

## **SOCIOECONOMIC DEVELOPMENT OF BRAZILIAN MUNICIPALITIES: THE ROLE OF PUBLIC AND PRIVATE BANKS<sup>°</sup>**

*DESARROLLO SOCIOECONÓMICO DE LOS MUNICIPIOS  
BRASILEÑOS: EL PAPEL DE LOS BANCOS PÚBLICOS Y  
PRIVADOS*

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*recibido: 26 julio 2020 – aceptado: 11 febrero 2021*

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### **Abstract**

The economic literature has discussed the role of public banks regarding their performance as drivers of socioeconomic development, highlighting their social role when compared to private banks. This paper contributes to this discussion and analyzes the impact of the physical presence of public and private commercial banks on the Firjan Index of Municipal Development (FMDI) of Brazilian municipalities. The results of a logit panel model show that public banks have greater impact on the FMDI rather than private banks, taking into account where the municipality is located and the externalities caused by the neighboring municipality. There is great probability of a municipality being in a high level of development if it has the physical presence of commercial public banks.

*JEL Codes:* R10, R11, G21.

*Keywords:* public banks, private banks, socioeconomic development, Brazilian municipalities

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<sup>°</sup> Pereira, G. A., & Silva, E. C. D. (2021). Socioeconomic development of Brazilian municipalities: the role of public and private banks. *Estudios económicos*, 38(77), pp. 147-170. DOI: <https://doi.org/10.52292/j.estudecon.2021.2200>.

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## Resumen

La literatura económica ha discutido el papel de los bancos públicos con respecto a su desempeño como motores del desarrollo socioeconómico, destacando su papel social en comparación con los bancos privados. Este documento contribuye a esta discusión y analiza el impacto de la presencia física de los bancos comerciales públicos y privados en el Índice de Desarrollo Municipal de Firjan (FIRJAN) de los municipios brasileños. Los resultados de un modelo de panel logit muestran que los bancos públicos tienen un mayor impacto en el FMDI en lugar de los bancos privados, teniendo en cuenta dónde se encuentra el municipio y las externalidades causadas por el municipio vecino. Existe una gran probabilidad de que un municipio se encuentre en un alto nivel de desarrollo si tiene la presencia física de bancos públicos comerciales.

*Códigos JEL:* R10, R11, G21.

*Palabras clave:* bancos públicos, bancos privados, desarrollo socioeconómico, municipalidades brasileñas.

## INTRODUCTION

The banking presence in Brazilian municipalities, here defined as the existence of a physical branch or an advanced service station (ASS)<sup>1</sup>, has increased over the two last decades. Accompanied by the technological sophistication of the supply products and services, it has allowed an increase in the number of people with bank accounts. Approximately 140 million Brazilians currently have at least one bank account, either in a public or a private bank (FEBRABAN, 2017).

The percentage of Brazilian municipalities with at least one bank branch or ASS increased from 70% in 2007 to 96.7% in 2017 (Bacen, 2017). It is also worth pointing out that a municipality without any bank branches is often inserted in a neighboring location to another municipality with a bank presence, consequently absorbing the possible benefits generated by its location. This municipality may also be served by banking correspondents<sup>2</sup>, linked to a neighbouring city branch.

The Brazilian banking market is organized into two large groups: public and private commercial banks. As seen in Figure 1, about 40% of the branches belong to public banks and the other 60%, to private banks. In this work, a market where both banks act simultaneously was considered. According to Andrianova et al. (2008), in this type of market there is an intermediate balance, where public and private banks coexist and the consumer of financial services has the option of choosing between these two types of banks.

In this paper, only commercial and multiple banks with public and/or private (domestic or foreign) capital were considered, separated into two groups: public banks and private banks. The following were treated as public banks: Banco do Brasil, Caixa Econômica Federal, as well as other state-owned banks. In turn, other institutions without any federal, state, or municipal government shareholdings were acknowledged as private banks. Credit unions were not considered due to unavailability of data<sup>3</sup>. Moreover, this segment has little representation in the Brazilian national scenario, when compared to the entire financial system, with a share of only 3.4% in the national credit volume (Bacen, 2018).

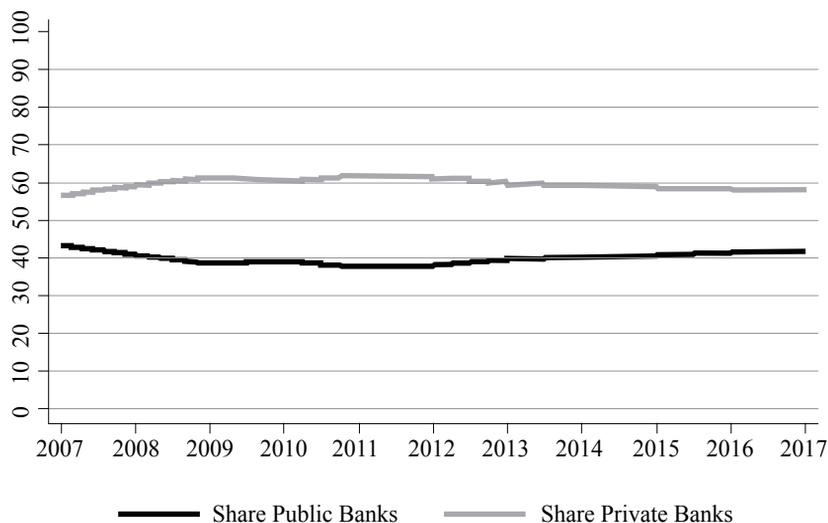
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<sup>1</sup> The advanced service station (ASS) provides the same services of a bank branch.

<sup>2</sup> Companies hired by banks to provide basic services such as small deposits, payment of bills, and government benefit payments.

<sup>3</sup> The Central Bank of Brazil (Bacen) made available the cooperative relationship from July 2016.

Figure 1. Brazilian Market Share of Branches. Public and Private Banks



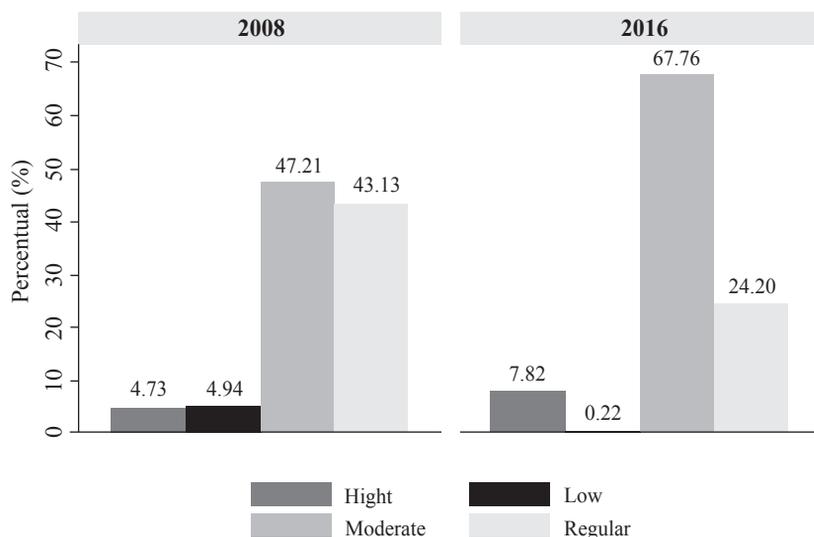
Source: BACEN (2007-2017).

When regarding the data on banking correspondents, although there are locations with only this type of establishment, it was not possible to consider them due to the unavailability of data. It is believed that the absence of this group of institutions does not hinder the analysis, since they are linked to a bank branch, as if it were just another bank supply channel. Therefore, their presence is captured by the binding agencies. In addition, according to Loureiro et al. (2016), the public served by banking correspondents is different from those of the agencies and are aimed more at government benefit payments services than the credit activity. The authors found evidences that there is no significance between the loan granted by the correspondents and GDP per capita in small municipalities.

In cities with bank presence, the intensity of the possible benefits generated by financial intermediation is greater. Banks can allocate resources from surplus agents (the depositors) to those in need of resources (borrowers). This monetary turnover contributes to the functioning of the real side of the economy, facilitating commercial transactions and increasing the volume of resources through the banking multiplier. Regionally, the availability of credit supply is an important driver of regional economic development, as it canalizes aggregate demand in different localities.

The Firjan Index of Municipal Development (FMDI), measured by the Industry Federation of the State of Rio de Janeiro (Firjan) to represent socioeconomic development, shows that there has been an improvement in the quality of life of the Brazilian population, especially in low-level municipalities, with evolution to higher strata. The FMDI ranges from 0 to 1, with municipalities grouped in four levels of development: low (FMDI 0 to 0.4), regular (from 0.4 to 0.6), moderate (from 0.6 to 0.8), and high (0.8 to 1). The average FMDI for all municipalities in 2008 was of 0.60, with a minimum of 0.26. In 2016, this indicator increased to 0.67, with a minimum of 0.32. Figure 2 shows a comparison between the percentage in each FMDI range between 2008 and 2016.

Figure 2. Percentage Distribution of Municipalities by FMDI Level. 2008 and 2016



Source: Firjan (2018). Generated by the authors.

Nyasha and Odhiambo (2018) described some issues and controversies regarding the relationship between financial development and economic growth<sup>4</sup>, based on theoretical literature and empirical facts. According to the authors, this relationship has been discussed since Schumpeter (1911), but no consensus has

<sup>4</sup> The authors call *finance-growth nexus* the link between the financial system and growth.

been reached until today. They concluded that the relationship between financial development and economic growth should be taken with extreme care. There is still controversy on the subject and the empirical literature suggests that the dynamic relationship between financial development and economic growth is not the same in all countries. That is, globally, it is still inconclusive.

According to Levine (1997), the financial system plays an important role in the development of any economy, influencing savings and investment decisions and, consequently, growth. In this sense, according to Nyasha and Odhiambo (2018), a large number of studies has illustrated the correlation between financial development and the development of the economy as a whole. At least when considering developed countries, a vast literature attests to the positive relationship between financial development and economic growth.

In this context, this paper contributes to the literature on the link between financial growth and economic development, as well as to the existing discussion regarding the role of public banks in economic and social development. Considering the increase in bank presence in Brazilian municipalities and the progress of the FMDI in recent years, the objective is to analyze and compare the impact of the presence of public and private banks on the FMDI of Brazilian municipalities, taking into account the spatial effects of municipalities over their neighbors and vice-versa.

## I. THEORETICAL FRAMEWORK

According to Dutra et al. (2015), the role of banks should take into account their ability to generate social welfare through resources intended for productive investment. Bank efficiency must be evaluated from both an operational and a social point of view. An increase in bank liquidity preference in less developed and poorer regions leads to a decrease in social efficiency, given the defensive positioning of economic agents in not ratifying productive expansion.

Freitas and Paula (2010) argued that the spatial concentration of banks may lead to changes in the credit granting decision, as it reflects the differentiation of the regions in the center and the periphery. The authors found evidence that bank liquidity preference (BLP) is higher in peripheral states. In Brazil, the average PPLB of municipalities for public banks in the period from 1999 to 2016 was of 0.6 versus 2.1 for private banks. Thus, signaling a different performance by public banks.

In a comparison between public and private banks, Araújo and Cintra (1994) quoting Stiglitz (1993), argued that in less developed economies, financial markets are incomplete, capital markets are incipient, and equity markets may not even exist. The authors stated that private banks tend to favor short-term loans, disregarding projects that have low private profitability and high risk, despite the high social return.

According to Araújo and Cintra (1994), public banks, operating with directed credit and lower market interest rates, allow entrepreneurs access to sources of resources that enable them to establish long-term liabilities and asset structures. This role of public banks is even more relevant in places where the access to the capital market is restricted. Together with the development banks, they play an important role in financing and coordinating investment projects, reducing their risks.

Martins et al. (2014) considered that if public banks only aim at improving social welfare, through greater competition, they would be accepting zero economic profit (marginal cost = price), which would thus result in a Lerner index equal to zero. However, as the authors found values greater than one, they concluded that these factors coexist with mixed goals of profitability and social welfare. According to the authors, the performance of the state in the economy is supported by several other studies. In the case of public banks, Amsden (2001) and Gerschenkron (1962) pointed out that there is an argument that public banks can reduce problems of credit shortages and help in financing complex long-term projects. In addition, despite some criticism of the existence and the need for public banks, there is evidence that such banks may play a countercyclical role in times of economic contraction, while the opposite is noticed when considering private banks, which reduce the supply of credit in times of crisis.

Galeano and Feijó (2012) argued that the financial sector plays an important role in advancing resources for the investment process. Quoting the “finance-funding” circuit of Resende (2007), the authors explained that banks, rather than savers, are the key-players in determining the supply of resources to finance an investment. Regarding the controversial relationship found in the literature between financial development and economic growth, the authors mentioned that “...the access to credit and the degree of development of the financial system can play a prominent role in the economic development process of a country or region” (Galeano & Feijó, 2012, p. 206).

For Vreyer and Spielvogel (2009), the growth of one location can affect others in three aspects: i) through the technological externality, in which the innovation of firms can cause positive externalities by the diffusion of technology in the region; ii) interactions between intermediate suppliers, customers, and final

producers, and; iii) the proximity to a major economic center can improve labor market matching, reduce costs, and increase productivity.

According to Cavalcante et al. (2006), although the roots of regional income differences can be found in structural factors, monetary variables can be responsible for maintaining and widening these inequalities when adopting an approach in which money and banks are always non-neutral to development. The post-Keynesian theory considers currency as an integral part of the economic process, and separating it from the real side of the economy may be counterproductive. Credit, for example, has the ability to determine investment, rather than deciding the overall level of prices, making currency an integral part of the economic process instead of being a neutral element. In a process of income generation, the productive process takes time and requires investment prior to the sale of the final product. In a continental country such as Brazil, with banks present throughout most of its national territory, these institutions bridge the gap, transferring resources from surplus regions to regions with less resources. In this sense, the banking sector can make an important contribution as a collaborator of the government in the economic policies of regional development and sectoral policies.

There are several works in the Brazilian regional economic literature dealing with the role of public banks, especially on the development of these banks and their paradoxical position. On the one hand, there are competitive market forces that pull these banks into the vision of profit and competitiveness. On the other, there is a social function. At this point, these institutions are often treated as the right arm of the government in the implementation of public policies. Thus, in this theoretical context, this paper agrees with Jayme Jr and Crocco (2010), who emphasized that studies that are willing to discuss the importance and role of public banks, their efficiency and competitive dynamics contribute to the definition of their strategies in the short and long term.

Some studies have highlighted the performance of microcredit in the country and the role of this type of credit in the social inclusion of individuals. According to Lima (2016), ensuring access to credit is a central instrument of an economy focused on the human being, whose main objective is social development. In turn, Gonzalez et al. (2017) argued that public banks are the ones with the greatest organizational advantages in granting microcredit, as they have more favorable conditions for attracting resources, strong articulation with public policies, as well as powerful influence in the decision-making process of the government and regulations. The authors found evidence that the determinants for the future of microcredit indicate difficulties for the performance of organizations that are not public.

The gross domestic product (GDP) per capita and average incomes have been used in several surveys as a proxy to assess the growth and economic development of a region. However, these indicators cannot effectively measure the quality of life of the population, especially in terms of income distribution. Thus, according to Torres et al. (2003), as quoted by Scarpin and Slomski (2007), in 1954 a group of United Nations experts proposed that other indicators should be considered in order to evaluate people's quality of life. In Brazil, a widely used quality of life indicator is the Firjan Index of Municipal Development (FMDI), which monitors the development of all Brazilian municipalities.

According to Avelino et al. (2013), the FMDI is more updated than the Municipal Human Development Index (MDHI)<sup>5</sup> and with a longer time series. While the FMDI is publicized annually, the Human Development Index (HDI) is only announced every ten years. The use of the FMDI does not affect the analysis of the results, considering the similarities between the two indexes and the high positive correlation between them. The Pearson correlation coefficient calculated by the authors presented a correlation of 0.793 between the indexes.

The study carried out by Nwosu and Metu (2015) analyzes the link between financial development and economic growth in Nigeria. The authors found evidence that there is a positive and important relationship in that country in the long run. The results support the theory of McKinnon-Shaw<sup>6</sup>, that government restrictions on financial system operations, such as interest rate cap, direct credit programs, and high reserves, can affect the quantity and quality of investments, consequently having a significantly impact on economic growth. The McKinnon-Shaw financial repression paradigm implies that a financial system that malfunctions can slow down economic growth.

Gobi et al. (2017) analyzed the spatial correlation between the FMDI and the availability of bank branches and/or ASS, using exploratory spatial data analysis methodology. However, despite showing a positive positioning between socioeconomic development and bank presence, the authors used the number of branches and ASS per thousand inhabitants, which may indicate certain bias, since it does not take into account the size and structure of each branch/ASS.

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<sup>5</sup> Calculated by the United Nations Development Program (UNDP).

<sup>6</sup> McKinnon (1973) and Shaw (1973).

## II. METHODOLOGY

### II.1. Data Base

In this work, the FMDI will be used as a measure of socioeconomic development. It is calculated by Firjan (2013) and has an annual periodicity for all municipalities and, in its composition, three areas of human development are considered: employment and income, education, and health. The FMDI is the average of the three areas. These indicators are calculated on the basis of official public statistics. To the employment and income area, Firjan uses this variables: generation of formal employment, rate of formalization of the labor market, income generation, real wages in the formal labor market, and gini index of income inequality in formal work. To the education area, the variables: attendance to early childhood education, dropout in elementary school, age-grade distortion in elementary school, teachers with higher education in elementary school, average daily class hours in elementary school, and result of the development education in elementary school. To health area, they use the following variables: proportion of adequate prenatal care, deaths from ill-defined causes, infant deaths from preventable causes, and hospitalization sensitive to primary care.

Several authors have already used the FMDI as a measure for economic development, having economic, social, and public finance indicators as explanatory variables. For example, Postali and Nishijima (2011) analyzed the impact of the distribution of oil revenues on the FMDI, while Avelino et al. (2013) developed a study to identify the accounting variables conditioning the FMDI of the Brazilian capitals, with Pereira and Silva (2016) having evaluated the impact of the participation municipalities in municipal public health consortia on the FMDI.

In order to identify the presence of public and private banks in the municipalities, the list of branches and ASS provided by Bacen (2017) was used. This is a monthly publication that contains data from September 2007 to January 2020<sup>7</sup>. Like this data regards the type of stock, the information referring to the months of December of each year was used. The existence of branches or ASS was taking account as an indicator of physical presence, since the latter has the same functions of a bank branch. Banking Service Posts (BSP) were not considered, since they are installed in an institution or entity of the public administration or private enterprise,

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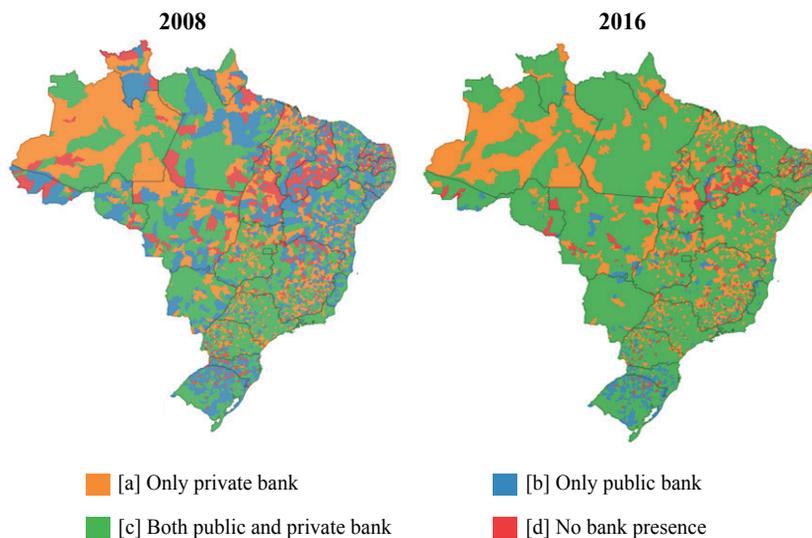
<sup>7</sup> The last data available before closing this article.

with the exclusive objective of attending to the interest of the respective organization and its servants, not providing assistance to the entire population.

Gobi et al. (2017) argued that, from a theoretical point of view, an increase in the availability of bank branches and/or ASS has a positive influence on the development of municipalities. However, as there is no information on the composition of the branches and ASS, the analyses will be performed based on dummy variables of municipal bank presence (1 = there is a bank presence, 0 = there is no bank presence). Two dummy variables were constructed: (dummy for the presence of a public bank) and (dummy for the presence of a private bank). In addition, municipalities were arranged into four groups: a, b, c, and d. Where “a” represents municipalities that only have private banks; “b” municipalities that have only public banks; “c” municipalities served by both types of banks, and “d” municipalities without physical bank presence.

As shown in Figure 3, when comparing the periods of 2008 and 2016, there was a substantial increase in the number of municipalities served by the two types of banks, predominantly in the Northeast and South of Brazil.

Figure 3. Spatial Distribution of Bank Presence in 2008 and 2016



Source: Bacen (2017). Generated by the authors.

Given that the analysis takes into account the territorial area, the existence of spatial dependence must be considered in the regional analyses. According to Almeida (2012), spatial dependence occurs when the variable of interest of a given region influences and is influenced by another neighboring region. To identify the degree of connection between one region and another, a spatial weighting matrix, generally called  $W$ , of size  $n \times n$ , is used. This matrix contains the spatial weights which are constructed on a proximity criterion, whose spatial weights can be measured by geographic or economic variables.

This work considered that bank presence in a municipality can influence its neighbors. It is expected that in municipalities where there is no bank presence, individuals and companies may have access to services in the vicinity. This hypothesis is corroborated by the *I-Moran*, a measure that varies between -1 and +1, in which positive values indicate that there is spatial association or positive spatial autocorrelation for the observed variable. When considering the presence of both public and private banks and their presence in general, the *I-Moran* was equal to 0.09, 0.04, and 0.07, respectively. For the calculation, we used a queen-type matrix of order 1<sup>8</sup>.

The control variables used in the research are as follows: per capita budget expenditure, the percentage of formal workers with at least secondary education, and the demographic density of the municipalities. Table 1 shows the relation of the variables, their codes, and respective data source.

Table 1. Description of the Variables Used in the Estimation

Code	Description	Source
FMDI	Firjan index of municipal development	Firjan (2018)
exp	Budgetary expenditure per capita deflated by IPCA	STN (2018)
edu	Formal workers with complete secondary education (%)	Brasil (2018)
den	Demographic density (population by Km <sup>2</sup> )	IBGE (2018), IBGE (2019)

<sup>8</sup> Consider all neighbors with border, either by edge or vertex.

dprpu	Dummy presence of public banks	Bacen (2017)
dprpr	Dummy presence of private banks	Bacen (2017)
wprpu	Presence of public banks in neighbors	Bacen (2017) <sup>1</sup>
wprpr	Presence of private banks in neighbors	Bacen (2017) <sup>1</sup>

Source: Prepared by the authors. *Note.* 1) Matrix W was calculated using the software Geoda 1.8.16.4.

## II.2. Descriptive Statistics

The data from Table 2 shows that municipalities without any bank presence have, on average, lower FMDI than those with a bank presence. When comparing the average FMDI of municipalities including only public or private banks, the difference is marginal. The other variables presented similar mean values.

Regarding the correlation matrix between the explanatory variables and the dependent variable (Table 3), the coefficients show a positive correlation between the FMDI and the per capita budget expenditure, as well as the demographic density. With regard to bank presence, there are indications showing that the presence of public banks provides a slightly larger FMDI. In this sense, the presence of public banks in the neighboring area also has a positive influence on the level of FMDI.

Table 2. Descriptive Statistics by Type of Bank Presence and Municipality (2008 to 2016)

	FMDI	exp	edu	den
Mean	0.6127	4.60	6.60	31.13
Standard deviation	0.1094	1.41	0.17	93.61
[a] Only private bank				
Minimum	0.2641	0.01	0.02	0.07
Maximum	0.9060	41.68	1.00	4582.20
Observations		15,536		

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[b] Only public bank	Mean	0.6302	3.79	0.55	35.58
	Standard deviation	0.1092	4.41	0.14	60.31
	Minimum	0.2916	0.01	0.06	0.39
	Maximum	0.8673	30.19	0.99	1738.51
	Observations	8,992			
[c] Both public and private bank	Mean	0.6863	4.54	0.59	219.06
	Standard deviation	0.1087	3.54	0.13	886.71
	Minimum	0.3049	0.01	0.08	0.22
	Maximum	0.9331	57.81	0.99	13 534.82
	Observations	21 585			
[d] No bank presence	Mean	0.6033	6.5	0.60	19.70
	Standard deviation	0.0935	5.57	0.17	23.61
	Minimum	0.2856	0.35	0.00	0.18
	Maximum	0.8584	38.91	1.00	198.16
	Observations	3882			
All municipalities	Mean	0.6470	4.58	0.58	112.13
	Standard deviation	0.1124	4.10	0.15	592.46
	Minimum	0.2641	0.01	0.00	0.08
	Maximum	0.9331	179.43	1.00	13,534.82
	Observations	50 004			

Source: Bacen (2017), Firjan (2018). Prepared by the authors using the software Stata/IC 14.1

Table 3. Correlation Matrix

	FMDI	exp	edu	den	dpr <sup>pu</sup>	dpr <sup>pr</sup>	wpr <sup>pu</sup>	wpr <sup>pr</sup>
FMDI	1.0000							
exp	0.3341	1.0000						
edu	-0.1329	0.0624	1.0000					
den	0.3336	-0.0879	0.1371	1.0000				
dpr <sup>pu</sup>	0.2590	-0.1029	0.0339	0.2997	1.0000			
dpr <sup>pr</sup>	0.1619	0.0577	0.0322	0.1491	-0.1211	1.0000		
wpr <sup>pu</sup>	0.2059	0.1250	-0.0278	0.0886	0.0081	0.3350	1.0000	
wpr <sup>pr</sup>	0.2679	0.1597	-0.0513	0.0943	0.0484	0.1578	0.7229	1.0000

Source: Prepared by the authors using the software Stata/IC 14.1.

### III. RESULTS

In order to estimate the impact of the presence of public private banks on the FMDI, a fixed effect panel model was used. The choice of the fixed effects model was obtained from the analysis of the tests: i) *Breusch-Pagan* [ $\chi^2=51,655.73$  and  $\text{prob}\chi^2=0.0000$ ], which rejected the hypothesis that there is adequacy of the Pooled model with respect to the random effects model; ii) *F of Chow* ( $F=31.84$  and  $\text{prob}F=0.0000$ ), which rejected the hypothesis that there are equal intercepts and slopes for all municipalities (Pooled); iii) *Hausman* [ $\chi^2=5,172.33$  and  $\text{prob}\chi^2=0.0000$ ], which assisted in rejecting the null hypothesis that the random effects model offers more consistent essentials. In addition, the fixed effects panel has the advantage of capturing the individual differences of each municipality. The analysis was carried out for 5,559 municipalities for the period from 2008 to 2016<sup>9</sup>. Although data on bank presence have been available since 2007, that from 2008 was used, considering that 775 municipalities started to have banking presence from that year.

<sup>9</sup> Eleven municipalities were withdrawn due to lack of data.

Given that the results of the descriptive statistics analysis showed signs of spatial dependence between bank presence, a variable was included which represents the weight of the banking presence of the neighboring regions on the FMDI of the municipalities. Therefore, considering spatial spillovers, the estimation was carried out as follows:

$$ifdm_{it} = \alpha_i + \beta_1 exp_{it} + \beta_2 edu_{it} + \beta_3 den_{it} + \beta_4 dpr^{pu} + \beta_5 dpr^{pr} + \beta_6 wpr^{pu} + \beta_7 wpr^{pr} + \epsilon_{it} \quad (1)$$

Table 4 shows the coefficients estimated in a fixed effects panel model. All variables were significant. Since the variables were treated in their logarithmic form, with the exception of dummies, the interpretation is given in terms of marginal effects. Two models were estimated: the first one show all municipalities of the sample, only including public bank presence, only private banks, both types of banks, and those without any bank presence. In the second model, only the municipalities without bank presence were considered, whose intention was to capture the effects of neighbors which have banking presence in these municipalities.

Table 4. Fixed Effects Panel Model Estimation

	All municipalities	No bank presence
Budgetary expenditure	0.095*** (0.004)	0.111*** (0.018)
Workers with secondary education	0.042*** (0.004)	0.030*** (0.010)
Demographic density	0.022* (0.013)	0.048 (0.068)
Dummy public bank presence	0.027*** (0.005)	
Dummy private bank presence	0.023*** (0.002)	

W public bank presence	0.070*** (0.004)	0.091*** (0.020)
W private bank presence	0.056*** (0.002)	0.076*** (0.008)
Observations	33,348	2,460
R <sup>2</sup>	0.298	0.244
Sigma_u	0.180	0.196
Rho	0.903	0.873
Sigma_e	0.059	0.075

Notes. 1) standard deviation in parentheses; 2) model estimated using Stata/IC 14.2. \*  $\rho < 0.10$ , \*\*  $\rho < 0.05$ , \*\*\*  $\rho < 0.01$ . S. Source: Prepared by the authors.

The results of model with all municipalities show that the presence of public banks has greater influence than that of private banks, when analyzing the presence in the municipality itself. The coefficients indicate that a municipality with the presence of public banks can increase the FMDI by 0.027%, while, for private banks, this value drops to 0.023%. When focusing in neighbor municipalities, the impact of public banks is marginally lower than that of private banks, with a difference of 0.003 percentage points.

The results of the estimation that considers only the municipalities without any bank presence show that there is a positive externality generated by the banking presence of both public and private banks, with greater impact of the former. In these municipalities, a 10% increase in the number of public bank institutions in the neighboring area has an impact of 0.91% in the FMDI. For private banks, the increase is approximately 0.76%.

The control variables budget expenditures, percentage of formal workers with complete secondary education, and demographic density showed a positive relationship with the FMDI, with emphasis on the first. The municipal budget expenditure per capita was the variable with the greatest impact on the FMDI, evidencing that public spending has positive impacts on socioeconomic development.

In addition to the fixed effects panel model estimation, which treated the FMDI as a continuous variable, an estimation was made considering Firjan's classification (high, moderate, regular, and low) in a logit-ordered panel model. The variable (oFMDI) was created with four different categories, from 1 to 4, where 4 is the highest level and 1 is the lowest. As stated by Pereira and Moreira (2016), the dependent variable FMDI was set into four categories, according to the methodology used by Firjan:

- i. FMDI=1 to FMDI between 0.0 and 0.4 - low development level;
- ii. FMDI=2 to FMDI between 0.4 and 0.6 - regular development level;
- iii. FMDI=3 to FMDI between 0.6 and 0.8 - moderate development level;
- iv. FMDI=4 to FMDI between 0.8 and 1.0 - high development level.

The organization in the abovementioned form will allow the model to reflect the level of FMDI. According to Maddala (1983), the methods of analysis are different for models with categorical and non-categorical dependent variables. In the first case, the ordered response model should be used.

In an ordered logit model, knowing the values of the coefficients enables to understand the direction of the effect of explanatory variables. Thus, according to the results in Table 5, all explanatory variables that presented statistical significance indicated positive relation with the FMDI of the municipalities.

While the direction of the effect of the explanatory variables on the probabilities and is determined by the sign of , the sign in itself does not always determine the direction of the effect for intermediate ordinations. In order to have an idea of the probability of the explanatory variable at each ordering level, the effect should be calculated for each IFDM level: low, regular, moderate or high.

Since the variable of interest of the study is binary, whether or not it has a banking presence, the marginal effect was calculated by the difference between the probability of the municipality having banking presence or not, maintaining the average of the other variables. The marginal effect is the difference between the two values found. The marginal effect calculation, and was calculated for each ordering level, according to Table 6.

The results of Table 5 show that municipalities that have public bank presence are more likely to rise to higher levels of development when compared to the presence of private banks. For example, if a municipality belongs to the regular level

of development, the probability of moving to the moderate level is 21.9% if it has the presence of a public bank. On the other hand, if it is regular and starts to having the presence of private banks, the probability that it will go to the next level is 9.8%.

The results are in accordance with some works, namely Araujo and Cintra (1994), Martins et al. (2014), and Dutra et al. (2015). These authors pointed out that public banks may have a social function that goes beyond the profit goal. The results of both the fixed effects panel model and the ordered logit panel model signalize that difference when the effects of public banks are higher than those of private banks. Although they are commercial banks, similar to private banks, the difference in their impact on the FMDI confirms what has been proposed in the literature.

Table 5. Ordered Logit Panel Estimation

	All municipalities	No bank presence
Budgetary expenditure	1.591*** (0.040)	1.633*** (0.101)
Workers with secondary education	1.329*** (0.260)	0.488 (0.501)
Demographic density	0.001*** (0.000)	0.018*** (0.005)
Dummy public bank presence	3.580*** (0.130)	
Dummy private bank presence	1.772*** (0.074)	
W public bank presence	0.019** (0.009)	-0.017 (0.022)
W private bank presence	0.002 (0.003)	0.020* (0.012)
cut1	-2,2065 (0.2050)	-0,1433 (0.4134)
cut2	7,5232	7,7832

	(0.2156)	(0.5398)
cut3	19,265	20,3688
	(0.3378)	(1,4391)
Observations	33,348	2,460
Sigma_u	4.981	2.622

Notes. 1) standard deviation in parentheses; 2) model estimated using Stata/IC 14.2. \*. Source: Prepared by the authors.

Table 6. Marginal Effect Estimation. Ordered Logit Panel

Marginal effect of having a bank presence [ $\text{prob}(y = j x = 1) - \text{prob}(y = j x = 0)$ ]								
FMDI Level	If it has public bank presence				If it has private bank presence			
	Low	Regular	Moderate	High	Low	Regular	Moderate	High
Low	-0.0667	-0.1847	0.2318	0.0196	-0.0375	-0.0941	0.1243	0.0073
Regular	-0.0475	-0.1975	0.2193	0.0257	-0.023	-0.0868	0.0979	0.0119
Moderate	-0.0286	-0.2323	0.2198	0.0411	-0.0142	-0.1283	0.1235	0.0190
High	-0.0175	-0.2208	0.1636	0.0747	-0.0049	-0.0899	0.0448	0.0500

Source: Prepared by the authors using the software Stata/IC 14.1

#### IV. DISCUSSION

Brazil is a continental country. Nevertheless, it has a coverage of public and/or private banks in almost its entire national territory. The expansion of the branches in recent years has allowed the growth of banking services to a part of the population that had never before experienced financial services.

The intermediation can direct resources from the surplus sectors to the deficit ones, contributing to lubricate the wheel of the real side of the economy, increasing production, demand, employment and, consequently, improving people's quality of life.

In this sense, this work identified whether the presence of a physical bank generates any impact on the FMDI, which measures the socioeconomic development of municipalities, separating the bank presence into two groups: public and private banks.

The results showed that both public and private banks have positive impacts on the FMDI of municipalities, especially the former. In both the fixed-effects model and the logit-ordered model, the results of public banks outperformed those of private banks.

Thus, this paper contributes to the discussion of the regional literature on the role of public banks in relation to private banks. The results indicated that public banks play an important role in the socioeconomic development, measured here by the FMDI.

#### ACKNOWLEDGEMENTS

The authors would like to thank CAPES for the financial support and the University of Alberta.

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