# Financial Cooperatives and Poverty Mitigation During Brazil's Lost Decade

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**Abstract:** Over recent decades the growth of cooperative financial institutions has coincided with a decline in traditional banking in many developing and emerging countries. This paper investigates the monetary poverty implications of financial cooperative presence in Brazilian states over the period 2012 to 2022. Utilising new household survey microdata, we compute measures of poverty's prevalence and severity at the state level, and combine this with different measures of financial cooperative presence in a panel-data analysis. At one level, our estimations indicate that financial cooperatives have significantly mitigated poverty's prevalence and severity over the last decade, thereby adding support for the 'bright side' view of local financial institutions. Whilst poverty is lower in states with a denser presence of financial cooperatives, the poverty-alleviating effect is found to be stronger and more significant using a more moderate measure of income poverty. Consistent with Brazilian financial cooperatives' strong local presence and socioeconomic objective function, our estimations also reveal larger poverty-mitigating effects in areas characterised by greater exclusion from Brazilian social safety nets, more localised employment structures, and less well developed public educational infrastructure. However, our results also indicate that financial cooperatives have been less well equipped to mitigate rising poverty amongst the poorest of the poor. Relevant policy implications emerge from our analysis.

**Keywords:** poverty; financial; cooperatives; panel data

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## 1. Introduction

Despite the rise of new lending technologies, big data and artificial intelligence, which some have argued could weaken the role of community banks due to their emphasis on relationship lending (DeYoung et al., 2011; Sedunov, 2017; Jakšič and Marinč, 2019), many communities are still highly dependent on local financial institutions to support income generation and employment (see e.g., Nguyen, 2019, for the US; Coccorese and Shaffer, 2021, for Italy; Jackowicz et al., 2021, for Poland; Sun et al., 2023, for China). This has been highlighted again recently during the Covid-19 pandemic, which represents the latest setback to global growth, and poses new questions about local financial institutions' capacity to mitigate rising poverty and deprivation within countries, especially in developing and emerging countries, some of which were amongst the worst-affected. In this paper, we draw on the early establishment and more recent growth of Brazilian financial cooperatives (BFCs) to investigate their linkages with the prevalence and severity of monetary poverty in Brazilian states over the last decade.[1]

Though different theories exist, financial development has long been linked to economic growth and poverty alleviation, with financial institutions thought to reduce transactions costs, information asymmetries and improve the allocation of credit (e.g., King and Levine, 1993; Beck et al., 2007, and the literature therein). Over time, more efforts have been made to establish the heterogeneity of financial and banking institutions in their effects on financial inclusion and economic development (e.g., Sette and Gobbi, 2015; Dereeper et al., 2020; Meslier et al., 2022). Local financial institutions have received increasing attention because of their comparative advantage in accessing soft information and greater use of relationship lending (Berger and Udell, 2006; Berger et al., 2017). Though local financial institutions can alleviate financial hardship and boost economic resilience during downturns due to relationship lending (e.g., Bolton et al., 2016), there is an evolving debate about their 'bright side' versus 'dark side' effects (e.g., Fonteyne, 2007; Canales and Nanda, 2012; Berger et al., 2022).[2] This paper focuses on cooperative financial institutions, which are member-owned, not-for-profit financial institutions. Financial cooperatives differ from most other banks and microfinance institutions (MFIs) due to their unique objectives, which include supporting local economic and social developments (Lensink and Bulte, 2019; McKillop et al., 2020). Many financial cooperatives are officially joined to the Global Compact and support the UN's Sustainable Development Goals (SDGs), which include poverty elimination. For these reasons, financial cooperatives are of growing interest to policymakers tasked with designing more inclusive and resilient economic and financial systems.

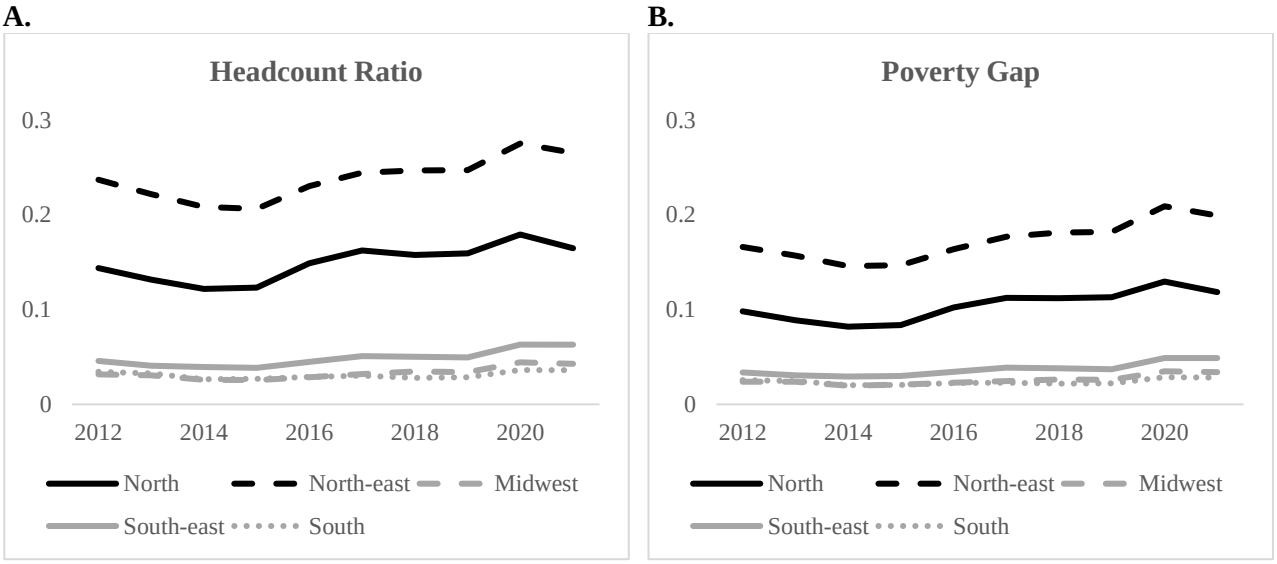
In Brazil, the strong growth of the financial cooperative movement has coincided with a decade of rising income inequality and poverty. Just as Brazil was starting to recover from a deep and prolonged recession from 2014 to 2016, the global pandemic hit the country hard. By 2021, the poverty headcount was higher than it was in 2011 according to the World Bank (2023), while living standards have deteriorated, food insecurity has increased, and illiteracy is back on the rise in many parts (UNICEF,

[1] BFCs are the largest providers of credit in Latin America and have become more prominent internationally over recent decades. According to the World Co-operative Monitor (WCM, 2022, p.41), its two largest networks, Sicredi (#7) and Sicoob (#5), were ranked in the world's top 10 financial cooperatives in terms of turnover/per-capita-GDP in 2020, ahead of all other developing and emerging countries. By comparison, in 2010, the world's top 10 was dominated entirely by cooperatives in France, Germany, Austria, Netherlands, Canada and the USA (WCM, 2012, p.29).

[2] For example, some have argued that localised financial institutions are more vulnerable to financial instability during downturns because of their less well diversified operations and lack of access to liquidity via international banking networks and financial markets (e.g., Fonteyne, 2007). Also, abuse of power can occur, with decentralised banks cherry-picking customers during downturns due to their dominance in local markets (e.g., Canales and Nanda, 2012). Further, localised banks can disadvantage certain individuals by offering more favourable lending terms to some borrowers than others during crises (e.g., Berger et al., 2022).

2023). There is also a concerning regional dimension to this development, with poverty increasing since the early 2010s from much higher initial levels in Brazil's least developed North and North-east macro regions, to even higher levels (Figures 1A-1B). This is evident from Figure 1A for the headcount ratio, which measures the proportion of individuals whose incomes fall below the poverty line; and in Figure 1B for the poverty gap, which indicates the average income distance of the poor from the poverty line. Therefore, at least from a monetary poverty perspective, the last decade represents a reversal of fortunes for Brazil, which had often been viewed as a model of development for other developing and emerging countries.

**Figures 1A-1B**. *Poverty in Brazilian Macro Regions*




*Source:* Authors' own computations using annualised microdata from quarterly PNADC surveys, 2012Q1-2021Q4.
*Notes:* Poverty line equivalent to USD $2.15 household income per capita.

In this paper, we aim to answer the following research questions: i) have BFCs mitigated rising monetary poverty in Brazilian states over the last decade?; ii) how do the results compare for more versus less extremely defined measures of monetary poverty?; and iii) what are the structural channels underlying the monetary poverty-financial cooperatives relationship in Brazilian states? To answer these research questions - which enable us to empirically validate the 'light side' or 'dark side' perspectives for BFCs in a monetary poverty context - we use data from the Central Bank of Brazil (BCB) on local financial institutional presence. We employ recently released microdata from the Brazilian Institute for Geographical Statistics' (IBGE) *Continuous Annual National Survey by Household Sample* (PNADC) to construct measures of monetary poverty's prevalence and severity in Brazilian states. We then conduct panel fixed effects and instrumental variables (IV) estimations across the period 2012 to 2022 at the state level.

This paper is organised as follows. Section 2 provides background on BFCs and research context. Section 3 provides an overview of relevant literature and highlights the scope for this paper's contributions. Section 4 sets out the empirical methodology and econometric approach, before discussing key choices in measurement and describing the data. Section 5 presents and discusses the estimation results. Section 6 provides concluding remarks.

## 2. Research Context

In 1902, Armstad Savings and Loans Bank was established in Nova Petrópolis in Brazil's far south, becoming the first financial cooperative in Latin America. This follows the earlier establishment of

rural credit cooperatives in Germany in the 1860s, before cooperative banking spread to other European countries, and further afield (e.g., McKillop, 2020, p.2). BFCs are member-owned, not-for-profit associations, which enable their members to pool financial resources for common purposes. They adhere to the general principles of cooperatives, as set out by the International Cooperative Alliance, which include: "self-help, self-responsibility, democracy, equality, equity and solidarity" (ICA, 2021, p.2). BFCs operate under an egalitarian structure wherein equal voting rights are preserved regardless of members' capital investment. Typically, BFCs serve low-income households and small agricultural producers, providing a range of basic banking services mainly to customers in more remote, rural, and semi-rural areas.

Though BFCs have a long history, their relatively recent growth during the 1990s and 2000s reflects several changes in Brazil's banking and financial industries. This includes the dismantling, decline and restructuring of state banks in the 1990s (e.g., Beck et al., 2005).[3] The country's main development bank, the BNDES, has traditionally provided finance for large national and regional infrastructure projects, as well as supporting small and large enterprises in trade and industry, though it has faced cutbacks over the last decade. The task of channelling finance to support economic development across Brazil has not been helped by the increasing concentration of traditional banks in Brazil's major urban and financial centres, as described by Nogueira et al. (2015) and Contel and Wojcik (2019). These changes in the banking and financial landscapes are not exclusive to Brazil and reflect development processes of urbanisation and financialization (Crocco et al., 2014). However, they have arguably weakened Brazil's capacity to sustain income generation and employment in more remote and rural communities during downturns due to the heavy reliance of many poorer households and small rural producers in these communities on external, bank-based finance. These changes have arguably increased BFCs' popularity and growth outside Brazil's larger cities and financial centres.

In Brazil, there are several types of financial institution that serve customers locally. Commercial and universal plus (multiple) banks are the main providers of banking services, with over 28,000 branches or branch-like offices according to the BCB's IF.data portal (see Table 1). As of December 2022, the total assets of commercial banks and universal plus banks (including both Banco do Brasil and Caixa Econômica, which are often referred to as commercial banks) constituted about 77% of the Brazilian banking system's total assets (IF.data, 2023). By comparison, BFCs' share of total financial assets is relatively small, though they play an important role in supporting financial inclusion via their extensive network of local branches. In December 2022, there were 883 BFCs operating in 26 Brazilian states. BFCs provide about USD $130 billion in lending facilities through around 8,000 branches or branch-like offices (IF.data, 2023). Most BFCs are affiliated with a larger network of cooperatives, which enables resource-sharing and information exchange. The largest cooperative networks include: Sicoob, Cresol, Sicredi, Ailos and Unicred, amongst others. Though other MFIs exist, they play a much smaller role in the Brazilian financial system.[4]

[3] State banks still exist in the form of Banco do Brasil and Caixa Econômica, though Banco do Brasil was consolidated and restructured as a commercial bank in 1992. Caixa Econômica has also developed large-scale operations in commercial banking, real estate, and investment banking, though it has retained some of its key socioeconomic functions.

[4] For example, according to the BCB's IF.data portal, there were only 25 MFIs that supplied around USD $55 million of credit under the SCMEPP initiative for microenterprises and small businesses, serving customers in 50 branches (IF.data, 2023).

**Table 1.** Presence, Penetration and Regional Distribution of Financial Cooperatives in the Brazilian Financial System

| | Panel A: Presence of Local Banking and Cooperative Financial Institutions | | | | | Panel B: Penetration of Financial Cooperatives | | | | | | Panel C: Regional Distribution of Financial Cooperatives | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Financial Cooperatives, 2022 | Cooperative Branches, 2022 | Commercial Branches, 2022 | Cooperatives' Share, 2022 | Change, 2012-2022 | Cooperative Branches/ Population, 2022 | Change, 2012-2022 | Cooperative Members/ Population, 2022 | Change, 2012-2022 | Cooperative Credit/ GDP, 2022 | Change, 2012-2022 | Branches, 2022 | Members, 2022 | Credit, 2022 |
| *North* | | | | | | | | | | | | | | |
| Acre | 3 | 3 | 83 | 3.49% | +3.49% | 0.003 | +0.003 | 0.029 | +0.023 | 0.013 | +0.010 | 0.04% | 0.18% | 0.09% |
| Amapá | 0 | 0 | 62 | 0.00% | 0.00% | 0.000 | 0.000 | 0.019 | +0.017 | 0.000 | -0.000 | 0.00% | 0.12% | 0.00% |
| Amazonas | 4 | 5 | 381 | 1.30% | +0.81% | 0.001 | +0.001 | 0.009 | +0.007 | 0.002 | +0.001 | 0.06% | 0.27% | 0.09% |
| Pará | 8 | 34 | 785 | 4.15% | +2.86% | 0.004 | +0.003 | 0.026 | +0.022 | 0.003 | +0.001 | 0.41% | 1.59% | 0.17% |
| Rondônia | 17 | 242 | 185 | 56.67% | +32.66% | 0.133 | +0.095 | 0.159 | +0.133 | 0.169 | +0.148 | 2.90% | 2.02% | 3.15% |
| Roraima | 1 | 4 | 49 | 7.55% | +7.55% | 0.007 | +0.007 | 0.010 | +0.008 | 0.003 | +0.002 | 0.05% | 0.04% | 0.02% |
| Tocantins | 1 | 16 | 220 | 6.78% | +1.31% | 0.010 | +0.000 | 0.027 | +0.021 | 0.004 | +0.001 | 0.19% | 0.30% | 0.07% |
| *North-east* | | | | | | | | | | | | | | |
| Alagoas | 6 | 39 | 310 | 11.18% | +7.49% | 0.012 | +0.008 | 0.011 | +0.005 | 0.020 | +0.015 | 0.47% | 0.27% | 0.43% |
| Bahia | 23 | 126 | 1,522 | 7.65% | +3.03% | 0.008 | +0.003 | 0.022 | +0.013 | 0.004 | +0.002 | 1.51% | 2.28% | 0.47% |
| Ceará | 4 | 29 | 787 | 3.55% | +1.41% | 0.003 | +0.001 | 0.006 | +0.003 | 0.004 | +0.001 | 0.35% | 0.36% | 0.22% |
| Maranhão | 6 | 35 | 544 | 6.05% | +4.75% | 0.005 | +0.004 | 0.005 | +0.003 | 0.003 | +0.002 | 0.42% | 0.24% | 0.12% |
| Paraíba | 12 | 54 | 440 | 10.93% | +6.71% | 0.013 | +0.008 | 0.018 | +0.010 | 0.029 | +0.015 | 0.65% | 0.51% | 0.68% |
| Pernambuco | 7 | 56 | 894 | 5.90% | +1.27% | 0.006 | +0.000 | 0.013 | +0.008 | 0.005 | +0.002 | 0.67% | 0.89% | 0.31% |
| Piauí | 2 | 3 | 278 | 1.07% | -0.13% | 0.001 | -0.000 | 0.004 | +0.002 | 0.001 | 0.000 | 0.04% | 0.10% | 0.01% |
| Rio Grande do Norte | 3 | 22 | 332 | 6.22% | +4.47% | 0.006 | +0.004 | 0.009 | +0.003 | 0.010 | +0.007 | 0.26% | 0.24% | 0.27% |
| Sergipe | 2 | 8 | 265 | 2.93% | +2.93% | 0.003 | +0.003 | 0.006 | +0.003 | 0.005 | +0.003 | 0.10% | 0.09% | 0.08% |
| *Midwest* | | | | | | | | | | | | | | |
| Distrito Federal | 14 | 53 | 377 | 12.33% | +8.13% | 0.017 | +0.007 | 0.029 | +0.010 | 0.010 | +0.003 | 0.64% | 0.63% | 0.95% |
| Goiás | 35 | 359 | 580 | 38.23% | +30.36% | 0.049 | +0.035 | 0.043 | +0.030 | 0.056 | +0.043 | 4.30% | 2.20% | 4.94% |
| Mato Grosso | 18 | 427 | 954 | 30.92% | +7.19% | 0.120 | +0.073 | 0.233 | +0.158 | 0.110 | +0.066 | 5.12% | 5.76% | 7.85% |
| Mato Grosso do Sul | 9 | 167 | 489 | 25.46% | +13.16% | 0.060 | +0.038 | 0.118 | +0.084 | 0.063 | +0.049 | 2.00% | 2.31% | 2.93% |
| *South-east* | | | | | | | | | | | | | | |
| Espírito Santo | 27 | 195 | 535 | 26.71% | +11.24% | 0.047 | +0.019 | 0.117 | +0.076 | 0.059 | +0.045 | 2.34% | 3.39% | 3.00% |
| Minas Gerais | 178 | 1,308 | 2,830 | 31.61% | +15.41% | 0.061 | +0.029 | 0.088 | +0.048 | 0.047 | +0.033 | 15.68% | 13.16% | 11.75% |
| Rio de Janeiro | 43 | 108 | 2,274 | 4.53% | +2.42% | 0.006 | +0.002 | 0.014 | +0.003 | 0.001 | +0.000 | 1.29% | 1.76% | 0.43% |
| São Paulo | 186 | 742 | 8,482 | 8.04% | +4.06% | 0.016 | +0.006 | 0.032 | +0.013 | 0.008 | +0.003 | 8.90% | 10.38% | 6.98% |
| *South* | | | | | | | | | | | | | | |
| Paraná | 74 | 1,718 | 1,877 | 47.79% | +27.14% | 0.147 | +0.091 | 0.173 | +0.110 | 0.099 | +0.077 | 20.60% | 14.09% | 17.00% |
| Rio Grande do Sul | 101 | 1,252 | 2,118 | 37.15% | +14.26% | 0.109 | +0.041 | 0.221 | +0.110 | 0.147 | +0.117 | 15.01% | 17.71% | 24.34% |
| Santa Catarina | 99 | 1,335 | 1,156 | 53.59% | +22.66% | 0.180 | +0.082 | 0.369 | +0.232 | 0.105 | +0.075 | 16.01% | 19.08% | 13.65% |
| *Brazil* | | | | | | | | | | | | | | |
| Overall | 883 | 8,340 | 28,809 | 22.45% | +12.03% | 0.038 | +0.021 | 0.067 | +0.043 | 0.036 | +0.026 | 100% | 100% | 100% |

*Source:* Authors' own computations using financial data from IF.data (2023), BCB (2016, 2024) and BureauCoop (2024).

*Notes:* Cooperatives' Share, 2022 corresponds to the share of financial cooperatives in total (commercial and cooperative) branches and service points (excluding ATMs).

Despite the overall dominance of commercial banks in the Brazilian financial system, BFCs have increased their local physical presence over recent decades in terms of the number of branches, both in absolute terms and relative to commercial banks (Table 1, Panel A). Between 2012 and 2022, BFC branch networks increased in 25 states. By contrast, the branch networks of commercial banks have decreased in 19 states.[5] BFCs have also penetrated localities more broadly, including via increased membership in the population and credit operations relative to GDP (Panel B). Though BFCs have traditionally had a stronger presence in the southernmost states due to their historical origins (Panel C), their penetration has increased in every macro region and in almost all states (Panel B). In several states, such as Santa Catarina in the South and Rondônia in the North, BFCs' physical branch presence now exceeds that of commercial banks (Panel A). Consequently, BFCs have grown to become more prominent across Brazil, while gaining prominence internationally in the cooperative movement (e.g., WCM, 2012, 2022).

## 3. Literature Review

### 3.1 Findings of Existing Studies

Through different theoretical channels, financial institutions are generally thought to promote growth and reduce poverty by alleviating financial constraints amongst the poor (King and Levine, 1993; Beck et al., 2007).[6] This expectation has often been confirmed empirically. For example, Beck et al. (2004) analysed cross-sectional data for between 47 and 58 countries over three decades and found a negative association between the share of private credit to GDP and monetary poverty. Using more recent data and averaging across 68 countries under an OLS regression framework, Beck et al. (2007) found that financially developed countries experienced larger reductions in the poverty headcount ratio. Honohan (2003) provided OLS cross-sectional evidence from 70 developing countries that banking depth negatively correlated with poverty headcount. Though a broad literature has developed on the poverty-finance nexus, critically many studies in this strand start out from the assumption that different financial institutions impact on poverty equally (e.g., De Haan et al., 2022).

Over time, studies have gradually accounted for different types of financial institutions, whilst providing a more careful consideration of space-time contexts. For example, Burgess and Pande (2005) exploited changes in Indian banking regulations to show that state-led bank branch expansion into formerly unbanked areas reduced the poverty headcount ratio. In a natural experiment, Bruhn and Love (2014) found that newly created Mexican commercial banks increased incomes of poorer households through their effects on employment. In a field experiment, Prina (2015) found that provision of basic savings accounts to female household heads in Nepal increased financial wellbeing, expenditure on education and certain foods, thereby suggesting favourable effects of savings banks on poverty. Using survey data from almost 2,000 rural households, Beck et al. (2015) found that MFIs facilitated investment and firm formation in China. More generally, the literature on MFIs has reported mixed findings with poverty, which is consistent with the differing objectives of individual MFIs (Lensink and Bulte, 2019).

[5] According to the BCB's annual report on the Brazilian financial system, the number of ATMs (which have often been used to replace physical bank branches) actually decreased in 23 states between 2012 and 2022 (BCB, 2023).

[6] Studies have highlighted several different theoretical channels. Firstly, the establishment of financial institutions in impoverished and underserved areas tends to reduce the costs of obtaining credit, especially for the self-employed, entrepreneurs and small businesses, due to the higher price for external finance (Banerjee and Newman, 1993). Secondly, due to the decreased cost of capital and increased investment in economic projects, firms can demand more labour, thereby creating new opportunities for employment and income generation among low-income households (Beck et al., 2010). Thirdly, an increased penetration of banks and other financial intermediaries can provide funding for education, thereby facilitating new economic opportunities for employment and earnings growth amongst the poor (Galor and Moav, 2004).

Local financial institutions, especially financial cooperatives, have received increasing attention in the literature due to their reputation for relationship lending and sustaining economies during downturns. Empirical evidence for financial cooperatives has so far been broadly favourable. Studies have highlighted favourable effects on credit availability (e.g., Dereeper et al., 2020); enterprise formation and firm performance (e.g., Coccorese and Shaffer, 2021); and employment (e.g., Schneiberg and Parmentier, 2022). The issue of income inequality has also received attention more recently. For example, Minetti et al. (2021) found that cooperative banks reduced income inequality in Italian provinces over the period 2001 to 2011 by slowing the turnover of firms and migratory flows. Peruzzi et al. (2023) highlighted financial cooperatives' role in mitigating income inequality between 2008 to 2015 in Italian municipalities during the global financial crisis and Eurozone sovereign debt crisis, especially in smaller cities. Arestis and Phelps (2023) found that financial cooperatives reduced income inequality during the Brazilian crisis of 2014-2016 due to their strong relationships with small businesses.

The poverty implications of financial cooperatives are, however, both relatively understudied and not well understood.[7] Firstly, income inequality studies might imply that financial cooperatives ought to reduce poverty; but financial cooperatives' capacity to alleviate negative shocks to income might not be equal at different poverty lines (e.g. more moderate versus more extreme poverty thresholds). Therefore, whether financial cooperatives can protect differently impoverished individuals (including the poorest of the poor), remains an important unanswered question. Secondly, exploiting new releases of data on cooperative memberships and their credit operations in the economy, we construct and employ some alternative measures of financial cooperative establishment and their local penetration. Thirdly, our understanding of the poverty-financial cooperatives nexus remains underexplored in relation to different channels. For example, financial cooperatives are well known for extending credit to support income generation and employment amongst small businesses during downturns. However, their impact on monetary poverty through other channels - such as their social investments in education or provision of emergency aid - remain underexplored empirically. We add to the literature by conducting some further empirical investigation into the different structural channels in this relationship for BFCs.

### 3.2 Evidence from Brazil

BFCs have a strong reputation for supporting economic growth and poverty alleviation in Brazil's more remote and rural parts, which typically lack access to traditional banking and financial institutions. For example, Sicredi cooperatives had branches in 217 municipalities in 2022 which were not served by any other banking or financial institution, as well as in 132 municipalities that were classified as low-income (Sicredi, 2022, p.147). In 2022, Sicredi cooperatives allocated BRL $18.9 billion in funding to sole traders, microenterprises, and small businesses (Sicredi, 2022, p.107). Cresol, which is Brazil's third-largest cooperative group and primarily serves farmer families, provides rural credit through its network of 734 local branches in 18 states. In 2021, Cresol cooperatives undertook 579,863 microcredit operations and allocated USD $460 million in credit to support small agricultural producers (IIED, 2023, p.16). BFCs have gained a reputation for extending credit to small businesses during crises, providing more flexibility on repayment terms, and returning financial surpluses to alleviate financial

[7] Formal econometric investigation into the poverty-financial cooperatives nexus is limited, though some studies have utilised factor analysis (Lal, 2018, for India), cluster analysis (e.g., Alvarez-Gamboa et al., 2023, for Ecuador) and cointegration analysis (Ngong et al., 2023, for Cameroon). None of these studies compares the nexus across different poverty lines, explores the use of different measures of financial cooperative presence, or investigates the channels through which financial cooperatives affect poverty.

hardship. For example, Sicredi and Cresol cooperatives were acknowledged as the leading financial institutions supporting small businesses with credit during the global pandemic (BNDES, 2020).

In a joint survey conducted by Sicredi and Fipe (Fundação Instituto de Pesquisas Econômicas) in 2019, it was established that BFCs bring several benefits to local economies through their lending activities relative to traditional financial institutions (Sicredi, 2019). Firstly, in contrast to commercial banks, BFCs expanded the balance of loans and increased the number of customers receiving loans even during the Brazilian economic crisis of 2014 to 2016. Secondly, BFCs' geographical distribution of branches and service points is relatively less concentrated in the most affluent South-east macro region, with greater diffusion across poorer parts in the Midwest, North and North-east macro regions. Thirdly, BFCs offer more loans to micro and small enterprises than other financial institutions (55.3% versus 12.4% of total loan portfolio); they lend at lower interest rates (for non-earmarked loans to small enterprises, an average interest rate of 32.4% versus 47.6% for traditional banks); and offer a greater proportion of loans with pre-fixed interest rates compared to traditional banks (73.4% versus 53.4%).[8] Fourthly, BFCs are less restrictive in granting credit to families and enterprises that do not meet the conditions to access finance from traditional financial institutions (Sicredi, 2019).

In addition to their lending activities, BFCs can impact their communities through their social investments, by sponsoring local causes, making donations and volunteering. BFCs reinvest part of their financial surpluses into a designated social fund ('*Fundo Social*'), which supports various local projects. One of the largest and best-known is Sicredi's flagship social responsibility initiative, '*A União Faz A Vida'*, which is an open access educational programme that aims to boost the inclusion, equity, and quality of education in over 475 municipalities (Sicredi, 2020). Elsewhere, the Ailos cooperative network has brought a wide range of educational courses to more than 100 municipalities through its '*PROGRID'* initiative (Ailos, 2023). Such social investments in education add to a community's base of human capital and provide new economic opportunities for traditionally disadvantaged groups, especially women and the youth. The latter are more likely to be entrapped by poverty, whilst suffering disproportionately from job destruction and economic exclusion (Beuermann et al., 2024).

Recently, BFCs have acted as a conduit for social protection during the Covid-19 pandemic. In 2020, cooperatives in the largest networks, Sicoob and Sicredi, were authorised to provide emergency cash transfers under the government's '*Auxilio Emergencial'* programme (AEP). Introduced in April 2020, the AEP primarily targeted individuals without regular employment, including informal workers and the unemployed, who were unprotected by Brazil's other social safety nets, and as such, were particularly vulnerable to poverty. By September 2020, the AEP became Brazil's largest ever cash-transfer programme and was subsequently extended in 2021 and 2022 (De Leon et al., 2023, p.141). Therefore, BFCs have potentially mitigated rising monetary poverty in different ways, including via the transmission of social transfers under the AEP. The latter is interesting because of the AEP's scale; also, because BFCs' role in distributing social protection during the global pandemic has been upgraded at a time when traditional banking and financial institutions have arguably had a weakened capacity to sustain local economies.

In summary, several informal accounts from Brazil offer a positive view of BFCs in their relationship with poverty, suggesting that BFCs can mitigate monetary poverty in their communities during troubled times.

### 3.3 Linkages Between Poverty and Brazilian Financial Cooperatives

[8] The lending statistics quoted in the main text correspond to June 2019.

In this contribution, we take a step towards investigating the different channels through which BFCs have reputedly mitigated rising monetary poverty. We focus on three major channels of poverty alleviation, which relate to: i) income-generation and employment creation; ii) human capital formation; and iii) social protection (e.g., Wanyama et al., 2008). Firstly, financial cooperatives are known for their engagement in relationship lending and can help absorb negative income shocks by extending finance to their members to support income generation and payroll (e.g., McKillop, 2020). Secondly, financial cooperatives' educational initiatives provide disadvantaged and low-income individuals with access to more remunerative job opportunities, thereby reducing poverty (e.g., Galor and Moav, 2004). Thirdly, financial cooperatives have played an additional role in distributing government-backed emergency aid during the Covid-19 pandemic, targeting Brazilians who were unprotected by the country's main social safety nets (e.g., De Leon et al., 2023). Hence, the poverty-financial cooperatives nexus remains underexplored both in general and in relation to the specificities of emerging countries like Brazil, where development processes have evolved alongside significant inequalities in regional financial and economic systems.

## 4. Methodology and Data

### 4.1 Empirical Methodology

This paper's empirical approach is motivated by an evolving debate about the capacity of local financial institutions to foster economic resilience (e.g., Bolton et al., 2016, versus Berger et al., 2022), as well as some recent informal accounts from the Brazilian cooperative movement which suggest BFCs mitigated the fallout from the Brazilian economic crisis and the global pandemic. Drawing on empirical studies on poverty determination (e.g., Ferreira et al., 2010; Thévenon et al., 2018; De Haan et al., 2022), this paper employs more formal, panel-data econometric methods to estimate the monetary poverty-financial cooperatives nexus across state (i), year (t) dimensions, as in equations (1)-(3):

$$Poverty_{it} = \beta_0 + \beta_1 Financial\ Cooperatives_{it} + \beta_2{}'\Pi_{it} + u_{it} \qquad (1)$$

Equation (1) provides a simple empirical regression framework for testing, through coefficient, $\beta_1$, whether a change in FCP ($Financial\ Cooperatives_{it}$) affects monetary poverty ($Poverty_{it}$) in Brazilian states. A set of controls ($\Pi_{it}$) and corresponding coefficient vector, $\beta_2$, accounts for other observable influences (e.g., depth of traditional banking system, demographic factors, labour-market conditions, state production structure, etc.), as detailed in sections 4.5-4.6. Finally, an error term, $u_{it}$, with the normal properties, accounts for residual variation.

$$Poverty_{it} = \beta_0 + \beta_1 Financial\ Cooperatives_{it} + \beta_2{}'\Pi_{it} + \alpha_i + \gamma_t + u_{it} \qquad (2)$$

Equation (2) controls additionally for unobservable heterogeneity across time and space, via state ($\alpha_i$), year ($\gamma_t$) specific effects. On the one hand, with considerable power devolved to each state, federative institutions and policies can affect monetary poverty rather differently within individual states. On the other hand, time-specific influences provide control for a multitude of inter-temporal shocks over the last decade. More generally, by absorbing unobserved variation across spatial and temporal dimensions which may correlate with our measures of poverty as well as the regressors, fixed effects can mitigate omitted variables bias.

This paper also provides some investigation into the structural channels that are influential in the main relationship. This is premised upon BFCs' strong local presence and socioeconomic objectives, which make them well positioned to mitigate rising poverty in states that have more localised employment structures, less well developed public educational infrastructure, and more limited social protection.

Firstly, we investigate whether BFCs' effect on monetary poverty depends on the local employment structure and the economic importance of microenterprises, small businesses and the self-employed due to their reliance on external financing and relationship lending. Secondly, we investigate the influence of public educational infrastructure, on the premise that states with less extensive schooling networks and lower public educational expenditure would benefit more from BFCs' social investments in education. Thirdly, BFCs have played an additional role in distributing government-backed social protection to their communities through the AEP. Therefore, we explore whether BFCs' effect on poverty has been stronger in parts of the country that contained a greater share of socially vulnerable Brazilians who were not protected by Brazil's other main social safety nets.

$$Poverty_{it} = \beta_0 + \beta_1 Financial\ Cooperatives_{it} + \delta_0 I_{it}^{k} + \delta_1 (Financial\ Cooperatives_{it} \times I_{it}^{k}) + \beta_2' \Pi_{it} + \alpha_i + \gamma_t + u_{it} \qquad (3)$$

The investigation is implemented by estimation of equation (3), which includes an indicator variable ($I_{it}^{k}$) that identifies whether a state is above- or below-average in conditioning factor $k$ and a corresponding interaction term ($Financial\ Cooperatives_{it} \times I_{it}^{k}$). This interaction specification allows us to capture differential poverty effects across states with more localised employment structures, weaker public educational infrastructure, and a greater share of socially unprotected Brazilians. For the latter, we also include year-specific interactions for the years 2020 to 2022 to capture any dynamic effects of BFCs on monetary poverty in more socially vulnerable states during the pandemic.

Overall, equations (1)-(3) provide an empirical framework for testing whether changes in BFC establishment have contributed to alleviating or exacerbating monetary poverty while shedding some further light on the income generation and employment, human capital formation and social protection channels of influence (e.g., Wanyama et al., 2008). Further details about the structural channels, variable measurements and expectations are provided in section 5.3.

### 4.2 Econometric Approach

By controlling for other poverty influences, our econometric approach arguably generates a more robust estimate of the relationship than could be obtained from descriptive statistics or unconditional correlation analysis, though we also acknowledge its limitations regarding causal inference in a state-level analysis of poverty and financial inclusion. Moreover, we take additional steps to mitigate endogeneity concerns as follows. Our baseline IV approach follows many other studies that have investigated the development-finance nexus by employing TSLS (e.g., Beck et al., 2007, for growth; D'Onofrio et al., 2019, for income inequality; De Haan et al., 2022, for monetary poverty). Following the standard approach (e.g., Chen et al., 2022), we employ two lags as internal instruments, treating the FCP variable as endogenous. However, for robustness, we exploit relevant geographical and historical dimensions of BFC establishment to generate an alternative set of (external) instruments.

Firstly, we exploit the observation that financial cooperatives have historically spread across neighbouring countries and regions. BFCs were established firstly in Brazil's southernmost states of Rio Grande do Sul and Santa Catarina, before gradually spreading to more central and northern states. Therefore, we instrument a state's FCP based on the average FCP in bordering states. Because BFCs generally allocate credit to support local projects, their presence in bordering states should not directly influence poverty in a given state, and ought to be a valid instrument (Meslier et al., 2022).[9] Secondly, following Arestis and Phelps (2023), we exploit the observation that the settlement of early German

[9] Similar arguments were made by Meslier et al. (2022) regarding community banks in French counties, albeit their study does not deal specifically with financial cooperatives or the poverty issue.

migrants in Brazil's rural south coincided with BFCs' early establishment in the same parts.[10] Significant channelling of migrant communities to Brazil's far south was a result of military-political considerations in order to counter the threat of invasion by Argentina in the years following Brazil's independence (Jordan, 1962, p.346). This historical military-political decision likely shaped the geography of BFC establishment, but without direct effects on monetary poverty in modern-day Brazil. Therefore, we instrument using a state's distance (in 1,000s of kilometres) from Nova Petrópolis, which contained a sizeable community of early German migrants, and is where the first BFC was established. Thirdly, we include the number of years since the establishment of a state's first German colony as an additional, time-varying instrument, on the basis that larger BFC networks would have developed in states that contained the oldest German migrant communities.[11] [12]

### 4.3 Sample Selection

Brazil's first-level territorial classification consists of 5 macro regions: North, North-east, Midwest, South-east and South. The country's second-level territorial classification consists of 27 federates, which we refer to as states: (1) North: Acre, Amapá, Amazonas, Pará, Rondônia, Roraima, and Tocantins; (2) North-east: Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe; (3) Midwest: Goiás, Mato Grosso, Mato Grosso do Sul and Distrito Federal; (4) South-east: Espírito Santo, Minas Gerais, Rio de Janeiro and São Paulo; and (5) South: Paraná, Rio Grande do Sul and Santa Catarina. Each state is further sub-divided into many municipalities, with there being over 5,500 municipalities across Brazil. While state boundaries have remained consistent over recent decades, there have been hundreds of boundary changes in Brazil's municipalities. Therefore, we employ annual data from 2012 to 2022 for all 27 states in a balanced panel. The starting point of 2012 coincides with IBGE's first PNADC annual household survey, which we use to compute monetary poverty, whereas 2022 corresponds to the latest release of PNADC survey data at the time of writing.

### 4.4 Poverty Measurement

This paper employs two main measures of monetary poverty, namely the headcount ratio and poverty gap, which are characterised by equation (4):[13]

$$Poverty(z, y, \alpha) = \frac{1}{N}\sum_{n=1}^{q}\left(\frac{z - y_n}{z}\right)^{\alpha} \qquad (4)$$

In equation (4), $N$ is the total number of individuals in the state population; $z$ is the poverty line; $y_n$ is the per capita household income of individual $n$; $q$ is the total number of individuals whose income falls below the poverty line. When $\alpha = 0$, poverty is indicated by the headcount ratio; and by the poverty gap when $\alpha = 1$.

[10] Arguably, due to greater linguistic and cultural differences, German migrants were more socially isolated than European migrants from countries like Portugal, Spain and Italy, hence had a stronger motivation to establish communal forms of finance.

[11] The earliest colonies were established in Bahia, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul according to Brazilian historian Toni Jochem's chronology, which is available at www.tonijochem.com.br/colonias_alemas.htm.

[12] We note no obvious relationship between modern-day poverty and historical German settlement in our dataset. For example, the state of Bahia contained several German colonies, yet it has above-average poverty in our sample. Contrarily, poverty is relatively low in other states where German colonies were first established, such as Santa Catarina.

[13] Multidimensional poverty indicators, such as the Oxford Poverty & Human Development Initiative's Global Multidimensional Poverty Index, provide an alternative approach by factoring in (non-monetary) dimensions of poverty including living standards, education, and health (e.g., Alkire and Foster, 2011). In this paper we focus on monetary poverty, but do not dispute the potential for local financial institutions to impact on multiple dimensions of poverty.

Firstly, we measure poverty using the headcount ratio ($Headcount_{it}$), which indicates the proportion of a state's population falling below the poverty line each year. Differently, the poverty gap ($Gap_{it}$), indicates the average income gap of the poor from the poverty line in each state-year. Whilst the headcount ratio captures poverty's prevalence in the state population, the poverty gap measures the severity of monetary deprivation. The headcount ratio and poverty gap measures are scaled from 0-1, where larger values correspond to greater poverty. Microdata on individual incomes and household characteristics are available from the IBGE's PNADC from 2012 to 2022. To compute household income per capita, we aggregate individuals' income (from all sources) within individual households before normalising by the family size.[14] Then we calculate the proportion of individuals with a household income per capita below the poverty line and compute the average income gap of the impoverished. Because the survey is conducted quarterly, with different representative households being selected over time, we average across quarters to obtain the annualised headcount ratio and poverty gap for each state-year.

We initially fix the poverty line at USD $3.65 (2017 PPP) per person per day, which is used by the World Bank (Jolliffe et al., 2022) and national statistics offices around the world as an international poverty line (e.g., IBGE, 2023). We firstly convert into BRL using the 2017 PPP conversion rate for private consumption of BRL $2.33 for USD $1, before aggregating the daily BRL values into a monthly equivalent. Around the base year of 2017, we deflate and inflate the monthly BRL value to obtain a monthly poverty line according to changes in Brazil's national consumer price index (NCPI). This paper's baseline approach is consistent with previous empirical studies on Brazilian poverty (e.g., Ferreira et al., 2010). Even so, due to the range of established poverty lines, and the potential sensitivity of our results to this choice, we consider several alternatives: (1) daily household per capita income below USD $2.15; (2) daily household per capita income below USD $6.85; and (3) monthly household per capita income below BRL $140.[15] Alternative (1) reflects the lower-end of the spectrum of international poverty lines, i.e., extreme poverty, whereas (2) provides a less extreme international poverty line relative to USD $2.15 and $3.65 lines. Alternative (3) is based instead on the (unofficial) Brazilian national poverty line of BRL $140 per person per month, which was defined by the Ministry of Social Development (MDS) as the income and consumption expenditure required to achieve the absolute minimum satisfaction level based on an individual's fundamental needs (Campello et al., 2014).[16]

### 4.5 Financial Cooperative Presence

To measure financial cooperative presence (FCP), we take the total number of cooperative branches, branch-like offices and other physical service points, and normalise by the population (in 1,000s) in each state-year *(Financial Cooperatives$_{it}$)*. This measure been widely used in the financial inclusion literature (e.g., Beck et al., 2007). BFCs' branch data are sourced from the BCB's IF.data portal (IF.data, 2023). For robustness, we consider two alternative measures of FCP, since BFCs' physical presence might not correspond that closely to the actual linkages between BFCs and their local membership and lending activities, which support local economies. Firstly, we take the number of BFC members registered in each state-year and normalise by the population.[17] Data from 2016 to 2022 are

[14] Domestic workers, parents of domestic workers and non-family tenants are excluded when calculating household per capita incomes.
[15] We deflate and inflate the USD $2.15 and $6.85 international poverty lines (monthly BRL equivalents) around the base year of 2017 according to changes in the NCPI.
[16] Because the Brazilian situation of poverty was defined at the launch of the 'Brazil without Extreme Poverty Plan' in 2011, we inflate the monthly value of BRL $140 to obtain values for the years 2012 to 2022 according to changes in the NCPI.
[17] Membership corresponds to people rather than legal entities.

sourced from BCB's database on cooperative membership (BCB, 2024). Data for the years 2012 and 2015 are from the BCB's annual report on the national system of credit cooperatives (BCB, 2016). Secondly, we obtain data from BureauCoop (2024) on BFCs' credit portfolio size in each state-year from 2012 to 2022 and normalise by GDP.[18] Population and GDP data are obtained from the IBGE.

### 4.6 Control Variables

In selecting control variables, we draw on the empirical literature (e.g., Ferreira et al., 2010; Thévenon et al., 2018; De Haan et al., 2022). To control for the presence of commercialised banks, which may compete locally with BFCs, we normalise the total number of commercial and universal plus (multiple) bank branches by the population (in 1,000s) in each state-year (*Commercial Banks*$_{it}$). In this calculation we initially include both the Banco do Brasil and Caixa Econômica, which operate as semi-public banks, but acknowledge that they are often referred to as commercial banks or multiple banks with significant commercial portfolios (e.g., ESTBAN, 2023). In our robustness checks, we consider separating out the public and private commercial banks. Detailed information about all registered commercial and universal plus banks is obtained from the BCB's UNICAD registration system. Data on Banco do Brasil and Caixa Econômica bank branches are sourced from the BCB's ESTBAN database.[19]

Demographic controls include the average household size (*Household Size*$_{it}$) and share of the population living in urban settlements (*Urbanisation*$_{it}$), which we have computed from the PNADC microdata, as well as state population growth (*Population Growth*$_{it}$), sourced from the IBGE. The unemployment rate (*Unemployment*$_{it}$) is included as a general control for labour-market conditions using IBGE data. The shares of employment in agriculture (*Agriculture*$_{it}$) and industry (*Industry*$_{it}$) are included to control for heterogeneity in production structure, based on the PNADC microdata.[20] To control for educational attainment (*Educational Attainment*$_{it}$), we include the share of 25–64-year-olds completing schooling to at least high school level based on PNADC microdata. The share of households assisted by Bolsa Família is used as an indicator of social assistance (*Bolsa Família*$_{it}$) based on IBGE data. Inflation (*Inflation*$_{it}$) is calculated from the GDP deflator using IBGE data. Finally, to control for the global pandemic, we include a dummy variable (*Pandemic*$_{it}$), which takes a value of unity for the years 2020 to 2022, and zero otherwise.[21] All variables are computed for individual states and those expressed as shares are scaled in percentage points as indicated in Table 2.

### 4.7 Statistical Summary

Table 2 provides summary statistics of the key variables used in our study.

[18] Data on branches, members and credit portfolio size are based on the December figures in each year.
[19] We use bank branch data in December of each year.
[20] The share of employment in the services sector is excluded to avoid the dummy variables trap.
[21] Separately, we included a dummy variable to indicate the Brazilian crisis over the period 2014 to 2016, but it had no material effect on our results. For simplicity, we include individual-year effects to absorb year-specific effects across our sample.

**Table 2.** Descriptive Statistics

**Panel A: Summary Statistics**

| | Obs | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Poverty Measures | | | | | |
| Headcount Ratio (USD $2.15) | 297 | 0.133 | 0.097 | 0.015 | 0.390 |
| Headcount Ratio (USD $3.65) | 297 | 0.233 | 0.139 | 0.037 | 0.527 |
| Headcount Ratio (USD $6.85) | 297 | 0.432 | 0.174 | 0.129 | 0.730 |
| Headcount Ratio (BRL $140) | 297 | 0.182 | 0.120 | 0.022 | 0.461 |
| Poverty Gap (USD $2.15) | 297 | 0.072 | 0.055 | 0.009 | 0.256 |
| Poverty Gap (USD $3.65) | 297 | 0.118 | 0.081 | 0.015 | 0.342 |
| Poverty Gap (USD $6.85) | 297 | 0.219 | 0.118 | 0.045 | 0.479 |
| Poverty Gap (BRL $140) | 297 | 0.094 | 0.069 | 0.011 | 0.298 |
| Financial Cooperative Presence | | | | | |
| Financial Cooperative Branches (per 1,000 Inhabitants) | 297 | 0.025 | 0.036 | 0.000 | 0.180 |
| Financial Cooperative Members per Capita | 243 | 0.043 | 0.064 | 0.002 | 0.369 |
| Financial Cooperative Credit Portfolio Size/GDP | 297 | 0.020 | 0.029 | 0.000 | 0.169 |
| Instrumental Variables | | | | | |
| Distance to Nova Petrópolis (1,000 km's) | 297 | 2.103 | 0.981 | 0.255 | 3.628 |
| Years Since First German Colony Established | 297 | 41.815 | 78.550 | 0.000 | 212.000 |
| Distance-Weighted Average FCP in Bordering States | 297 | 0.026 | 0.029 | 0.000 | 0.180 |
| Control Variables | | | | | |
| Commercial Bank Branches (per 1,000 Inhabitants) | 297 | 0.135 | 0.046 | 0.070 | 0.287 |
| Household Size | 297 | 3.131 | 0.315 | 2.530 | 4.164 |
| Urbanisation (%) | 297 | 73.163 | 10.078 | 49.366 | 93.556 |
| Population Growth (%) | 297 | 1.157 | 1.012 | -7.950 | 5.362 |
| Educational Attainment (%) | 297 | 51.189 | 9.151 | 33.433 | 77.692 |
| Unemployment Rate (%) | 297 | 9.889 | 3.744 | 2.500 | 20.000 |
| Employment Share – Agriculture (%) | 297 | 17.828 | 7.231 | 2.045 | 37.808 |
| Employment Share – Industry (%) | 297 | 10.114 | 3.924 | 3.993 | 24.554 |
| Inflation (%) | 297 | 6.702 | 3.820 | -9.090 | 22.870 |
| Bolsa Família Assisted (%) | 297 | 18.728 | 11.585 | 1.400 | 44.000 |

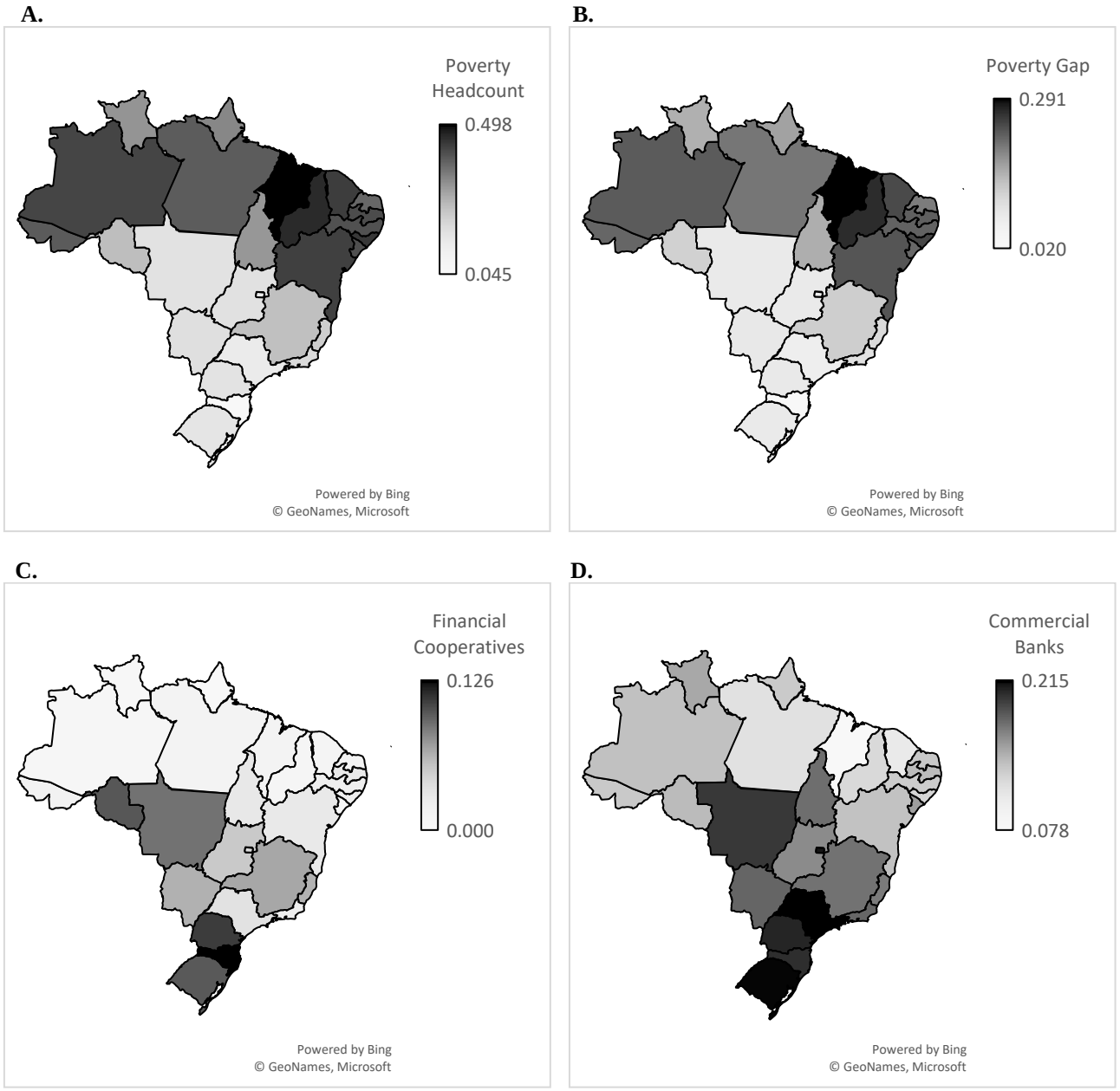
**Panel B: Inter-temporal Variation of Poverty in Brazilian States**

| | | **Headcount Ratio (USD $3.65)** | | **Poverty Gap (USD $3.65)** |
|---|---|---|---|---|
| | SD | State | SD | State |
| Minimum | 0.006 | Santa Catarina | 0.003 | Santa Catarina |
| 25th Percentile | 0.013 | São Paulo | 0.007 | São Paulo |
| 50th Percentile | 0.021 | Ceará | 0.015 | Ceará |
| 75th Percentile | 0.027 | Tocantins | 0.024 | Rio Grande do Norte |
| Maximum | 0.045 | Roraima | 0.031 | Amazonas |

*Source:* Authors' own computations.

In Table 2 (Panel A), commercial bank density (branches per 1,000 inhabitants) is greater than that of financial cooperatives when averaging across all states and years, though both are more highly concentrated in the South and South-east macro regions. Monetary poverty is generally less prevalent and severe in Brazil's South, South-east and Midwest than in the North and North-east macro regions. Consistent with other studies, we find that the headcount ratio and poverty gap are extremely high in several states in the North and North-east macro regions, far exceeding the national average (cf. UNDP, 2020, p.41). These spatial divides can be seen in Figures 2A-2D, which map the average poverty headcount ratio (2A), poverty gap (2B), financial cooperative density (2C), and commercial bank density (2D) in Brazil's states.

**Figures 2A-2D.** *Poverty, Financial Cooperatives and Commercial Bank Branches per 1,000 Inhabitants, State Averages, 2012-2022*




*Source:* Authors' own computations using data from the BCB, IBGE and PNADC surveys.
*Notes:* A. Headcount ratio (USD $3.65); B. Poverty gap (USD $3.65); C. Financial cooperative branches (per 1,000 inhabitants). D. Commercial and universal plus bank branches (per 1,000 inhabitants). Averages computed over the years 2012 to 2022.

The substantial variation in poverty reflects not only significant spatial disparities in income but also considerable inter-temporal volatility of monetary deprivation over the last decade. Panel B of Table 2 reveals that states experiencing the most volatility (and usually the largest increases) in poverty over the sample period include Roraima and Amazonas in the less developed North and North-east macro regions, respectively. By contrast, states like Santa Catarina in the South and São Paulo in the South-east macro regions, are relatively well developed, and have experienced much lower inter-temporal variation in poverty during the last decade.

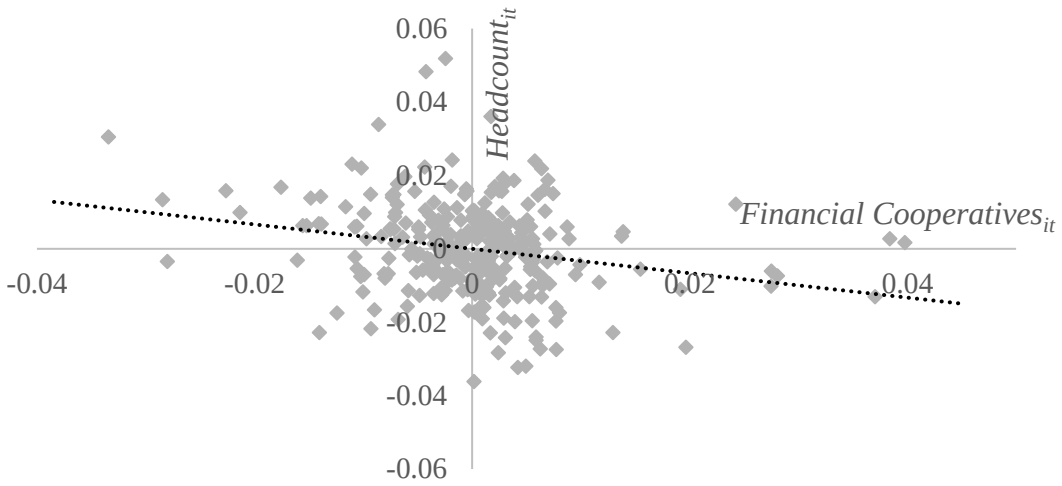
## 5. Estimation Results

### 5.1 Baseline Results

The estimation results are summarised in Table 3 using the headcount ratio (Panel A) and poverty gap (Panel B) at the USD $3.65 poverty line.[22] Overall, we find a negative association between FCP and both measures of monetary poverty, with estimates statistically significant at the 1% level.[23] When the full set of controls is included in columns (4)-(5) and (9)-(10), LSDV and TSLS results are similar. Statistically, the presence of financial cooperatives is associated more significantly with poverty alleviation than commercial banks. The negative empirical associations between FCP and the headcount ratio and poverty gap measures are illustrated in Figures 3A-3B, which highlight the conditional correlations (after partialling-out all other controlling influences).[24] Economically, a one standard deviation increase in FCP reduces the headcount ratio by 0.012 (-0.341 x 0.036), whereas it reduces the poverty gap by 0.007 (-0.207 x 0.036). This corresponds to taking about 3 million Brazilians out of poverty. Therefore, from a monetary poverty perspective, our results corroborate the thesis that financial cooperatives protect their communities during troubled times (e.g., Bolton et al., 2016; Sette and Gobbi, 2015; Schneiberg and Parmentier, 2022; Arestis and Phelps, 2023).

**Figures 3A-3B.** *Partial Correlations of Financial Cooperative Presence, Headcount Ratio and Poverty Gap*

**A.**

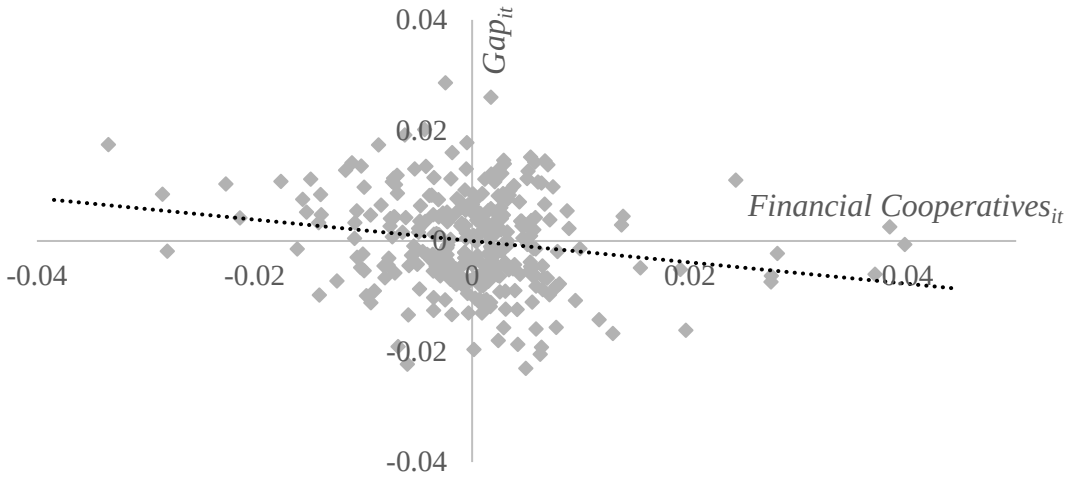



**B.**

[22] Absolute t-statistics are reported (in parentheses) using Conley's (1999) corrected standard errors, which are robust to spatial autocorrelation and arbitrary heteroskedasticity.

[23] Results in Tables 3-10 are not particularly sensitive to whether we detrend the poverty headcount and poverty gap variables. As an alternative, we regressed both poverty variables separately on state-specific time trends, before taking the resulting residuals as the detrended poverty measures. However, using the detrended variables instead generated extremely similar if not identical results to those presented in this paper.

[24] Conditional correlation plots for the headcount ratio and poverty gap correspond to LSDV estimations in columns (4) and (9) of Table 3, respectively.




*Source:* Authors' own computations.
*Notes:* A. Conditional correlation between $Headcount_{it}$ and $Financial\ Cooperatives_{it}$; B. Conditional correlation between $Gap_{it}$, and $Financial\ Cooperatives_{it}$.

Table 3 reveals several other robust monetary poverty determinants. Household size, unemployment, inflation, and the Covid-19 dummy positively and significantly affect both poverty measures. Consistent with prior expectations and empirical findings elsewhere, larger households tend to suffer more from poverty due to an increase in the dependency ratio (e.g., Thévenon et al., 2018). Higher rates of unemployment and inflation reduce per-capita household incomes and erode consumers' purchasing power, thereby increasing poverty (e.g., Ferreira et al., 2010). As expected, states with higher educational achievement tend to be significantly less impoverished (e.g., De Haan et al., 2022). The government's main poverty reduction programme, Bolsa Família, has reduced poverty, and significantly so, which corroborates previous empirical findings (e.g., Ferreira et al., 2010). Our results also indicate that Covid-19 has had a large impact on poverty; it has significantly increased the headcount ratio by 0.054-0.089, and the poverty gap by 0.034-0.051.

**Table 3.** Baseline Estimation Results

| | Panel A: Headcount Ratio (USD $3.65) | | | | | Panel B: Poverty Gap (USD $3.65) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LSDV | LSDV | LSDV | LSDV | TSLS | LSDV | LSDV | LSDV | LSDV | TSLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *Financial Cooperatives*$_{it}$ | -0.372*** | -0.332*** | – | -0.332*** | -0.341*** | -0.316*** | -0.190*** | – | -0.193*** | -0.207*** |
| | (5.031) | (3.514) | | (3.902) | (4.380) | (8.016) | (3.461) | | (3.650) | (4.215) |
| *Commercial Banks*$_{it}$ | – | – | -0.030 | -0.000 | 0.026 | – | – | -0.006 | 0.011 | 0.020 |
| | | | (0.651) | (0.013) | (0.744) | | | (0.305) | (0.651) | (1.271) |
| *Household Size*$_{it}$ | – | 0.070*** | 0.053*** | 0.070*** | 0.112*** | – | 0.029*** | 0.020*** | 0.030*** | 0.056*** |
| | | (5.748) | (5.216) | (6.151) | (8.026) | | (3.626) | (2.698) | (3.633) | (8.414) |
| *Urbanisation*$_{it}$ | – | -0.000 | -0.000 | -0.000 | -0.000 | – | -0.001*** | -0.001*** | -0.001*** | -0.001** |
| | | (0.210) | (0.550) | (0.197) | (0.424) | | (3.148) | (3.430) | (2.910) | (2.494) |
| *Population Growth*$_{it}$ | – | 0.002*** | 0.002*** | 0.002*** | 0.005*** | – | -0.000 | 0.000 | -0.000 | -0.001 |
| | | (5.887) | (6.162) | (5.725) | (3.272) | | (0.386) | (0.071) | (0.357) | (0.950) |
| *Educational Attainment*$_{it}$ | – | -0.004*** | -0.004*** | -0.004*** | -0.005*** | – | -0.003*** | -0.003*** | -0.003*** | -0.004*** |
| | | (5.037) | (4.176) | (4.784) | (5.807) | | (4.421) | (3.915) | (4.364) | (6.348) |
| *Unemployment*$_{it}$ | – | 0.005*** | 0.005*** | 0.005*** | 0.004*** | – | 0.003*** | 0.004*** | 0.003*** | 0.003*** |
| | | (12.858) | (12.603) | (12.936) | (7.244) | | (13.566) | (13.911) | (13.481) | (11.003) |
| *Agriculture*$_{it}$ | – | 0.002*** | 0.002*** | 0.002*** | 0.002*** | – | 0.000 | 0.000 | 0.000 | -0.000 |
| | | (5.404) | (4.632) | (5.634) | (3.174) | | (0.909) | (0.548) | (0.984) | (0.385) |
| *Industry*$_{it}$ | – | 0.002 | 0.002* | 0.002 | 0.000 | – | 0.001 | 0.001 | 0.001 | 0.001 |
| | | (1.604) | (1.844) | (1.605) | (0.307) | | (0.930) | (1.040) | (0.920) | (0.772) |
| *Inflation*$_{it}$ | – | 0.000** | 0.000** | 0.000* | 0.000** | – | 0.000*** | 0.000** | 0.000** | 0.000*** |
| | | (2.331) | (2.050) | (1.803) | (2.240) | | (2.891) | (2.517) | (2.255) | (2.733) |
| *Bolsa Família*$_{it}$ | – | -0.001** | -0.001** | -0.001** | -0.001*** | – | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | | (2.313) | (2.527) | (2.355) | (4.459) | | (5.130) | (5.340) | (5.289) | (12.842) |
| *Pandemic*$_{it}$ | – | 0.071*** | 0.054*** | 0.071*** | 0.089*** | – | 0.043*** | 0.034*** | 0.044*** | 0.051*** |
| | | (5.958) | (3.866) | (5.477) | (12.559) | | (5.186) | (3.592) | (4.831) | (10.549) |
| + State,Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | – | – | – | 1309.40*** | – | – | – | – | 1309.40*** |
| Hansen's J Test | – | – | – | – | [0.280] | – | – | – | – | [0.155] |
| RMSE | 0.015 | 0.013 | 0.013 | 0.013 | 0.011 | 0.011 | 0.009 | 0.009 | 0.009 | 0.008 |
| Observations | 297 | 297 | 297 | 297 | 243 | 297 | 297 | 297 | 297 | 243 |

*Source:* Authors' own computations.

*Notes:* Constant terms and fixed effects are included in estimations as indicated but are excluded in the table to conserve space. F Statistic corresponds to the F-test for joint significance of excluded instruments. Hansen's J Test is the p-value for Hansen's (1982) over-identification test. RMSE corresponds to the root mean squared error. Absolute t-statistics (in parentheses) are based on Conley's (1999) robust standard errors. Significance is indicated by * (10%), ** (5%), *** (1%).

### 5.2 Additional Estimations

Firstly, we explore sensitivity of results by considering a spectrum of established international poverty lines (e.g., World Bank, 2018): (1) daily household per capita income below USD $2.15; (2) daily household per capita income below USD $6.85; and (3) monthly household per capita income below BRL $140. Table 4 reveals that, unlike commercial banks, BFCs have a significant effect on poverty at more and less extreme poverty lines. However, BFCs' effects on less extreme poverty (2) are about twice as large (columns 4-6 vs 1-3), suggesting a stronger role in preventing low-income households from falling into poverty than lifting the poorest out of extreme poverty. The outcomes using the national poverty line (3) (columns 7-9) are more in line with the results for extreme poverty (columns 1-3). Overall, our results indicate a robust effect of BFCs on poverty mitigation; but they also point to limitations in BFCs' capacity to alleviate poverty among the most extremely impoverished and monetarily deprived Brazilians.

Secondly, we present the results using alternative measures of FCP in Table 5, based on BFC members in the population (Panel A) and BFC credit portfolio size to GDP (Panel B). These results confirm a negative association between FCP and both poverty measures, and a more favourable relationship than for commercial banks. We again obtain stronger results at the less extreme poverty threshold (USD $6.85) using both alternative measures of FCP. Another observation is that the measure of FCP based on credit to GDP yields somewhat stronger results than the membership per capita measure. For example, according to output in columns (4)-(6), a 10% increase in BFC credit to GDP associates with a reduction in the headcount ratio by about 0.03, whereas a 10% increase in BFC membership per capita associates with a smaller reduction of about 0.02. Using the credit to GDP measure, we also find weaker but still highly significant results even at the more extreme poverty threshold (USD $2.15), whereas using the membership per capita measure, the estimates are closer to zero and not always significant. Therefore, the credit to GDP measure may better capture BFCs' real activities and their influence on local economies.

Thirdly, we implement alternative IV identification strategies using external instruments in Table 6 as discussed in section 4.2. Reassuringly, both the German colony establishment and average FCP in bordering states instruments positively and significantly associate with *Financial Cooperatives*$_{it}$, whereas a state's distance from Nova Petrópolis negatively and significantly associates with *Financial Cooperatives*$_{it}$ (Panel A). Our alternative IV estimations confirm that BFCs have alleviated poverty both in absolute terms and compared to commercial banks; but our results point again to a more significant and stronger effect of BFCs on more moderately defined monetary poverty (Panel C versus Panel B). Importantly, the estimations are supported by the F-test for significance of external instruments, as well as Hansen's (1982) over-identification test, which indicates in most cases that the instruments are valid at the 5% level of significance.

Fourthly, we explore the implications of separating out Brazil's public banks from other (private) commercial and universal plus banks. Though the main state banks, Banco do Brasil and Caixa Econômica Federal, effectively operate as commercial banks, they still retain some socioeconomic functions. For example, by making public investments, allocating microcredit under various government-lending schemes, and distributing social transfers under Bolsa Família. Therefore, we add into the estimations a measure of state bank presence (*State Banks*$_{it}$), based on the number of state bank branches per 1,000 inhabitants. Furthermore, we subtract the number of state branches from all (public and private) commercial bank branches to generate a

measure of private commercial bank density (branches per 1,000 inhabitants) (*Private Commercial Banks*$_{it}$). The results in Table A1 (in the Appendix), indicate that the different financial institutions all tend to alleviate monetary poverty unconditionally (columns 1-3, 7-9); but only BFCs robustly alleviate poverty once the full set of controls is added (columns 5-6, 11-12) and under TSLS (columns 6, 12).

**Table 4.** Additional Estimations: Alternative Poverty Lines

| | **International Poverty Line (Lower), More Extreme Poverty (USD $2.15)** | | | **International Poverty Line (Upper), Less Extreme Poverty (USD $6.85)** | | | **MDS National Poverty Line, Poverty (BRL $140)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | LSDV | LSDV | TSLS | LSDV | LSDV | TSLS | LSDV | LSDV | TSLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **Panel A: Headcount Ratio** | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.227*** | -0.236*** | -0.234*** | -0.436*** | -0.414*** | -0.403*** | -0.252*** | -0.246*** | -0.229*** |
| | (3.209) | (3.452) | (3.935) | (4.564) | (5.157) | (5.416) | (2.973) | (3.135) | (3.279) |
| *Commercial Banks*$_{it}$ | – | 0.026 | 0.034 | – | -0.062 | -0.052 | – | -0.015 | 0.006 |
| | | (1.055) | (1.490) | | (1.349) | (0.982) | | (0.500) | (0.229) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | – | 1309.40*** | – | – | 1309.40*** | – | – | 1309.40*** |
| Hansen's J Test | – | – | [0.131] | – | – | [0.801] | – | – | [0.140] |
| RMSE | 0.011 | 0.011 | 0.010 | 0.013 | 0.013 | 0.011 | 0.012 | 0.012 | 0.010 |
| Observations | 297 | 297 | 243 | 297 | 297 | 243 | 297 | 297 | 243 |
| **Panel B: Poverty Gap** | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.120*** | -0.127*** | -0.145*** | -0.280*** | -0.276*** | -0.285*** | -0.131*** | -0.134*** | -0.139*** |
| | (3.291) | (3.359) | (4.123) | (3.868) | (4.220) | (4.703) | (2.990) | (3.093) | (3.516) |
| *Commercial Banks*$_{it}$ | – | 0.018* | 0.017* | – | -0.009 | 0.005 | – | 0.008 | 0.011 |
| | | (1.857) | (1.758) | | (0.313) | (0.195) | | (0.701) | (0.959) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | – | 1309.40*** | – | – | 1309.40*** | – | – | 1309.40*** |
| Hansen's J Test | – | – | [0.205] | – | – | [0.275] | – | – | [0.133] |
| RMSE | 0.008 | 0.008 | 0.007 | 0.010 | 0.010 | 0.009 | 0.008 | 0.008 | 0.007 |
| Observations | 297 | 297 | 243 | 297 | 297 | 243 | 297 | 297 | 243 |

*Source* and *Notes:* See under Table 3.

**Table 5.** Additional Estimations: Alternative Measures of Financial Cooperative Presence

| | Headcount Ratio | | | | | | Poverty Gap | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LSDV | LSDV | TSLS | LSDV | LSDV | TSLS | LSDV | LSDV | TSLS | LSDV | LSDV | TSLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| **Panel A: Financial Cooperative Members per Capita** | | | | | | | | | | | | |
| | More Extreme Poverty (USD $2.15) | | | Less Extreme Poverty (USD $6.85) | | | More Extreme Poverty (USD $2.15) | | | Less Extreme Poverty (USD $6.85) | | |
| *Financial Cooperatives*$_{it}$ | -0.135*** | -0.101*** | -0.030 | -0.217*** | -0.219*** | -0.189*** | -0.124*** | -0.055*** | -0.021 | -0.155*** | -0.132*** | -0.076*** |
| | (6.151) | (3.438) | (0.985) | (4.088) | (5.058) | (6.115) | (7.666) | (3.203) | (0.934) | (5.800) | (4.557) | (3.058) |
| *Commercial Banks*$_{it}$ | – | 0.018 | 0.020 | – | -0.043 | -0.041 | – | 0.009 | 0.012 | – | -0.003 | 0.000 |
| | | (0.723) | (0.637) | | (1.033) | (0.727) | | (0.824) | (0.660) | | (0.113) | (0.011) |
| +Additional Controls | NO | YES | YES | NO | YES | YES | NO | YES | YES | NO | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | – | 273.18*** | – | – | 273.18*** | – | – | 273.18*** | – | – | 273.18*** |
| Hansen's J Test | – | – | [0.844] | – | – | [0.571] | – | – | [0.710] | – | – | [0.748] |
| RMSE | 0.013 | 0.011 | 0.008 | 0.015 | 0.013 | 0.011 | 0.009 | 0.008 | 0.006 | 0.012 | 0.010 | 0.008 |
| Observations | 243 | 243 | 189 | 243 | 243 | 189 | 243 | 243 | 189 | 243 | 243 | 189 |
| **Panel B: Financial Cooperative Credit Portfolio Size/GDP** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.257*** | -0.172*** | -0.149*** | -0.332*** | -0.306*** | -0.258*** | -0.212*** | -0.096*** | -0.083*** | -0.272*** | -0.202*** | -0.177*** |
| | (7.461) | (3.914) | (5.046) | (5.737) | (7.201) | (7.025) | (6.472) | (3.657) | (3.929) | (8.423) | (5.067) | (6.555) |
| *Commercial Banks*$_{it}$ | – | 0.028 | 0.060** | – | -0.058 | -0.072 | – | 0.020* | 0.037*** | – | -0.006 | 0.017 |
| | | (1.130) | (2.377) | | (1.256) | (1.111) | | (1.903) | (2.752) | | (0.218) | (0.511) |
| +Additional Controls | NO | YES | YES | NO | YES | YES | NO | YES | YES | NO | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | – | 395.96*** | – | – | 395.96*** | – | – | 395.96*** | – | – | 395.96*** |
| Hansen's J Test | – | – | [0.715] | – | – | [0.537] | – | – | [0.895] | – | – | [0.700] |
| RMSE | 0.013 | 0.011 | 0.010 | 0.016 | 0.013 | 0.011 | 0.010 | 0.008 | 0.007 | 0.012 | 0.010 | 0.009 |
| Observations | 297 | 297 | 243 | 297 | 297 | 243 | 297 | 297 | 243 | 297 | 297 | 243 |

*Source* and *Notes:* See under Table 3.

**Table 6.** Additional Estimations: Alternative Instrumental Variables

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **Panel A: First Stage Estimations (TSLS)** | | | | | | |
| | *Financial Cooperatives$_{it}$* | *Financial Cooperatives$_{it}$* | *Financial Cooperatives$_{it}$* | *Financial Cooperatives$_{it}$* | *Financial Cooperatives$_{it}$* | *Financial Cooperatives$_{it}$* |
| *FCP in Bordering States$_{it}$* | 0.416*** | 0.793*** | 0.664*** | 0.416*** | 0.793*** | 0.664*** |
| | (5.966) | (14.145) | (9.253) | (5.966) | (14.145) | (9.253) |
| *Distance to Nova Petrópolis$_{it}$* | -0.016*** | – | – | -0.016*** | – | – |
| | (7.928) | | | (7.928) | | |
| *Years Since First German Colony$_{it}$* | – | – | 0.000*** | – | – | 0.000*** |
| | | | (2.821) | | | (2.821) |
| + Macro Region, Year FE | YES | NO | NO | YES | NO | NO |
| + State, Year FE | NO | YES | YES | NO | YES | YES |
| F Statistic - First Stage TSLS | 152.44*** | 200.07*** | 106.37*** | 152.44*** | 200.07*** | 106.37*** |
| $R^2$ - First Stage TSLS | 0.509 | 0.404 | 0.420 | 0.509 | 0.404 | 0.420 |
| Observations | 297 | 297 | 297 | 297 | 297 | 297 |
| | **Headcount Ratio** | **Headcount Ratio** | **Headcount Ratio** | **Poverty Gap** | **Poverty Gap** | **Poverty Gap** |
| **Panel B: Second Stage Estimations (TSLS) - More Extreme Poverty (USD $2.15)** | | | | | | |
| *Financial Cooperatives$_{it}$* | -1.303*** | -0.606* | -0.399** | -0.804*** | -0.142 | -0.183 |
| | (3.348) | (1.811) | (1.977) | (3.016) | (0.637) | (1.308) |
| *Commercial Banks$_{it}$* | -0.116* | 0.059 | 0.040 | -0.073* | 0.019 | 0.023 |
| | (1.827) | (1.243) | (1.014) | (1.685) | (0.618) | (0.844) |
| + Additional Controls | YES | YES | YES | YES | YES | YES |
| + Macro Region, Year FE | YES | NO | NO | YES | NO | NO |
| + State, Year FE | NO | YES | YES | NO | YES | YES |
| Hansen's J Test | [0.282] | – | [0.413] | [0.329] | – | [0.815] |
| RMSE | 0.024 | 0.011 | 0.010 | 0.016 | 0.007 | 0.007 |
| Observations | 297 | 297 | 297 | 297 | 297 | 297 |
| **Panel C: Second Stage Estimations (TSLS) - Less Extreme Poverty (USD $6.85)** | | | | | | |
| *Financial Cooperatives$_{it}$* | -1.844*** | -1.106*** | -0.555** | -1.445*** | -0.689** | -0.402** |
| | (4.615) | (2.707) | (2.410) | (4.142) | (2.196) | (2.169) |
| *Commercial Banks$_{it}$* | -0.197*** | 0.000 | -0.050 | -0.130** | 0.028 | 0.003 |
| | (3.032) | (0.001) | (1.098) | (2.292) | (0.638) | (0.069) |
| + Additional Controls | YES | YES | YES | YES | YES | YES |
| + Macro Region, Year FE | YES | NO | NO | YES | NO | NO |
| + State, Year FE | NO | YES | YES | NO | YES | YES |
| Hansen's J Test | [0.000] | – | [0.055] | [0.311] | – | [0.215] |
| RMSE | 0.024 | 0.013 | 0.012 | 0.021 | 0.010 | 0.009 |
| Observations | 297 | 297 | 297 | 297 | 297 | 297 |

*Source:* Authors' own computations.

*Notes: Financial Cooperatives$_{it}$* is treated as an endogenous regressor using the instruments in Panel A. Second stage TSLS estimations in Panels B-C follow from corresponding first stage estimations in Panel A. In Panels B-C, the headcount ratio is used as dependent variable in columns (1)-(3), whereas the poverty gap is used in columns (4)-(6). F Statistic corresponds to the F-test for joint significance of excluded instruments. Hansen's J Test is the p-value for Hansen's (1982) over-identification test. RMSE corresponds to the root mean squared error. Absolute t-statistics (in parentheses). Significance is indicated by * (10%), ** (5%), *** (1%).

### 5.3 The Influence of Local Employment Structures, State Educational Infrastructure and Accessible Social Protection

In sections 5.1 and 5.2, we explored how changes in FCP affect monetary poverty, holding constant other factors. Differently, in this section we start out from the assumption that heterogeneities in local employment structures, state educational infrastructure and access to social protection via the banking and financial systems can condition BFCs' effect on monetary poverty. Our expectations are shaped by informal accounts from the BFC movement. Table 7 provides an overview of the different structural channels, variable measurements and expected impacts on the poverty-financial cooperatives nexus. Each structural influence is discussed separately in sections 5.3.1-5.3.3.

**Table 7.** Summary of Structural Channels in the Poverty-Financial Cooperatives Nexus

| Structural Channel | Variable Measurement ($I_{it}^{k}$) | Expected Impact ($\delta_1$) |
|---|---|---|
| **Panel A: Local Employment Structure (Table 8)** | | |
| Microentrepreneurship | Above-average share of microenterprises in total employment | - |
| Small business owners | Above-average share of small business owners in total employment | - |
| Sole proprietors | Above-average share of sole proprietors in total employment | - |
| **Panel B: Public Educational Infrastructure (Table 9)** | | |
| State-level public expenditure on education | Below-average share of state-level public educational expenditure per student | - |
| Public elementary school infrastructure | Below-average share of the total number of public elementary schools per capita | - |
| Public high school infrastructure | Below-average share of the total number of public high schools per capita | - |
| **Panel C: Accessible Social Protection (Table 10)** | | |
| Social protection by traditional banking system | Below-average share of Caixa Econômica Federal bank branches per capita | - |
| Socially unprotected individuals | Above-average share of recipients of AEP funding | - |

Source: Authors' own construction.

Our empirical approach involves estimating the interaction-term effect, $\delta_1$, in equation (3), to establish if each structural channel (local employment structure, public educational infrastructure and accessible social protection) associates with poverty alleviation as expected. We also experimented using continuous variables instead of dummy variables for ($I_{it}^{k}$) in equation (3), but do not present these results for brevity.[25]

#### 5.3.1 Local Employment Structures

Individuals in less developed areas tend to be more reliant on self-employment and microentrepreneurship to earn a living (e.g., DIEESE, 2018, p.59). In rural areas especially, many small agricultural producers and self-employed workers are heavily reliant on raising external finance from local banks. Furthermore, during downturns, small local firms and sole traders can benefit from relationship lending with BFCs to sustain income generation and employment. Therefore, we construct three dummy variables, which indicate if microenterprises, small business owners and sole proprietors are above-average in their contribution to a state's total employment using data from the Inter-Union Department of Statistics and Socio-Economic Studies (DIEESE) for 2018.[26] In Table 8, the relevant interaction-term estimates of equation (3) are always negatively signed under LSDV and TSLS, implying stronger poverty-alleviating effects of BFCs in states characterised by more localised employment structures. The results are especially significant for sole proprietors and small businesses (columns 5-12). This evidence further corroborates the relationship-lending argument that financial cooperatives help sustain local economies during periods of turmoil by extending

[25] We slightly prefer the binary variable approach for two main reasons. Firstly, economic interpretation of the interaction effects for above- versus below-average states is immediately clear upon estimation. Secondly, some continuous variables were quite highly correlated with other control variables in the estimation, whereas the binary variables better mitigated multicollinearity problems in our sample. All the results referred to in the main text are available from the authors upon request.

[26] Specifically, we utilise the outcomes in Map 2, for sole proprietors; Table 18, for microenterprises; and Map 3, for small business owners (DIEESE, 2018, pp.55-59).

microcredit to support small local producers (e.g., Berger et al., 2017; Dereeper et al., 2020). However, the results are often weaker at the more extreme poverty line (USD $2.15), which suggests that many of the poorest may be beyond the reach of BFCs and their established networks in the South and South-east macro regions.

**Table 8.** *Poverty, Financial Cooperatives and Local Employment Structures*

| | Above-Average Microenterprises | | | | Above-Average Small Business Owners | | | | Above-Average Sole Proprietors | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Headcount Ratio | | Poverty Gap | | Headcount Ratio | | Poverty Gap | | Headcount Ratio | | Poverty Gap | |
| | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| **Panel A: More Extreme Poverty (USD $2.15)** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.190*** | -0.228*** | -0.107*** | -0.130*** | -0.141*** | -0.173*** | -0.080** | -0.105*** | -0.152*** | -0.183*** | -0.084** | -0.108*** |
| | (2.926) | (3.710) | (3.108) | (4.626) | (2.825) | (3.714) | (2.480) | (3.602) | (2.817) | (3.661) | (2.533) | (3.614) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ | -0.111 | -0.016 | -0.050 | -0.040 | -0.277*** | -0.209*** | -0.138*** | -0.139*** | -0.248*** | -0.186*** | -0.128*** | -0.132*** |
| | (1.589) | (0.275) | (1.183) | (1.162) | (8.811) | (5.471) | (5.382) | (4.492) | (5.905) | (4.161) | (4.558) | (4.191) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | 699.54*** | – | 699.54*** | – | 670.37*** | – | 670.37*** | – | 688.96*** | – | 688.96*** |
| Hansen's J Test | – | [0.209] | – | [0.385] | – | [0.532] | – | [0.632] | – | [0.524] | – | [0.658] |
| RMSE | 0.011 | 0.010 | 0.008 | 0.007 | 0.011 | 0.010 | 0.008 | 0.007 | 0.011 | 0.010 | 0.008 | 0.007 |
| Observations | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 |
| **Panel B: Less Extreme Poverty (USD $6.85)** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.326*** | -0.382*** | -0.224*** | -0.268*** | -0.330*** | -0.336*** | -0.193*** | -0.221*** | -0.351*** | -0.350*** | -0.205*** | -0.230*** |
| | (4.129) | (4.370) | (3.597) | (4.281) | (5.617) | (5.983) | (4.245) | (4.992) | (4.966) | (5.649) | (4.047) | (4.823) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ | -0.214*** | -0.048 | -0.127* | -0.041 | -0.246*** | -0.226*** | -0.244*** | -0.217*** | -0.189*** | -0.191*** | -0.212*** | -0.194*** |
| | (2.765) | (0.499) | (1.960) | (0.679) | (6.876) | (4.828) | (7.525) | (6.741) | (3.254) | (3.538) | (4.691) | (4.904) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | 699.54*** | – | 699.54*** | – | 670.37*** | – | 670.37*** | – | 688.96*** | – | 688.96*** |
| Hansen's J Test | – | [0.384] | – | [0.349] | – | [0.957] | – | [0.833] | – | [0.800] | – | [0.823] |
| RMSE | 0.013 | 0.011 | 0.010 | 0.009 | 0.013 | 0.011 | 0.010 | 0.009 | 0.013 | 0.011 | 0.010 | 0.009 |
| Observations | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 |

*Source* and *Notes:* See under Table 3.

### 5.3.2 State Educational Infrastructure

Whilst the stock of human capital can positively affect employability and earnings growth in communities, BFCs may have a stronger potential to alleviate poverty in areas where the public educational infrastructure is weaker due to their social investments in education. To explore whether communities in states which lacked public educational infrastructure were better protected from rising poverty, we interact the FCP variable with dummy variables indicating whether a state is below-average in terms of total state-level public expenditure per student, total number of public elementary schools (upper level) per capita, and the total number of public high schools per capita. In Table 9, the interaction effects are negatively signed and significant at conventional levels for both USD $2.15 and USD $6.85 poverty lines, though the effects are usually stronger and more significant statistically for the less extreme poverty line (USD $6.85). BFCs' stronger association with less extreme poverty alleviation may reflect their focus on developing more advanced, professional skills that can be applied in business. Therefore, BFCs have probably benefitted individuals who already had skills in literacy, rather than the most impoverished, including individuals who are more likely to be deprived of a basic education.

**Table 9.** *Poverty, Financial Cooperatives and State Educational Infrastructure*

| | **Below-Average State-Level Public Expenditure** | | | | **Below-Average Public Elementary Schools** | | | | **Below-Average Public High Schools** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Headcount Ratio | | Poverty Gap | | Headcount Ratio | | Poverty Gap | | Headcount Ratio | | Poverty Gap | |
| | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS | LSDV | TSLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| **Panel A: More Extreme Poverty (USD $2.15)** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.181*** | -0.198*** | -0.103*** | -0.118*** | -0.174*** | -0.187*** | -0.099*** | -0.112*** | -0.173*** | -0.185*** | -0.098*** | -0.111*** |
| | (3.593) | (4.369) | (3.273) | (4.562) | (3.529) | (4.623) | (3.900) | (5.426) | (3.613) | (4.752) | (3.988) | (5.406) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ | -0.167*** | -0.134*** | -0.073* | -0.095*** | -0.150*** | -0.124** | -0.068** | -0.087** | -0.155*** | -0.132** | -0.071** | -0.092** |
| | (2.832) | (2.672) | (1.857) | (2.635) | (3.174) | (2.494) | (2.048) | (2.149) | (3.323) | (2.546) | (2.118) | (2.180) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | 773.40*** | – | 773.40*** | – | 638.41*** | – | 638.41*** | – | 623.72*** | – | 623.72*** |
| Hansen's J Test | – | [0.454] | – | [0.602] | – | [0.368] | – | [0.479] | – | [0.407] | – | [0.521] |
| RMSE | 0.011 | 0.010 | 0.008 | 0.007 | 0.011 | 0.010 | 0.008 | 0.007 | 0.011 | 0.010 | 0.008 | 0.007 |
| Observations | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 |
| **Panel B: Less Extreme Poverty (USD $6.85)** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.348*** | -0.359*** | -0.221*** | -0.243*** | -0.341*** | -0.355*** | -0.219*** | -0.238*** | -0.340*** | -0.353*** | -0.218*** | -0.237*** |
| | (5.776) | (6.576) | (5.041) | (5.912) | (4.757) | (5.442) | (4.274) | (5.564) | (4.817) | (5.546) | (4.357) | (5.720) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ | -0.200*** | -0.162*** | -0.169*** | -0.148*** | -0.178*** | -0.118** | -0.139*** | -0.118*** | -0.182*** | -0.124** | -0.143*** | -0.125*** |
| | (4.552) | (3.122) | (3.674) | (3.220) | (2.878) | (2.185) | (3.023) | (2.717) | (3.015) | (2.416) | (3.196) | (2.842) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| F Statistic - First Stage TSLS | – | 773.40*** | – | 773.40*** | – | 638.41*** | – | 638.41*** | – | 623.72*** | – | 623.72*** |
| Hansen's J Test | – | [0.559] | – | [0.748] | – | [0.390] | – | [0.461] | – | [0.436] | – | [0.526] |
| RMSE | 0.013 | 0.011 | 0.010 | 0.009 | 0.013 | 0.011 | 0.010 | 0.009 | 0.013 | 0.011 | 0.010 | 0.009 |
| Observations | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 | 297 | 243 |

*Source* and *Notes:* See under Table 3.

### 5.3.3 Accessible Social Protection

Gaps have emerged in Brazil's social safety net over the last decade, to the extent that BFCs were authorised to grant credit under the AEP during the pandemic. Furthermore, individuals eligible for the AEP were unprotected by other poverty-reduction programmes, including Bolsa Família, but were able to access social transfers via BFCs' branches. We explore whether BFCs played a part in mitigating poverty in areas which contained more socially vulnerable individuals, and where communities had less access to social transfers during the onset of the pandemic via the traditional banking system. Specifically, we interact the FCP variable with binary variables, which indicate whether a state was above-average in the share of recipients of AEP funding between 2020 and 2022, and whether a state had a below-average number of Caixa Econômica Federal branches per capita at the outbreak of Covid-19 in 2020, since Caixa was the government's principal distributor of AEP transfers (De Leon et al., 2023).

In Table 10, for above-average share of recipients of AEP funding, the interaction effects in columns (5) and (7) are always negative and statistically significant at the 1% or 5% level. The interaction effects for below-average Caixa branches per capita are also negative in columns (1) and (3), but only significant at the 5% or 10% level for the USD $6.85 poverty line. When interacting further with year-specific dummies for the years 2020 to 2022 to ascertain the dynamic interaction effects during the crisis, BFCs are most strongly associated with poverty reduction during the onset of the pandemic in 2020 in columns (2), (4), (6) and (8). The dynamic effects of BFCs on poverty alleviation are more robust for the moderately impoverished, whereas the effects are weaker and fade faster at the threshold of extreme poverty (Panel B versus Panel A). Overall, these results suggest that socially vulnerable Brazilians were better protected from rising poverty around the onset of the crisis under the AEP due to BFCs' local presence.

**Table 10.** *Poverty, Financial Cooperatives and Accessible Social Protection*

| | **Below-Average Caixa Econômica Branches** | | | | **Above-Average *Auxilio Emergencial*** | | | |
|---|---|---|---|---|---|---|---|---|
| | Headcount Ratio | | Poverty Gap | | Headcount Ratio | | Poverty Gap | |
| | LSDV | LSDV | LSDV | LSDV | LSDV | LSDV | LSDV | LSDV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Panel A: More Extreme Poverty (USD $2.15)** | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.206*** | -0.204*** | -0.133*** | -0.132*** | -0.184*** | -0.186*** | -0.099*** | -0.100*** |
| | (3.193) | (3.135) | (3.494) | (3.535) | (3.555) | (3.493) | (3.141) | (3.057) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ | -0.738 | – | -0.242 | – | -0.138** | – | -0.076*** | – |
| | (1.248) | | (0.794) | | (2.465) | | (2.713) | |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ x $Dummy2020_{it}$ | – | -1.148 | – | -0.624 | – | -0.195*** | – | -0.132*** |
| | | (1.404) | | (1.393) | | (3.460) | | (4.572) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ x $Dummy2021_{it}$ | – | -0.301 | – | 0.191 | – | -0.147*** | – | -0.073*** |
| | | (0.565) | | (0.818) | | (2.796) | | (3.085) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ x $Dummy2022_{it}$ | – | -0.826 | – | -0.341 | – | 0.084 | – | 0.081** |
| | | (1.446) | | (1.062) | | (1.378) | | (2.287) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES |
| RMSE | 0.011 | 0.011 | 0.008 | 0.008 | 0.011 | 0.011 | 0.008 | 0.008 |
| Observations | 297 | 297 | 297 | 297 | 297 | 297 | 297 | 297 |
| **Panel B: Less Extreme Poverty (USD $6.85)** | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -0.342*** | -0.329*** | -0.228*** | -0.223*** | -0.328*** | -0.329*** | -0.218*** | -0.219*** |
| | (6.838) | (6.612) | (4.862) | (4.760) | (5.908) | (5.866) | (4.977) | (4.883) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ | -1.651** | – | -1.061* | – | -0.218*** | – | -0.154*** | – |
| | (2.086) | | (1.670) | | (3.309) | | (2.662) | |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ x $Dummy2020_{it}$ | – | -2.489** | – | -1.639** | – | -0.273*** | – | -0.242*** |
| | | (2.419) | | (2.002) | | (4.409) | | (4.137) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ x $Dummy2021_{it}$ | – | -1.630* | – | -0.745 | – | -0.200*** | – | -0.142*** |
| | | (1.674) | | (1.117) | | (2.727) | | (2.599) |
| *Financial Cooperatives*$_{it}$ x $I_{it}^{k}$ x $Dummy2022_{it}$ | – | -1.284** | – | -0.997* | – | -0.153* | – | 0.045 |
| | | (2.030) | | (1.717) | | (1.895) | | (0.767) |
| +Additional Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| +State, Year FE | YES | YES | YES | YES | YES | YES | YES | YES |
| RMSE | 0.013 | 0.013 | 0.010 | 0.010 | 0.013 | 0.013 | 0.010 | 0.010 |
| Observations | 297 | 297 | 297 | 297 | 297 | 297 | 297 | 297 |

*Source* and *Notes:* See under Table 3.

## 6. Summary and Conclusions

This paper has produced some new evidence and insights on BFCs' capacity to alleviate monetary poverty during what has been described as Brazil's lost decade. Utilising new household survey microdata, we constructed different measures of monetary poverty in Brazilian states over the period 2012 to 2022 and combined this with panel data on financial cooperative presence. Our findings corroborate the literature as follows. Firstly, we found that BFCs have significantly mitigated monetary poverty's prevalence and severity in Brazilian states, thereby adding to the 'bright side' view of local financial institutions. Secondly, BFCs have contributed to moderating the rise in monetary poverty over the last decade, and more so than commercial banks, thereby confirming the implication of earlier studies on income inequality.

This paper also contributed by generating new findings and insights. Firstly, it uncovered a heterogeneity in the poverty outcomes, since poverty is lower in states with a denser presence of BFCs poverty, but the poverty-alleviating effect was found to be significantly stronger using a more moderate measure of income poverty. This outcome is robust to several checks, including use of alternative measures of FCP, based on BFC membership in the state population and credit in the economy, and points to BFCs being less well equipped to mitigate negative income shocks amongst the poorest of the poor. Secondly, this paper has uncovered significant heterogeneities in the poverty-financial cooperatives nexus. BFCs have had stronger poverty-alleviating effects in states that are more reliant on self-employment and sole proprietorship, which is consistent with BFCs' greater use of relationship lending to support small local producers. Consistent with their social investments in education, BFCs have also had stronger poverty-alleviating effects in states with less well developed public educational infrastructure. However, our estimations suggest that BFCs have had stronger effects in areas where inhabitants already have skills in literacy and a minimum level of education. Therefore, our findings imply the need for BFCs to further embed literacy in their general educational initiatives, before linking this foundational learning to more advanced programmes in professional skills and commerce. BFCs have also mitigated rising poverty strongly in areas that contained a larger share of socially vulnerable Brazilians under the AEP. Therefore, this paper adds to the literature by providing some novel evidence of BFCs' effectiveness in distributing emergency aid during the early years of the global pandemic.

Overall, some caution is needed on the causal implications of our analysis given the simplicity of our empirical approach, the focus on states and lack of more localised measures of financial cooperative penetration. However, our analysis does indicate a potential for financial cooperatives to alleviate monetary poverty during turbulent times. If sustained, their growth beyond the South and South-east macro regions suggests that BFCs could have stronger effects on more extreme monetary poverty in the future. At the same time, such growth may raise concerns about efficiencies in economic development. A concern in Brazil, as well as in other emerging market economies where financial cooperatives are growing in popularity, is that new economic policies may be formulated in the future to limit financial cooperatives' local presence or commercialise their operations. Our findings suggest that such a move would represent a step in the wrong direction, putting many communities at risk of suffering from larger poverty reversals during downturns.

**References**

Ailos (2023). Ailos System of Cooperatives – Education. Available at: www.ailos.coop.br/educacao/ (Accessed 25th September 2023).

Alkire, S. and Foster, J. (2011). "Counting and multidimensional poverty measurement", *Journal of Public Economics*, 95(7-8), 476-487.

Álvarez-Gamboa, J., Cabrera-Barona, P. and Jácome-Estrella, H. (2023). "Territorial inequalities in financial inclusion: a comparative study between private banks and credit unions", *Socio-Economic Planning Sciences*, 87, [101561]. https://doi.org/10.1016/j.seps.2023.101561.

Arestis, P. and Phelps, P. (2023). "Local financial institutions and income inequality: evidence from Brazil's credit cooperative movement", *Development and Change*, 54(4), 739-779.

Banerjee, A. and Newman, A. (1993). "Occupational choice and the process of development", *Journal of Political Economy*, 101(2), 274-298.

BCB (2016). Overview of the National Cooperative Credit System. Available at: https://www.bcb.gov.br/estabilidadefinanceira/coopcredpanorama?ano=2016 (Accessed 1st January 2025).

BCB (2023). SFN Evolution Reports. Banking Services in the Country – Branches by Region and State. Available at: https://www.bcb.gov.br/publicacoes/relatorioevolucaosfnano/cronologicos (Accessed 1st November 2023).

BCB (2024). Database on Municipal Cooperative Members. Based on Document 5300: Information on Cooperative Relationships. Available at: https://www.bcb.gov.br/estabilidadefinanceira/cooperados_ municipio (Accessed 1st January 2025).

Beck, T., Crivelli, J. and Summerhill, W. (2005). "State bank transformation in Brazil – choices and consequences", *Journal of Banking and Finance*, 29(8-9), 2223-2257.

Beck, T., Demirgüç-Kunt, A. and Levine, R. (2004). "Finance, inequality and poverty: cross-country evidence". NBER Working Paper, Number 10979. Cambridge, MA.: National Bureau of Economic Research.

Beck, T., Demirgüç-Kunt, A. and Levine, R. (2007). "Finance, inequality and the poor", *Journal of Economic Growth*, 12(1), 27-49.

Beck, T., Levine, R. and Levkov, A. (2010). "Big bad banks? The winners and losers from bank deregulation in the United States", *Journal of Finance*, 65(5), 1637-1667.

Beck, T., Lu, L. and Yang, R. (2015). "Finance and growth for microenterprises: evidence from rural China", *World Development*, 67(C), 38-56.

Berger, A., Bouwman, C. and Kim, D. (2017). "Small bank comparative advantages in alleviating financial constraints and providing liquidity insurance over time", *Review of Financial Studies*, 30(10), 3416-3454.

Berger, A., Bouwman, C., Norden, L., Roman, R., Udell, G. and Wang, T. (2022). "Is a friend in need a friend indeed? How relationship borrowers fare during the COVID-19 crisis", Kelley School of Business Research Paper, Number 2021-01. Bloomington: Indiana University.

Berger, A. and Udell, F. (2006). "A more complete conceptual framework for SME finance", *Journal of Banking and Finance*, 30(11), 2945-2966.

Beuermann, D., Bottan, N. Hoffmann, B., Jackson, C. and Vera-Cossio, D. (2024). "Does education prevent job loss during downturns? Evidence from exogenous school assignments and COVID-19 in Barbados", *European Economic Review*, 162, [104675]. https://doi.org/10.1016/j.euroecorev.2024.104675.

BNDES (Various Years). Annual Integrated Report (Years 2007, 2014, 2019, 2021). Rio de Janeiro: National Bank for Economic and Social Development. Available at: https://ri.bndes.gov.br/en/publications-and-communications/integrated-annual-report/ (Accessed 3rd September 2023).

BNDES (2020). BNDES Recognition: Financial Agents Highlights in 2020. Available at: www.bndes.gov.br/wps/portal/site/home/instituicoes-financeiras-credenciadas/agentes-financeiros-destaques-2020 (Accessed 28th September 2023)

Bolton, P., Freixas, X., Gambacorta, L. and Mistrulli, P. (2016). "Relationship and transaction lending in a crisis", *Review of Financial Studies*, 29(10), 2643-2676.

Brune, M. and Love, I. (2014). "The real impact of improved access to finance: evidence from Mexico", *Journal of Finance*, 69(3), 1347-1376.

BureauCoop (2024). Interactive Data Portal for Brazilian Credit Cooperatives. Available at: https://bureau.coop.br/ (Accessed 1st January 2025).

Burgess, R. and Pande, R. (2005). "Do rural banks matter? Evidence from the Indian social banking experiment", *American Economic Review*, 95(3), 780-795.

Campello, T., Falcào, T. and da Costa, P. (2014). *O Brasil sem Miséria* ["*Brazil without Misery*"]. Brasília: Ministério do Desenvolvimento Social e Combate à Fome [MDS].

Canales, R. and Nanda, R. (2012). "A darker side to decentralised banks: market power and credit rationing in SME lending", *Journal of Financial Economics*, 105(2), 353-366.

Chen, J., Guo, X. and Zhong, S. (2022). "The financialization of urban development and urban labour productivity: evidence from China", *Regional Studies*, 56(8), 1295-1307.

Coccorese, P. and Shaffer, S. (2021). "Cooperative banks and local economic growth", *Regional Studies*, 55(2), 307-321.

Conley, T. (1999). "GMM estimation with cross sectional dependence", *Journal of Econometrics*, 92(1), 1-45.

Contel, F. and Wójcik, D. (2019). "Brazil's financial centers in the twenty-first century: hierarchy, specialization, and concentration", *The Professional Geographer*, 71(4), 681-691.

Crocco, M., Faria-Silva, F., Paulo-Rezende, L. and Rodriguez-Fuentes, C. (2014). "Banks and regional development: an empirical analysis on the determinants of credit availability in Brazilian regions", *Regional Studies*, 48(5), 883-895.

D'Onofrio, A., Minetti, R. and Murro, P. (2019). "Banking development, socioeconomic structure and income inequality", *Journal of Economic Behavior and Organization*, 157(C), 428-451.

De Haan, J., Pleninger, R. and Sturm, J-E. (2022). "Does financial development reduce the poverty gap?", *Social Indicators Research*, 161(1), 1-27.

De Leon, F., Malde, B. and McQuillin, B. (2023). "The effects of emergency government cash transfers on beliefs and behaviours during the COVID pandemic: evidence from Brazil", *Journal of Economic Behavior and Organization*, 208(C), 140-155.

Dereeper, S., Lobez, F. and Statnik, J. (2020). "Bank credit rates across the business cycle: evidence from a French cooperative contracts database", *Journal of Banking and Finance*, 112, [105220]. https://doi.org/10.1016/j.jbankfin.2017.09.016.

DeYoung, R., Frame, W., Glennon, D. and Nigro, P. (2011), "The information revolution and small business lending", *Journal of Financial Services Research*, 39(1), 19-33.

DIEESE (2018). "2018 Yearbook: Small Businesses". Available at: www.dieese.org.br/anuario/2018/anuarioPequenoNegocio2018 (Accessed 3rd March 2023).

ESTBAN (2023). ESTBAN - Monthly Banking Statistics by Municipality. Available at: www4.bcb.gov.br/fis/cosif/estban.asp?frame=1 (Accessed 3rd October 2023).

Ferreira, F., Leite, P. and Ravallion, M. (2010). "Poverty reduction without economic growth? Explaining Brazil's poverty dynamics, 1985-2004", *Journal of Development Economics*, 93(1), 20-36.

Fonteyne, W. (2007). "Cooperative banks in Europe - policy issues", IMF Working Paper, Number WP/07/159. Washington, DC: International Monetary Fund.

Galor, O. and Moav, O. (2004). "From physical to human capital accumulation: inequality and the process of development", *Review of Economic Studies*, 71(4), 1001-1026.

Hansen, L. P. (1982). "Large sample properties of generalized method of moments estimators", *Econometrica*, 50(4), 1029-1054.

Honohan, P. (2003). "Financial development, growth and poverty: how close are the links?", World Bank Policy Research Working Paper, Number 3203. Washington, D.C.: World Bank.

IBGE (2023). *Síntese de Indicadores Sociais. Uma Análise das Condições de Vida da População Brasileira*. 2023.

ICA (2021). *Guidance Notes to the Co-operative Principles*. Brussels: International Cooperative Alliance.

IF.data (2023). Central Bank of Brazil's Database of Financial Institutions. Available at: www3.bcb.gov.br/ifdata/ (Accessed 20th June 2023).

IIED (2023). *Mobilising Internal Finance from within Forest and Farm Producer Organisations: A Case Study of Cresol Credit Union System Founded by Farmers*. London: International Institute for Environment and Development.

Jackowicz, K., Kozlowski, L. and Wnuczak, P. (2021). "Which local markets do banks desert first? Evidence from Poland", *Finance Research Letters,* 38, [101478]. https://doi.org/10.1016/j.frl.2020.101478.

Jakšič, M. and Marinc, M. (2019). "Relationship banking and information technology: the role of artificial intelligence and Fintech", *Risk Management,* 21(1),1-18.

Jolliffe, D., Mahler, D., Lakner, C., Atamanov, A., and Tetteh-Baah, S. (2022). "Assessing the impact of the 2017 PPPs on the international poverty line and global poverty", World Bank Policy Research Working Paper, Number 9941. Washington, D.C.: World Bank.

Jordan, T. (1962). "Aspects of German colonization in southern Brazil", *Southwestern Social Science Quarterly*, 42(4), 346-353.

King, R. and Levine, R. (1993). "Finance and growth: Schumpeter might be right", *Quarterly Journal of Economics,* 108(3), 717-738.

Lal, T. (2018). "Impact of financial inclusion on poverty alleviation through cooperative banks", *International Journal of Social Economics*, 45(5), 807-827.

Lensink, R., and Bulte, E. (2019). "Can we improve the impact of microfinance? A survey of the recent literature and potential avenues for success". In Berger, A., Molyneux, P. and Wilson, J. (Eds.), *Oxford Handbook of Banking*. Oxford: Oxford University Press.

McKillop, D., French, D., Quinn, B., Sobiech, A. and Wilson, J. (2020). "Cooperative financial institutions: a review of the literature", *International Review of Financial Analysis,* 71, [101520]. https://doi.org/10.1016/j.irfa.2020.101520.

Meslier, C., Rehault, P-N., Sauviat, A. and Yuan, D. (2022). "Benefits of local banking in local economic development: disparities between micro firms and other SMEs", *Journal of Banking and Finance,* 143, [106594]. https://doi.org/10.1016/j.jbankfin.2022.106594.

Minetti, R., Murro, P. and Peruzzi, V. (2021). "Not all banks are equal: cooperative banking and income inequality", *Economic Inquiry,* 59(1), 420-440.

Ngong, C., Abner, I., Ugbam, C. and Onwumere, J. (2023). "Do cooperative credit unions reduce or increase poverty in Cameroon?", *Social Science Quarterly*, 104(6), 1267-1281.

Nogueira, M., Crocco, M., Figueiredo, A. and Diniz, G. (2015). "Financial hierarchy and banking strategies: a regional analysis for the Brazilian case", *Cambridge Journal of Economics*, 39(1), 139-156.

Peruzzi, V., Murro, P. and Di. Colli, S. (2023). "The distributional impact of local banking. Evidence from financial and sovereign-debt crises", *European Journal of Political Economy*, 80, [102478]. https://doi.org/10.1016/j.ejpoleco.2023.102478.

Prina, S. (2015). "Banking the poor via savings accounts: evidence from a field experiment", *Journal of Development Economics*, 115(1), 16-31.

Schneiberg, M. and Parmentier, E. (2022). "Banking structure, economic resilience and unemployment trajectories in US counties during the great recession", *Socio-Economic Review*, 20(1), 85-139.

Sedunov, J. (2017). "Does bank technology affect small business lending decisions?", *Journal of Financial Research*, 40(1), 5-32.

Sette, E. and Gobbi, G. (2015). "Relationship lending during a financial crisis", *Journal of the European Economic Association*, 13(3), 453-481.

Sicredi (2019). "Economic Benefits of Credit Unions in the Brazilian Economy". Technical Report. December 2019. https://ri.sicredi.com.br/en/sicredi/benefits-of-credit-cooperatives/ (Accessed 1st January 2025).

Sicredi (2020). Estudo de Impacto Social do Programa 'A União Faz a Vida' ["Social Impact Study of the 'A União Faz a Vida' Programme"]. Available at: www.auniaofazavida.com.br/impacto/estudo/Revista_Impactos%20PUFV_pagina.pdf (Accessed 10th August 2023).

Sicredi (2022). Sustainability Report 2022. Available at: www.sicredi.com.br/media/produtos/filer_public/2023/07/03/sustainability-report-2022-sicredi-030723.pdf (Accessed 10th August 2023).

Sun., R., Zhou, N. and Zhang, B. (2023). "Can bank branch establishment help SMEs survive? Evidence from China", *International Review of Financial Analysis*, 88, [102694]. https://doi.org/10.1016/j.irfa.2023.102694.

Thévenon, O., Manfredi, T., Govind, Y. and Klauzner, I. (2018). "Child poverty in the OECD: trends, determinants and policies to tackle it", OECD Social, Employment and Migration Working Papers, Number 218. Paris: Organisation for Economic Co-operation and Development Publishing.

UNDP (2020). "Social protection response to COVID-19 in Brazil". COVID-19 Policy Document Series, Number 27. New York: United Nations Development Programme.

UNICEF (2023). *As Múltiplas Dimensões da Pobreza* ["*The Multiple Dimensions of Poverty*"]. New York: United Nations International Children's Emergency Fund.

Wanyama, F., Develtere, P. and Pollet, I. (2008). "Encountering the evidence: cooperatives and poverty reduction in Africa", *Journal of Co-operative Studies*, 41(3), 16-27.

WCM (Various Years). Exploring the Cooperative Economy: Report (Years 2012, 2022). World Cooperative Monitor Report. https://monitor.coop/en/online-library/resources (Accessed 25th September 2023).

WOCCU (2021). *Annual Statistical Report 2021*. Washington, D.C.: World Council of Credit Unions.

World Bank (2023). Poverty and Inequality Platform (Version 20230328_2017_01_02_PROD) [Data Set]. Available at: https://pip.worldbank.org/country-profiles/BRA (Accessed 20th June 2023).

## APPENDIX

**Table A1.** *Robustness: Addition of State Banks and Private Commercial Banks*

| | Headcount Ratio | | | | | | | | | Poverty Gap | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LSDV | LSDV | LSDV | LSDV | LSDV | TSLS | LSDV | LSDV | LSDV | LSDV | LSDV | TSLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| **Panel A: More Extreme Poverty (USD $2.15)** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -1.619*** | – | – | -0.651*** | -0.240*** | -0.265*** | -0.886*** | – | – | -0.384*** | -0.119*** | -0.142*** |
| | (5.599) | | | (4.109) | (3.181) | (3.290) | (5.411) | | | (3.608) | (2.719) | (3.248) |
| *Private Commercial Banks*$_{it}$ | – | -1.620*** | – | -1.339*** | 0.025 | 0.063** | – | -0.879*** | – | -0.720*** | 0.018* | 0.041*** |
| | | (7.397) | | (14.541) | (1.077) | (2.566) | | (6.717) | | (6.080) | (1.851) | (2.817) |
| *State Banks*$_{it}$ | – | – | -4.566*** | -1.657*** | -0.058 | -0.297 | – | – | -2.449*** | -0.785** | 0.176 | 0.255 |
| | | | (4.279) | (2.817) | (0.150) | (0.543) | | | (4.405) | (2.362) | (0.531) | (1.001) |
| + Additional Controls | NO | NO | NO | NO | YES | YES | NO | NO | NO | NO | YES | YES |
| + Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| + State FE | NO | NO | NO | NO | YES | YES | NO | NO | NO | NO | YES | YES |
| F Statistic - First Stage TSLS | – | – | – | – | – | 48.36*** | – | – | – | – | – | 48.36*** |
| Hansen's J Test | – | – | – | – | – | [0.501] | – | – | – | – | – | [0.591] |
| RMSE | 0.078 | 0.068 | 0.089 | 0.059 | 0.011 | 0.010 | 0.045 | 0.040 | 0.050 | 0.035 | 0.008 | 0.007 |
| Observations | 297 | 297 | 297 | 297 | 297 | 243 | 297 | 297 | 297 | 297 | 297 | 243 |
| **Panel B: Less Extreme Poverty (USD $6.85)** | | | | | | | | | | | | |
| *Financial Cooperatives*$_{it}$ | -3.215*** | – | – | -1.573*** | -0.392*** | -0.445*** | -2.102*** | – | – | -0.946*** | -0.263*** | -0.307*** |
| | (6.862) | | | (6.735) | (3.598) | (3.186) | (6.204) | | | (4.168) | (3.417) | (3.252) |
| *Private Commercial Banks*$_{it}$ | – | -3.197*** | – | -2.583*** | -0.062 | -0.065 | – | -2.092*** | – | -1.707*** | -0.008 | 0.023 |
| | | (9.609) | | (19.028) | (1.292) | (1.038) | | (8.478) | | (8.152) | (0.290) | (0.732) |
| *State Banks*$_{it}$ | – | – | -8.484*** | -1.939** | 0.349 | -0.889 | – | – | -5.724*** | -1.675** | 0.249 | -0.269 |
| | | | (4.147) | (2.236) | (0.581) | (0.605) | | | (4.310) | (2.171) | (0.765) | (0.357) |
| + Additional Controls | NO | NO | NO | NO | YES | YES | NO | NO | NO | NO | YES | YES |
| + Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| + State FE | NO | NO | NO | NO | YES | YES | NO | NO | NO | NO | YES | YES |
| F Statistic - First Stage TSLS | – | – | – | – | – | 48.36*** | – | – | – | – | – | 48.36*** |
| Hansen's J Test | – | – | – | – | – | [0.851] | – | – | – | – | – | [0.674] |
| RMSE | 0.132 | 0.109 | 0.159 | 0.087 | 0.013 | 0.011 | 0.092 | 0.078 | 0.108 | 0.065 | 0.010 | 0.009 |
| Observations | 297 | 297 | 297 | 297 | 297 | 243 | 297 | 297 | 297 | 297 | 297 | 243 |

*Source:* Authors' own computations.

*Notes: Financial Cooperatives*$_{it}$, *Private Commercial Banks*$_{it}$, and *State Banks*$_{it}$ are treated as endogenous regressors in columns (6) and (12) using two lags of each variable as instruments.