26,0 %	14,4 %	5,3 %	0,5 %	0,0 %
	0,72 -	90	29	10	1	0	0	32,2 %	11,1 %	1,1 %	0,0 %	0,0 %
	Subtotal	**466**	**129**	**79**	**33**	**4**	**2**	**27,7 %**	**17,0 %**	**7,1 %**	**0,9 %**	**0,4 %**
Overall	0 - 0,58	911	9	5	2	1	0	1,0 %	0,5 %	0,2 %	0,1 %	0,0 %
	0,58 - 0,61	727	22	14	5	0	0	3,0 %	1,9 %	0,7 %	0,0 %	0,0 %
	0,61 - 0,65	791	86	61	39	7	3	10,9 %	7,7 %	4,9 %	0,9 %	0,4 %
	0,65 - 0,68	674	148	112	60	14	11	22,0 %	16,6 %	8,9 %	2,1 %	1,6 %
	0,68 - 0,72	1131	346	237	110	15	7	30,6 %	21,0 %	9,7 %	1,3 %	0,6 %
	0,72 -	1331	472	263	97	18	9	35,5 %	19,8 %	7,3 %	1,4 %	0,7 %
	Total	**5565**	**1083**	**692**	**313**	**55**	**30**	**19,5 %**	**12,4 %**	**5,6 %**	**1,0 %**	**0,5 %**