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The Influence of Regional Aspects on the Capital Structure of Brazilian Companies Served by Public Banks

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Abstract

Objective: Identify the influence of regional characteristics on the capital structure of the certified Brazilian enterprises to serve public banks.

Method: According to Meslier et al. (2020), research data from Brazilian companies (except the financial sector) were extracted from the accounting-financial statements and market value of the Economática® database from 2010 to 2020 and processed using panel data linear regression models.

Results and Discussions: The results show that being in regions where more than one PB operates does not imply an increasement in corporate debt, except in periods of crisis. On the other hand, according to the Pecking Order Theory, financial health has a relevant effect on the capital structure of companies, specifically profitability and the ability to pay interest.

Contributions: The study analyzes the capital structures of companies with regionality proxy, not only in the geographic aspect, listing its effects on indebtedness and debt cost. Accessing public banks plays a major role in the Brazilian credit scenario and overcomes the issue of regionality, implying a stimulus in the financial health of companies, given the preference for internal resources. The research contemplated the geographic location of the analyzed companies matrix, creating limited access to the public banks by the branches. More regionalized future study may embrace the performance of private banks and deepen the effective link between enterprises and regional banks.

Keywords: Capital structure; Indebtedness; Regionality.

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Introduction

Internationalization provides opportunities for companies and diversifies their economic and business objectives, however, it exposes these companies to many challenges (Rezende & Reis, 2021). From this phenomenon, it appears, from the 1980s, the interdependence and westernization in the world through technological advances, the standardization of habits, the speed of change, and the advent of commercial exchanges, which end up raising the need for reorganization. in the management of companies (Pettinati, 2012).

Regional aspects are determinant in several aspects of the company, such as performance (Goerzen & Beamish, 2003), shareholder value, and investment decisions (Pike, 2005). According to Sonza et al. (2020), indebtedness, which consists of using third-party capital to finance the company activities, is an important instrument for its growth, and can also be included in this group.
It becomes imperative, therefore, to contemplate and study the regional scenario in detail, with its characteristics and particularities, especially economics (Martin & Polland, 2017). The PBs aim to promote the development of a given region, through public policies aimed at promoting and offering subsidized credit (Tarantin et al., 2015). PBs have advantages when compared to private banks, as they have public resources and guarantees from governments, which reduces the risk of credit supply. In this way, BPs, under the aegis of developing a region, based on public policies, can raise funds in the market at lower costs than other institutions and offer them at subsidized costs (Baumann, 2017).

Therefore, the capital structure of a company can be influenced by institutional factors related to each economy and each region, and not only to internal factors of the firm (Faulkender & Petersen, 2006), with few studies that have explored these specificities.

PBs have the potential to neutralize the effects, supplying credit needs in the national economy, especially in long-term financing (Lobato, 2020). Considering the PBs as a relevant source of funding for organizations, and with subsidized interest rates, their observance in this research, in addition to proposing a regionality proxy, also points out the issues inherent to the indebtedness of organizations to be worked under the bias of the structure of capital in a regional analysis.

It is in this context that the present work seeks to identify differences in the capital structure of Brazilian companies listed on B3 when they are headquartered in regions served by PBs, answering the following research problem: What is the influence of regional aspects on the capital structure of Brazilian companies qualified to service public banks?

In this work, the existing relationship between banks and companies will not be addressed, to overcome credit restrictions. The focus of the work is on the scope of regionality, analyzing such relationships (banks and companies) under the service bias, given the location of the headquarters around the operation of these financial institutions.

One aspect that has been gaining ground in capital structure studies includes crisis scenarios, especially in the analysis of how the capital structure behaves during such moments.

From a theoretical point of view, this article contributes to the capital structure literature by introducing regionality as a study variable, but in a way that goes beyond simple geographic marking and translates into an analysis of the reach of Brazilian PBs.

In practical terms, the work contributions are aimed at analyzing the relevance of PBs and their credit offers for companies within their scope of action. The implications may lead to more appropriate aspects in contracting lines of financing or even in offering more assertive credit.

At a social level, understanding the relationship between banks and companies, assuming that they are important intermediation agents in the financial relationship of attracting and investing resources, becomes relevant, especially in Brazil, where access to credit is an important investment vehicle and the capital structure of companies can impact on profitability, on their continuity and, therefore, on the attractiveness for the market, especially for new investors.

The research was based on the analysis of financial data extracted from the Economática ® database for the period from 2010 to 2020. Following Meslier et al. (2020), companies in the financial sector were excluded from the sample, as they have their characteristics in the capital structure, complying with specific legislation for their activity, such as compulsory deposits and the Basel recommendations, which totaled a sample of 525 companies for the period. The location of the companies

was determined according to the registered address in the National Register of Legal Entities - CNPJ of the head office and the performance of the BPs consulted on the websites of each institution. Econometric models were proposed using the linear regression technique with panel data.

The results indicate that PBs contribute to the reduction of debt costs, and perhaps play an important role in providing financial resources in times of crisis. However, this role of PBs is secondary to the role of generating internal resources in the company, corroborating the hierarchy of resources in the Pecking Order Theory.

2. Theoretical Reference

With due support in the literature, the theories of finance and relevant concepts treated throughout the work will be exposed in this section. The first section examines the Pecking Order Theory (Myers, 1984), followed by the presentation of content relating to public banks, their method of operating, and their importance in the national economy, and, finally, essential concepts concerning regionality.

2.1. Pecking Order Theory and Capital Structure

The Pecking Order Theory, which is among the most influential theories of capital structure and corporate leverage (Frank & Goyal, 2003; Jõeveer, 2013), was presented in Stewart Myers' seminal study in 1984 and, according to Frank et al. (2020), motivated by the joint work of the same author and Nicolas Majluf, also developed in 1984.

The capital structure refers to the composition of the companies indebtedness, which can cover both their resources and third-party capital (Bressan et al., 2009). One of the premises of this theory is the existence of information asymmetry in the market. This theme was included in discussions about capital structure by Ross (1977), arguing that there are impacts on capital structure arising from the lack of complete information about companies in the market (Sampaio et al., 2021).

Information asymmetry involves the agents participating in the decisions of the companies and the profits earned by them, treating both as determining factors in the choices about the composition of the company capital structure. It is because of this scenario that the theory postulates a hierarchy in the preference of the company's financing sources (Sampaio et al., 2021).

In practical terms, this order of choice of funding sources, considering the Pecking Order, consists of the preference for internal sources over external sources (Myers, 1984), given price inaccuracies arising precisely from the asymmetry of information between owners and investors (Jõeveer, 2013). Access to internal sources is preferred, as it avoids problems arising from information asymmetry, including adverse selection (Albanez & do Valle, 2009).

The Pecking Order Theory offers predictions regarding the company and country-specific factors that affect company leverage (Jõeveer, 2013). Especially in the Brazilian context, the characteristics of the emerging economy; the developing stock market; the imbalance between the supply of credit from private and public sources, and a recent past of high interest rates are factors that must necessarily be observed given their potential influence on determining the capital structure of companies (Bouattour, 2020; Pereira & Miterhof, 2018; Siffert & Puga, 2016; Bressan et al., 2009).

The Pecking Order Theory highlights the importance of transparency in the organization activities (Jõeveer, 2013). Above all, at the national level, where the stock market is, to a certain extent, a novelty, the problems of information asymmetry cannot be ignored due to their relevance and recurrence, which culminate in a lower propensity of companies to resort to external sources of financing. In Brazil, Iglesias et al. (2021) analyzed the financing of Brazilian companies in the light of pecking order theory and market timing. The results are consistent with the Pecking Order Theory, in which companies tend to prioritize the use of internal resources over third parties, especially in times of economic recession, when there is a greater impact on business profits, and it is not possible to ratify the Market Timing Theory.

Several studies conducted around the world have corroborated the Pecking Order Theory. Agyei et al. (2020) conducted a study in which to examine the theoretical predictions of the Pecking Order Theory for the financing of small and medium-sized enterprises (SMEs) in Ghana. They found that, in general, the financing decisions of Ghanaian SMEs exhibit the theoretical predictions of the hierarchy theory.

Jarallah et al. (2019) empirically tested the traditional trade-off model against the pecking model, using data from Tokyo Stock Exchange-listed Japanese companies. Once again, the results were consistent with the pecking model, predicting that for Japanese companies, external debt financing is driven by the internal financial deficit.

Yıldırım and Çelik (2021) test the validity of the Pecking Order Theory at different investment levels for manufacturing companies listed on Borsa Istanbul. The results revealed that the Pecking Order Theory is valid for Turkish companies listed on Borsa Istanbul and that sensitivity to internal funds and debt increases as investment levels increase. In this sense, it is expected that the Pecking Order Theory explains the behavior of the

capital structure.

2.2. The Role and Importance of Public Banks

There are several theoretical currents regarding the functionality of public banks, regardless of the country in which they operate. Jayme Jr. and Crocco (2010) provide a summary view of what, according to them, is the main function of public banks: offering credit to specific sectors, regions, and services discredited by the private sector.
Other theoretical currents, which will be exposed here, may even present different arguments, but regardless of these positions, what is known is that the relevance of PBs has been growing in recent years. Jayme Jr. and Crocco (2010) show that the credit/GDP ratio grew by more than 15%, from 30% to 45% from 2008 to 2009, with BPs playing a leading role in this result. According to a report by the Central Bank of Brazil, in 2018, this ratio was 47.4%.

Yeyati et al. (2009) defend the so-called vision of development and argue that public banks should, invariably, seek actions aimed at the growth of the country or region where they are located.

Lobato (2020) analyzes data from this period to illustrate the positive impact caused by such direct and counter-cyclical action by the PBs. According to the author, PBs are important to credit providers in these scenarios, and these institutions went from an average rate of credit growth of 3% in the quarter that ended in September 2003 to 8.3% in June 2008.

Corroborating these figures consolidated by the author, the Central Bank of Brazil (2020) disclosed in its report that, even if from 2016 to 2019 public banks had slightly cut the supply of credit, as soon as the crisis set in due to the pandemic, the PBs returned to acting strongly in the market and presented, in 2020, a growth of 12.1% in the supply of credit.

According to Lobato (2020), in an environment of uncertainty, as an example of the 2008 financial crisis, public banks had and still have an important role in the country monetary policy, mitigating negative effects in these moments of crisis on credit operations in the country.

Jayme Jr. and Crocco (2010) state, based on their analysis of Brazilian Financial System (SFB) financial indicators, that if the BPs did not have a direct and counter-cyclical presence during the 2009 financial crisis, the Brazilian economy would have had very different results and the country would certainly have entered into a severe recession, perhaps even with an economic collapse. Having highlighted the relevance of public banks in the national scenario, it is necessary to analyze the convergence of theories regarding the gaps and objectives of PBs in both the national and regional scenarios.

According to Jayme Jr. and Crocco (2010), the PBs have as their primary function to fill the market gaps that the other SFN actors are not able to fill until then, whether in a crisis scenario, as Lobato (2020) describes, but mainly in social and regional scenarios. Therefore, an analysis of the conceptualization of regionality is necessary to understand the differentiation of the concept with purely geographical issues and where the BPs will be inserted.

2.3. Regionality

The emergence of an economically more open society, with a free exchange of goods and ideas, and the emergence of alliances and institutional arrangements constituted by the valorization of the local and the regional (Gil et al., 2008), highlights the importance of understanding and highlighting regionality in current research.

According to Gil et al. (2008), the concept of regionality can no longer be seen as a purely geographical aspect. According to the authors, the complete understanding of the concept passes through broader spheres such as economic, social, political, and cultural characteristics, in addition to geography itself. It is important to bring these dimensions into parallel with the role of public banks.

Such definitions of regionality and their differentiation from purely geographical aspects are necessary as the PBs present different actions for different regions. Regionality is directly related to the performance of these PBs and, according to Gil et al. (2008), it is directly related to the reorganization of the local state with the direction of developing local resources, not necessarily from geographical aspects but part of a broader vision. In this sense, the PBs play a role in regional development by offering public credit with lower risks and subsidies to companies located in the regions covered by the BPs. Thus, it is hypothesized that:

H1: Companies located in areas covered by regional public banks have a lower cost of third-party capital.

From the assumptions presented by the Pecking Order Theory, companies preferentially use internal sources to finance themselves. The use of banks is a secondary source and it is used when the first and main source is scarce. Thus, at the level of hypotheses for the research, it is formulated:

H2: Companies located in areas covered by regional public banks have a less leveraged capital structure, that is, a lower concentration of third-party capital (debt).

That is, even in areas covered by the PBs, with subsidized interest rates, companies will not have an impact on their indebtedness, as the hierarchy between sources prevails, regardless of the ease of access to third-party credit. On the other hand, alternatively, PBs, operating in a delimited

geographic area(s), are useful to alleviate the short-term credit restrictions of companies and are beneficial for their access to credit lines.

According to Meslier et al. (2020), these institutions stand out in regional development precisely through the granting of subsidized credit.Thus, it is expected that proximity between PBs and companies will result in a positive impact on their access to credit lines as external sources of financing, and it is inferred, at a hypothetical level, that:

H3: Companies located in areas covered by regional public banks have a more leveraged capital structure, that is, a greater concentration of costly third-party capital (indebtedness).

It is expected that the regional factor of PBs in the execution of public policies aimed at offering cheaper credit to companies in these regions where such PBs are located could, in some ways, invert the hierarchical order advocated by the Pecking Order Theory.

3. Methodology

In this section, the classification, the methodological path adopted for the research development, and the definition of the variables will be presented.

3.1. Methodological Aspects

This is descriptive research with a quantitative approach. Its construction was based on secondary data, covering the economic-financial information of Brazilian companies that trade shares on B3, which is available on Economatica®.

The choice of Brazilian companies is due to the territorial size of Brazil, with more than 8.5 million square kilometers, with 27 independent states. The regional characteristics, given the geopolitical division of Brazil, and the performance of different PBs in each region, allow us to identify the role of these banks as agents for the execution of public policies for the offer of subsidized credit to promote regional development, and consequently in the capital structure of companies that have access to these institutions.

The period analyzed in this work covered the interval between the years 2010 and 2020, considering the implementation of IFRS, to ensure better comparability between the published data. Regarding the level of comparison, considering the accounting particularities of the financial, insurance, and fund sectors, such companies were not included in the research sample.

The research methodology is based on the work of Meslier et al. (2020), which examined the impact of the structure of the local banking market on the access of small and medium-sized French companies to credit in the period from 2005 to 2013, covering periods of crisis. The adoption of regional banks as a proxy in the research was one of the main factors that guided the choice of this article as the basis of the work, as they promote regional development through public policies implemented with the offer of subsidized credit to companies in each region (Faulkender & Petersen, 2006; Tarantin Junior & Valle, 2015).

As for the research findings, the comparative advantages of proximity to banks and banking relationships are cited over the financial constraints of small and medium-sized companies. However, the relationship is not limited to regional banks. While a greater market share of regional banks or a stronger presence of geographically focused banks has been presented as beneficial in relieving the short-term constraints of sample companies, a greater market share of national banks or a stronger presence of geographically diversified banks is more likely to reduce the cash flow sensitivity of these organizations (Meslier et al., 2020). It is also worth noting that the heavy influence of regional banks facilitated financing access for more profitable enterprises before the global financial crisis (Meslier et al., 2020). (Meslier et al., 2020).

The context from which the explanatory variables will be constructed in this work is summarized in the fact that bank credit is an important external source of financing for companies (Berger et al., 2015; Canales & Nanda, 2012), which is concomitant with what was proven by Meslier et al. (2020) that regional banks – which operate in a delimited geographical area – are useful to alleviate the short-term credit restrictions of companies and beneficial for their access to credit lines. Thus, it is expected that the proximity between regional banks and firms will result in a positive impact on their access to credit lines as external sources of financing.

While Meslier et al. (2020) based their analysis on the presence of a regional bank as an explanatory variable, here we will seek to evaluate its effect on the capital structure of Brazilian companies. This proposal makes use of the acceptance and valuation of the variable established by them as a proxy for investigation of regionality, but will, in this research, be restricted to the area of operation of the country's regional financial institutions.

According to Campos (2020), there are currently 24 financial institutions in Brazil whose control is state-owned, which are distributed into 21 federative units. These institutions are subdivided into 16 development agencies, 5 public banks, and 3 development banks. Public and development banks will be covered in this study, according to, namely:

Table 1. Public and development banks included in this study.

Initials	Public Bank Name
BANRISUL	Bank of the State of Rio Grande do Sul
BRB	Bank of Brasilia
BANESE	Bank of the State of Sergipe
BANESTES	Bank of the State of Espírito Santo
BANPARÁ	Bank of the State of Pará
BDMG	Development Bank of Minas Gerais
BRDE	Regional Development Bank of the Far South
BANDS	Espírito Santo Development Bank
BASE	Amazon Bank
BNB	Northeast Bank

In a complementary approach, BASA – Bank of Amazon and BNB – Bank of Northeast were added to this list, given their relevance in the national picture, notably in terms of the geographic extent of operation.

3.2. Definition of variables

To meet the research objective, this work resorted to the literature to choose variables in the proposal to build an econometric model. The expected relationships for each of these variables vis-à-vis the dependent variable, as well as their concepts and studies that support their selection, are detailed in the following paragraphs.

Table 2. Variables Used.

Variables		formulas	Studies	Signal	Description
Dependents	Indebtedness (END)	PC oneroso+PNC oneroso/PL	(a) and (b)		Onerous liability on equity.
	Third-party capital cost (KD)	Financial expense / (Short and long-term financing + short-term and long-term debentures	(h) and (i)		Third-party capital cost
Variable	Access to Regional Public Banks (BP)	BP = Dummy: 1 if the company is headquartered in UFs with more than 1 regional bank	(B)	END (+) KD (-)	Companies with access to regional public banks have greater access to indebtedness with subsidized capital costs and lower
independent	Profitability (ROA)	LO/AT	(c) and (d)	END (-) KD (-)	Higher profitability reduces the need for third-party capital and the cost of debt.
	Size (TAM)	log(AT)	(d)	END (+) KD (-)	Larger companies tend to meet more requirements for credit release and have their capital costs with third parties reduced.
	Tobin's Q (Q)	VM/AT	(The)	END (+) KD (-)	Companies finance growth opportunities with third-party capital and lower third-party capital costs.
	Risk	DP(RO)/AT	(and)	END (-) KD (+)	The higher cost of bankruptcy for companies in riskier businesses reduces debt and increases the cost of third-party capital.
	Tangibility (TANG)	(Imob.)/AT	(b) and (d)	END (+) KD (-)	Assets for guarantees facilitate access to credit and reduce the cost of third-party capital.
	Sales Growth (CRESC)	ROt-ROt-1/ROt-1	(B)	END (+) KD (-)	Companies tend to seek third-party capital to finance growth. Growth lowers the cost of debt.
	Solvency (SOLV)	PL/AT	(b) and (f)	END (-) KD (-)	Solvent companies better control indebtedness and lower third-party capital cost.
	Interest Coverage (COBJUR)	EBIT/DF	(b) and (f)	END (-) KD (-)	With satisfactory interest coverage, indebtedness is lower and more controlled, and the cost of third-party capital is reduced.
	Profitability (LUC)	LAIR/RO	(b) and (c)	END (-) KD (-)	Companies with high profitability should have lower indebtedness and a lower cost of third-party capital.
	Crisis (DCRISE)	Dummy: 1 for crisis years and 0 for non-crisis years.	(g) and (b)	END (-) KD (+)	In crises, companies prefer security to investments with third-party capital, and the cost of capital increases given the increase in risks.
	BPC crisis	Interaction between BP and DCRISE	(B)	END (+) KD (-)	In crisis, proximity to banks facilitates access to credit and reduces the cost of capital.
	SECTOR	Control from the sector.	Authors' proposal.	+/-	Control by sector.

Notes: (a) Lang et al. (1996); (b) Meslier et al. (2020); (c) Myers (1984); (d) Frank and Goyal (2009); (e) Rajan and Zingales (1995); (f) Myers and Majluf (1984); (g) Espinola (2013), (h) Nardi and Nakao (2009); (i) Fonseca et al. (2016). PC = Current Liabilities, PNC = Non-Current Liabilities; PL = Shareholders' Equity; LL = Net Income; AT = Total Assets; VM = Market Value; SD = Standard Deviation; RO = Operating Revenue; Property _ = Fixed assets; EBIT = Earnings before interest and taxes (earns before interests and taxes); DF = financial expenses; LAIR = Earnings before taxes.

Source: Prepared by the authors.

The dependent variables are defined according to the literature. To investigate the first hypothesis of the study, that companies located in areas covered by regional public banks have a lower cost of third-party capital, we adopted the cost of third-party capital (KD), calculated by the ratio between onerous financial expenses and liabilities short and long-term costs of the firm, according to Nardi and Nakao (2009) and Fonseca et al. (2016).

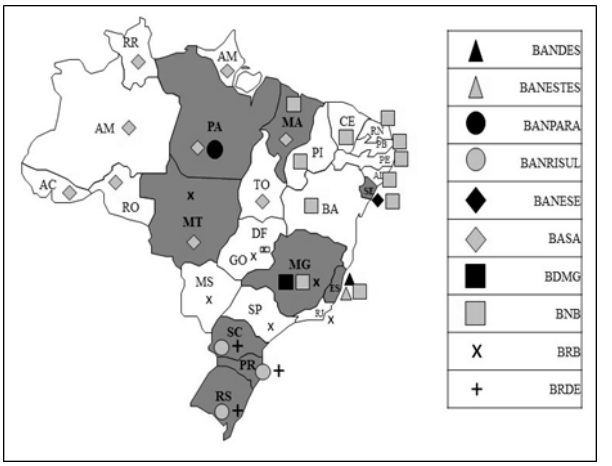
For hypotheses 2 and 3, whose objective is to analyze the leverage level of companies located in the areas covered by the PBs, indebtedness (END) was adopted, given by the ratio of the sum of onerous short and long-term liabilities and shareholders' equity (PL), according to Lang et al. (1996) and Meslier et al. (2020).

The variable access to regional public banks (PB) will be considered as a dummy variable, whose values will be assigned as follows: when the company being studied is headquartered in states where there is coverage by more than one of the regional public banks, the assigned value will be 1, and when the state in which the company is located is covered by only one public bank, the assigned value will be 0.

It is worth noting that, according to data collected on institutional websites of regional public banks, in all Brazilian states there is coverage of at least one of these institutions. This, which is the study variable of the research, will therefore be assigned according to the details below, in which the states are duly highlighted when covered by more than one PB.

Companies with high profitability tend to have a lower need to raise funds from third parties and lower third-party capital costs (Meyers, 1984). Frank and Goyal (2009) complement each other by stating that large companies, due to the ease of access to credit, especially long-term with lower cost, choose, even if profitable, to raise more resources from third parties and, therefore, the size variable (TAM) was also adopted and, here, defined by the logarithm of Total Assets.

Figure 1 Performance of Regional Public Banks by Federation Unit.



Source: Prepared by the authors.

It is important to emphasize that debt and the cost of third-party capital may be linked to other factors, such as, for example, the company growth opportunities that, as they grow, seek greater investments and, consequently, higher levels of indebtedness, with access to lower capital costs (Lang et al., 1996). Based on this approach, the variable Q-de-Tobin (Q) was chosen for the model, a variable that places the Market Value (VM) to Total Assets (AT). Complementing this approach, Rajan and Zingales (1995) show that, even with great market opportunities, companies that tend to take more risk have a higher bankruptcy cost, so the business risk variable (RISK) was also chosen.

Bringing it to a more regionalized aspect, Meslier et al. (2020) found results similar to those of the aforementioned authors, as this work also brings up the regional issue, but in an approach more with companies' access to these BPs, the tangibility variable (TANG) in the same way as in previous studies. Here, it is expected that the effect will also be positive for indebtedness and negative for the cost of third-party capital.

Most studies on capital structure find a positive relationship between growth and debt and the cost of capital (Krugman 2008; Akerlof & Shiller, 2009; Meslier et al., 2020). Therefore, a positive relationship is also expected between the variable sales growth (CRESC) and indebtedness.

On the other hand, the expected relationship between the interest coverage variable (COBJUR), as well as profitability (LUC), is negative both for indebtedness and for the cost of third-party capital. This is because, according to Myers and Majluf (1984), interest coverage plays a key role in controlling the company's indebtedness and reducing the cost of debt, and in the case of profitability (LUC), it will have lower financial risk, lower debt cost, and less capital from third parties, as it will have the capital from this source of profit available for investment. This same reasoning, according to the authors, applies to the solvency variable (SOLV) because, if this index is high, better debt management and a lower cost of third-party capital are expected concerning insolvent companies.

For the analysis of crisis episodes, DCRISE was chosen as the dummy that composes the model. In moments of crisis, it is considered as 1 and in moments without crisis, it is considered as 0. The periods for which the existence of a crisis was considered are the years in which the Brazilian GDP recorded a negative value and, alternatively, the value of 0 was assigned to years in which the GDP values were positive. Within the period studied, the years with negative GDP were 2015, 2016, and 2020, with values of -3.5%, -3.3%, and -4.1%, respectively (IBGE, 2021). It is expected that in times of crisis, risks will increase and companies' profitability will decrease, which increases the cost of capital and reduces indebtedness.

However, it is expected that for companies that are in the regions of the PBs the effect of the crisis will be smaller due to the countercyclical role of public policies of the PBs in times of crisis, that is, a positive relationship with indebtedness and a negative relationship with the cost of third-party capital. For analysis, the variable PB Crise was proposed, which consists of the interaction between the PB and DCRISE dummies, aiming at an analysis of the effect of these combined scenarios on the company's indebtedness and cost of capital. The model was also controlled by the SECTOR variable, according to the classification of companies in Economatica® to analyze particularities related to the activities performed by each company to analyze particularities related to the activities performed by each company.

For the processing of the presented model, the regression technique with panel data was used, which has an unbalanced panel. The software used for this processing was Stata®. Although the Hausman test was applied for selection between the regression models of the grouped types and these pointed to the adoption of fixed effects, considering the invariability of the dependent variable of study (PB) over the years of the sample, we adopted random effects modeling.

The variance inflation test (VIF) did not point out multicollinearity problems in the model. The incidence of eventual autocorrelation and/or heteroscedasticity was corrected by estimating models with robust standard errors. The data were winsorized at a level of 5% to avoid the effects of overestimating the coefficients of the regression variables due to the presence of very extreme outliers in the sample (Kokic & Bell, 1994).

The equations that represent the proposed regression models for the test of hypothesis H1 are:

$$KD_{it} = \beta_0 + \beta_1 BP_{it} + \beta_2 ROA_{it} + \beta_3 TAM_{it} + \beta_4 Q_{it} + \beta_5 RISCO_{it} + \beta_6 TANG_{it} + \beta_7 CRESC_{it} + \beta_8 SOLV_{it} + \beta_9 COBJUR_{it} + \beta_{10} LUC_{it} + \beta_{11} CRISIS_t + \beta_{12} BPCrise_{it} + \beta_{13} SECTOR_i + \mu_{it} \quad (1)$$

To test hypotheses H_2 and H_3, we identify the effects of BPs on the level of indebtedness:

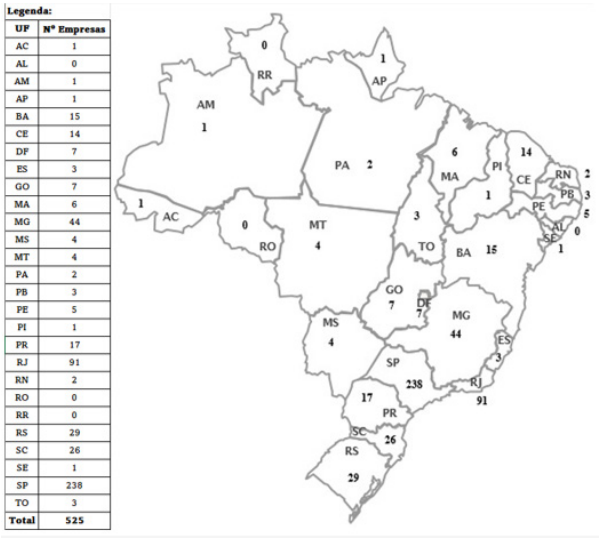
$$END_{it} = \beta_0 + \beta_1 BP_{it} + \beta_2 ROA_{it} + \beta_3 TAM_{it} + \beta_4 Q_{it} + \beta_5 RISCO_{it} + \beta_6 TANG_{it} + \beta_7 CRESC_{it} + \beta_8 SOLV_{it} + \beta_9 COBJUR_{it} + \beta_{10} LUC_{it} + \beta_{11} CRISIS_t + \beta_{12} BPCrise_{it} + \beta_{13} SECTOR_i + \mu_{it} \quad (2)$$

Concerning these models, it should be noted: β_0 represents the intercept or angular coefficient; μ_{it} is the regression error term; the sub-index i mentions the observation from the companies in the companies sample; t represents time, also considered in the regressions.

4. Results

Among the results obtained from the data processing for the work, Figure 2 shows the distribution of companies whose data are available in Economática ® - and were analyzed in the research - based on the head office state of the headquarters (search carried out by CNPJ on the website of the Federal Revenue of Brazil).

Figure 2. Distribution of companies in Brazilian states.



Source: Prepared by the authors

As verified, from the total of 525 companies included in the sample, 45% (238) have their headquarters in the state of São Paulo. The second state with the highest number of companies in the country is Rio de Janeiro, with 91, equivalent to 17% of the total. In Minas Gerais, it is 8% of the public (44 companies). There are, in Espírito Santo, the headquarters of 3 organizations (0.6%), totaling, therefore, in the Southeast, 376 business headquarters - 72% of the total - confirming that this is the main region of the country in terms of concentration of companies. In the sample, only the states of Alagoas, Rondônia, and Roraima did not reach the observations of the Brazilian companies headquarters.

Descriptive statistics of the study variables are shown below in Table 3. Before presenting the data, it is important to highlight the process of handling the missing data values applied to the sample, resulting in a final sample with 2,444 observations.

Therefore, for the valid sample, the total liabilities of the companies represent, on average, 2.12 times their net worth, which indicates a high level of indebtedness. The indicator oscillates between 0.14 and 13.45, considering the winsorization process applied. The cost of debt is 7.26% per year, ranging between 4.32 and 15.32% per year. As for ROA, with an average of 0.26, it indicates a positive profitability for the companies in the sample (26%, ranging between 0.4% and 54%). For the variable size, the average total assets identified in the sample was R$3.3bn, with the extremes being R$18.7MM and R$46.1bn. The average result for the Tobin-Q variable suggests that the market value of organizations equals 76% of the sum of their assets and varies between 5% and 290% in the sample.

In the Risk variable, there is an oscillation between 0.1% and 72%, with an average of 19%, indicating that the standard deviation of operating revenue is, on average, five times smaller than the organizations total assets. As for the other variables, we highlight the average percentage of 23% of the tangibility of assets in companies, a positive annual growth of revenues, but of low expression (3.8% on average), especially with the inflation rates registered in the periods. Solvency, Interest Coverage, and Profitability are variables with positive averages, denoting the good financial capacity of the analyzed companies.

A second study carried out with work variables was the correlation analysis. The details are presented below in Table 4, in which the significant correlations at the 5% level are duly marked. The debt-dependent variable presents a significant and positive correlation with Tangibility and a negative correlation with Size, Tobin's Q, Risk, Growth, Solvency, and Interest Coverage. In turn, the dependent variable cost of debt presented a positive and significant correlation with Risk and a negative and significant correlation with Indebtedness, ROA, Size, Tangibility, Solvency, and Interest Coverage. There is no problem of multicollinearity between the independent variables, a perception corroborated by the VIF test.

Table 3. Descriptive statistics of the study variables regional effects on the capital structure of Brazilian companies.

Variable	Comments	Average	Standard deviation	Minimum	Maximum
KD	2.444	7,2632	0,2556	4,3252	15,3248
END	2.444	2,1234	2,9726	0,1427	13,4533
BP	2.444	0,2750	0,4466	0	1
ROA	2.444	0,567	0,0898	0,0044	0,5435
SIZE	2.444	9,5209	0,7423	7,2727	10,6637
Q	2.444	0,7630	0,7343	0,0552	2,9003
RISK	2.444	0,1972	0,1900	0,0007	0,7236
TANG	2.444	0,2326	0,2140	0	0,7607
GROW	2.444	0,0385	0,2309	-0,4016	0,6431
SOLV	2.444	0,4548	0,2581	0,0753	1,1713
COBJUR	2.444	3,3383	5,2321	0,1295	27,2720
PROF	2.444	0,3062	0,5016	0,0117	2,1608
DCRISE	2.444	0,2840	0,4510	0	1
BPC crisis	2.444	0,0745	0,2626	0	1

Source: Prepared by the authors.

Table 4. Correlation matrix: study variables of regional effects on the capital structure of Brazilian companies.

	KD	END	ROA	SIZE	Q	Risk	Tang	grow	solve	Cobjur	Luc
KD	1										
end	-0,457*	1									
ROA	-0,134*	-0,0231	1,000								
size	-0,364*	-0,011*	-0,321*	1,000							
Q	-0,043	-0,234*	0,123*	0,007	1,000						
Risk	0,558*	-0,151*	0,124*	-0,312*	-0,024	1,000					
Tang	-0,544*	0,035*	-0,045	-0,057*	-0,100*	0,002	1,000				
grow	0,045	0,035*	-0,235*	0,085*	0,193*	-0,065*	0,035	1,000			
solve	-0,523*	-0,521*	0,346*	-0,367*	0,202*	0,017	-0,005	-0,029	1,000		
Cobjur	-0,568*	-0,198*	0,246*	-0,111*	0,296*	0,014	-0,153*	0,029	0,271*	1,000	
Luc	-0,101	-0,002	0,5142*	-0,166*	-0,083*	0,054*	-0,137*	-0,113*	0,274*	0,220*	1,000

Note: Correlation significant at the level of 5% (*).
Source: Prepared by the authors.

Table 5, below, presents the results of the regressions.

Table 5. The regression findings of the econometric model used to examine the effects of regionality on the capital structure of Brazilian firms.

	KD	END
BP	-0.8410***	-0.3304**
ROA	-0.9080*	-2.7035**
SIZE	-1.4077***	-1.0626***
Q	-0.6035**	-0.3624***
RISK	0.6743**	-0.5633*
TANG	-1.3548**	0.4622*
GROW	0.3465	0.0013*
SOLV	-10.2892***	-9.1643***
COBJUR	-0.0423***	-0.0234**
PROF	-0.2161	-0.5743
DCRISE	0.0413	-0.1442
BPC crisis	-0.4019	0.0453**
cons	13.36143	16.8154
SECTOR	Sim	Sim
average VIF	1,23	1,98
No. observations	2.444	2.444
R^2 within	0,4821	0,4504
Prob > chi^2	0,0000	0,0000

Notes: END = (onerous PC + onerous PNC) / Shareholders' Equity; KD = Financial expense / (Short and long term financing + short and long term debentures); BP = 1 if the company's headquarter UF is covered by more than one regional bank; ROA = return on assets (Net Operating Income / Total Assets); SIZE = size (logarithm of Total Assets); Q = growth opportunity (Market Value / Total Assets; Risk = standard deviation of Operating Income / Total Assets; Tang = Tangibility (Fixed Assets / Total Assets); Cresc = Growth [(Operating Revenue t - Operating Revenue t-1)/ Operating Income t-1]; Solv = Solvency (Shareholders' Equity / Total Assets); CobJur = Interest Coverage (EBIT / Financial Expenses); Luc = Profitability (LAIR / Operating Income); DCRISE = 1 in the years where the Brazilian GDP presented negative variation BPC Crise = interaction between BP and DCRise dummies Sector = Economic Sector Statistical significance at 1% (***), 5% (**) and 10 %(*) Regression estimated by random effects.

Source: Prepared by the authors.

The control variables of both models showed expected behavior, as detailed in Table 2, with most variables showing statistical significance, indicating an internal consistency of the models with previous studies. Size and Tobin's Q revealed opposing trends, demonstrating that larger organizations with higher market value have lower levels of indebtedness because they have more internal resources.

The first model tested the hypothesis that companies located in areas covered by regional public banks have a lower third-party capital cost (H1). The evidence found shows that the variable access to regional public banks (BP) presented a negative and significant coefficient at the level of 1% on the cost of debt capital (KD). This evidence supports hypothesis H1. As a result, there is evidence in Brazil supporting what Meslier et al. (2020) suggest: PBs distinguish themselves in regional development precisely through the provision of subsidized credit.

In the second model, the competing hypotheses H2 and H3 were tested. The results point to a negative and significant sign at the level of 5% of the variable access to regional public banks (PB) on the level of indebtedness (END). This result indicates that companies located in areas covered by regional public banks have a less leveraged capital structure, that is, with a lower concentration of third-party capital (debt), corroborating hypothesis H2.

This confirmation is in the sense that proximity or location in regions covered by more than one regional bank reduces third-party capital costs, but does not necessarily imply an increase in indebtedness. On the contrary, it reduces indebtedness. The controls used show that indebtedness is lower for companies with higher profitability (ROA) and greater ability to settle interest (CONJUR), which directs the supply of financial resources to internal sources (first source of access according to Pecking Order) and reduces the need to contract debts from external sources (second source in the hierarchy of Theory).

Detailing more about this evidence in times of crisis (DCRISE), it is not possible to infer that the crisis has effects on the cost of debt (KD) and the level of indebtedness of companies (END). However, it is possible to observe that in times of crisis for companies with access to PBs (PB crise), indebtedness is higher. This may indicate that in times of crisis companies would be less able to rebuild their internal sources of funds, given the reduction in operating profit and profitability, in this case, resorting to banks.

It is not possible to say, with these results, that the increasement in indebtedness occurs due to access to regional public banks. However, there are strong indications that this is the case, given that private banks in times of crisis restrict credit, while public banks, performing their countercyclical role for the development of the region, offer more credit (Meslier et al. al., 2020). This feeling is reinforced by the negative and non-significant relationship of the isolated crisis variable (DCRISE), indicating that in moments of crisis there is a tendency, although not significant, to reduce indebtedness. However, when the crisis interacts with access to PBs (BP), the relationship becomes positive and significant, assuming that PBs play a role in this increase in indebtedness.

The results suggest alignment with the assumptions presented by the Pecking Order Theory, evidenced in different regions of the world (Chatzinas; Papadopoulos, 2018; Jarallah et al., 2019; Agyei et al., 2020; Yıldırım;

Çelik, 2021; Iglesias et al., 2021). Although access to regional public banks (PB) reduces third-party capital costs (KD), companies located in these regions that have access to such PBs, instead of increasing their levels of indebtedness (END), end up reducing them. os, reinforcing the behavior of the Pecking Order Theory, in which companies will preferentially turn to internal sources to finance themselves. That is, despite the benefit in terms of costs that access to PBs brings, evidenced in H1, banks seem to be a secondary source, used after the companies internal resources are exhausted.

These results do not corroborate the study by Meslier et al. (2020) and contribute to the Pecking Order Theory. The results indicated that, in the Brazilian case, PBs even reduce debt costs and perhaps play an important role in providing financial resources in times of crisis. However, this role of PBs is secondary to that of generating internal company resources. That is, even with the apparent benefits of having access to PBs, with less expensive resources, companies prefer to avoid increasing their levels of indebtedness, without first exhausting their internal sources.

5. Final Considerations

This study identified the influence of regional aspects on the cost of third-party capital and on the indebtedness of Brazilian companies qualified to serve public banks. Given the territorial extension of Brazil, the differences between regions, and the importance of regional public banks for the implementation of public policies for regional development, as well as their countercyclical role in times of crisis, we adopted access to companies as a proxy for regionality. to regional public banks.

Especially with the continental extensions of Brazil and the social, cultural, and economic differentiation experienced in the country, the presence of PBs was listed for its wide diffusion in the national territory, but also for the importance they have in promoting subsidized credit (Jayme Jr. & Crocco, 2010; Lobato, 2020) and regional development (Yeyati et al., 2009). This proxy was also used by previous works such as Meslier et al. (2020).

It was hypothesised that the location of enterprises in specific regions provides them access to PBs, alleviating credit constraints and lowering the cost of third-party capital, resulting in an increasement in these companies indebtedness.

The findings suggest that public banks have a negative impact on loan costs and likely contribute to an increasement in corporate indebtedness during times of crisis.

However, the benefit of offering subsidized credit by PBs does not seem to be a feature taken advantage of by the average Brazilian company located in regions that have PB coverage. This is because, instead of companies taking advantage of the subsidized credit offer, they reduce their level of indebtedness. We found that it is only in times of crisis, a period in which credit offers from private banks become scarcer and more expensive and that internal sources of funds deteriorate, with greater demand for such resources and lower replacement rates due to the compromising of the company operating profit, that PBs become an option.

These results do not corroborate the study by Meslier et al. (2020) and contribute to the Pecking Order Theory, with findings from previous studies (Chatzinas; Papadopoulos, 2018; Jarallah et al., 2019; Agyei et al., 2020; Yıldırım; Çelik, 2021; Iglesias et al., 2021).

It is then presented that, for Brazil, the role of PBs seems to be secondary to the role of generating internal resources of the company, reinforcing the hierarchy of sources accessed by the company in meeting its financial needs - own resources, third-party resources, and financing. of capital--presented by her.

A social implication of the findings of this research points to the discussion of the effectiveness of the public policy of granting subsidized public credit to companies. It is noteworthy that the offer of subsidized public credit generates costs to society that directly finances this credit offer. Given the hierarchical preference of companies for internal sources of funds over external sources, even if subsidized, except in times of economic crisis, the maintenance of stability and economic growth policies, as they favor the obtaining of internal resources by the companies' operations, seems to make more sense.

Limitations of the research contemplated the necessary simplification of the performance of the companies, contemplating only the city/FU (Federal Unit) headquarters of the matrix, as well as the assumption that the presence in states covered by more than one public bank necessarily configured a possible relationship between this and the analyzed company. Another limitation is the separation of corporate debt into debt from private banks and debt from public banks.

For future research, there is the possibility of covering the model for the performance of private banks as well as expanding the scope related to companies by covering their entire operational extension, with branches, offices, and manufacturing plants, distributed throughout the country. The finding of an effective relationship between companies and financial institutions, in a complementary way to their location, opens up opportunities for new jobs. Finally, separating debt from PBs and private banks would allow for better identification of the source of increased indebtedness during times of crisis.

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