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O PAPEL DO BNDES NO APOIO ÀS MICRO E PEQUENAS EMPRESAS DURANTE A PANDEMIA DA COVID-19: UMA ANÁLISE A PARTIR DO MÉTODO DE MATRIZ DE INSUMO-PRODUTO

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ABSTRACT

This study aims to analyze the impacts of the Brazilian Development Bank financing on micro and small enterprises in terms of employment and income, using the input-output matrix method. Historically, the bank's disbursements were predominantly directed towards large enterprises. However, in 2020, there was an increase in the number of financings granted to medium-sized enterprises, possibly as a result of the pandemic. Emergency financing accounted for approximately 27% of the total volume between March and December 2020. It is important to note that the highest volume of credit was allocated to medium-sized enterprises, while micro and small enterprises were primarily concentrated in the Trade and Services sector in the South and Southeast regions. The loans granted had positive impacts on the number of supported jobs, value added, GDP, taxes, and wages, which contributed to reducing the impact of COVID-19 on small businesses and the economy as a whole, through multiplier effects.

Keywords: Brazilian Development Bank (BNDES); Micro and small businesses; Employment; Income; COVID-19; Input-output matrix.

RESUMO

O objetivo do estudo é analisar os impactos dos financiamentos do BNDES destinados às micro e pequenas empresas no que diz respeito ao emprego e à renda, utilizando o método da matriz de insumo-produto (MIP). Historicamente, constatou-se que os desembolsos do banco eram predominantemente direcionados para grandes empresas. No entanto, em 2020, observou-se um aumento no número de financiamentos concedidos às médias empresas, possivelmente como resultado da pandemia. Os financiamentos emergenciais representaram cerca de 27% do volume total entre março e dezembro de 2020. É importante ressaltar que o maior volume de crédito foi destinado às médias empresas e as micro e pequenas empresas se concentraram principalmente no setor de Comércio e Serviços, nas regiões Sul e Sudeste. Os empréstimos concedidos tiveram impactos positivos no número de empregos apoiados, no valor adicionado, no PIB, nos impostos e nos salários, o que contribuiu para reduzir o impacto da covid-19 nos pequenos negócios e na economia como um todo, por meio dos efeitos multiplicadores.

Palavras-chaves: BNDES. Micro e pequenas empresas. Emprego e Renda. COVID-19. Insumo-Produto.

1. INTRODUCTION

The COVID-19 pandemic, declared by the World Health Organization (WHO) in March 2020, resulted in the infection of millions of people worldwide. The transmission of the virus through liquid particles released by infected individuals led to the implementation of restrictive mobility measures globally, aiming to reduce exposure to the pathogen (Jin *et al*., 2021).

The ensuing social isolation had far-reaching negative socio-economic consequences, resulting in the most severe crisis in over a century. The pandemic acted as an exogenous shock with significant impacts on the global economy. Consequently, the immediate impacts were evident in the economic recession, which affected unemployment rates and increased public debt (Senhoras, 2020). The World Bank (2022a) reports that the decline in demand in 2020 affected nearly 90% of countries, causing a 3% contraction in the global economy.

The impact of the pandemic on economies was uneven, with emerging economies experiencing more severe and long-lasting economic effects. This disparity is evident when analyzing the time it took for each country to return to 2018 production levels. While only 27% of middle-income countries and 21% of low-income countries achieved this in 2021, 40% of advanced economies managed to do

so within the same period. This scenario contributed to increased inequality both between and within countries (World Bank, 2022a).

During the pandemic, the global labor market experienced a significant impact, affecting both employment and income. According to the International Labour Organization (ILO), many countries faced employment deficits. In the fourth quarter of 2020, there was an 8.3% decline in global labor income compared to the fourth quarter of 2019, equivalent to 4.4% of global GDP. Women, youth, and less skilled workers were the most affected. The ILO (2021) states that, compared to the fourth quarter of 2019, 8.8% of global working hours were lost in the same period of 2020, corresponding to 255 million full-time jobs. This figure is approximately four times higher than the number of jobs lost during the 2009 global financial crisis. The services sector was the most negatively impacted in terms of employment. Low and middle-income countries were more affected by movement restrictions, while labor market recovery in developed countries occurred more quickly. Another disparity between country categories is related to labor underutilization, which is higher in middle-income countries (ILO, 2021).

In response to the economic consequences of measures to combat COVID-19, governments of various countries adopted policies that included direct cash transfers, and credit guarantees and support for families and small businesses. However, many countries were facing high public debt, which limited their ability to respond to the crisis. As a result, the government's ability to provide direct support for the recovery of these entities, in the fight against the pandemic, and in reducing the impact on poverty and inequality was diminished (World Bank, 2022a).

According to the International Labor Organization (2020), government programs had a positive impact on reducing the impacts on the labor market in developed countries, but developing countries had more limited financial resources. As a result, only about 14% of global spending on combating the pandemic was spent in developing countries, which impacted the recovery process.

In Brazil, a middle-income country, economic policies adopted to mitigate the effects of the pandemic included aid to states and municipalities, employment and income policies, and credit policies. In this context, the role of public banks was fundamental to the success of these measures. The National Bank for Economic and Social Development (BNDES) played a significant role in combating the effects of COVID-19, implementing various countercyclical emergency measures that enabled the survival

and recovery of micro and small enterprises, which are vital for regional economic development. It is important to highlight that the BNDES' actions were part of a coordinated economic policy by the federal government, which also included emergency aid, transfers of resources for health in the states, and other measures to mitigate the effects of the pandemic throughout the country (Barboza *et al.*, 2021).

In this context, this study aims to analyze the impacts of financing granted in the first year of the pandemic, between March and December 2020, to combat the effects of the COVID-19 pandemic for micro and small enterprises by BNDES, on the labor market and income in Brazil. To achieve this objective, the input-output matrix methodology will be used. This technique allows for the analysis of the interdependencies between productive sectors, enabling the estimation of direct and indirect impacts of economic shocks.

In addition to this introduction, the paper consists of six more sections. The second section presents the context and objectives of the study. The third section provides a brief overview of the economic impacts of the COVID-19 pandemic and highlights the importance of micro and small enterprises (SMEs) during this period. The fourth section describes the methodologies and databases used for the analysis. The fifth section focuses on the analysis of BNDES financing, exploring its impacts on employment, value added, gross domestic product (GDP), taxes, and wages. The sixth section presents a discussion of the results obtained. Finally, the last section concludes and discusses possible limitations of the study are presented.

2. A BRIEF CONTEXTUALIZATION OF THE ECONOMIC IMPACTS OF THE COVID-19 PANDEMIC AND THE EMERGENCY ACTIONS OF BNDES.

2.1 INITIAL IMPACTS OF THE PANDEMIC ON EMPLOYMENT AND INCOME

In Brazil, the vast majority of subnational administrations imposed mobility restrictions in March 2020 to combat COVID-19. These restrictions led to economic uncertainty, postponement of investments and consumption, reduced trade and production, shorter working hours, increased bankruptcies, and reduced credit availability. By July 2020, employment and income were directly affected, particularly in the transportation, food service, and tourism sectors (Da Silva and Da Silva, 2022).

The measures to combat the economic effects of the pandemic have impacted employment in Brazil. The Brazilian labor market already had a history of high unemployment and significant informality.

Data from the Continuous National Household Survey (PNAD) show that the unemployment rate, which was 11.1% in the fourth quarter of 2019, increased to 13.6% in the second quarter of 2020 and reached 14.9% in the third quarter after mobility restrictions were implemented. According to data from PNAD and Brazilian Institute of Geography and Statistics (IBGE), the informality rate in the Brazilian labor market was 40.6% in the fourth quarter of 2019, fell to 36.5% in the second quarter of 2020, and returned to the same level as 2019 in the third quarter of 2021. Informality, measured by the number of workers without formal contracts or those who are self-employed, is an indicator of job precariousness, as pointed out by Ramos (2002), since these workers lack labor protection, which represents a problem for the Brazilian labor market.

In addition to employment, household income is another important variable to consider in the Brazilian economy. Brazil had been in recession since 2014, according to Barbosa Filho (2017), and was recovering slowly when the pandemic struck. The real GDP contraction in 2020, compared to 2019, was 3.88%, according to IBGE data, making it the country's third-largest recession. The World Bank (2022b) projects a recovery for emerging economies like Brazil in 2022 and 2023, with growth rates similar to those of the past decade.

2.2 CONTEXT OF MICRO AND SMALL ENTERPRISE IN BRAZIL: PRE- AND POST-PANDEMIC PERIOD

Micro and small enterprises (MSEs) have a high representation in the value of production and the share of employed people in the country and are regulated by the National Statute of Micro and Small Enterprises, created in 2006. This law classifies companies according to their annual gross revenue, including Individual Microentrepreneurs, Microenterprises, and Small Enterprises. BNDES also provides a classification for medium and large companies.

MSEs are responsible for a significant portion of national production and job creation, representing 29.5% of production and 51% of jobs generated in the Brazilian economy, according to Sebrae (2020a). The Services sector is the most representative in terms of contribution to value added in the economy, followed by commerce and manufacturing. In terms of job creation, the Manufacturing Industry and Commerce are the most relevant sectors.

Insolvency is high among small businesses in Brazil. According to research conducted by Sebrae (2018), the mortality rate of micro and small enterprises with two years of operation, established in 2012, is 45% and 5%, respectively. Factors driving these high mortality rates include pressure from suppliers, customers, the state, and banks. Suppliers charge high prices with short-term payment terms, while customers impose long-term payment terms, compromising the liquidity and survival of small businesses. In addition, the high interest rates charged in the credit market, incompatible with the possibility of amortization, and the requirements for obtaining credit make operations unfeasible. State bureaucracy can also have serious consequences in terms of time and costs, serving as a barrier to these ventures (Ferronato, 2009).

Access to credit is a major obstacle for micro and small enterprises (MSEs) in Brazil, due to high interest rates and restrictions on guarantees and the requirements imposed by banks. The banks' credit portfolio for MSEs has fallen significantly since 2014, and banks claim that profitability is low and the risk of default is high. The concentration of entrepreneurs' information by large banks also affects the supply of credit and increases interest rates. According to Sebrae (2020b), due to this restriction of access, the provision of credit to new customers increases the overall cost of loans in the economy, so that good payers subsidize bad ones, generating an adverse selection effect and high interest rates. As a result, MSEs face financial difficulties and high mortality (Ferronato, 2009).

In the face of the pandemic, many companies were impacted due to the closure of economic activities to contain the spread of the virus. MSEs stand out in these impacts, as they do not have the financial structure to remain idle for long periods, which generates difficulties in continuing operations and an increase in the demand for credit to boost working capital (Da Silva; Nascimento; Gomes, 2021). Sebrae's research on the impact of the pandemic on small businesses shows that monthly revenue fell in 87% of establishments, with a highlight on the tourism, gyms, creative economy, fashion, and beauty sectors. The research also indicates that 58.9% of micro and small enterprises temporarily interrupted their activities and 31% changed their operations.

Despite the higher demand for credit by MSEs, banks, in the pandemic context, have been extremely conservative and with high interest rates. Pereira (2021) confirms, from the analysis of credit behavior for small businesses, the contraction of private banks in periods of recession. Furthermore, given the low reach

of private credit and the lack of resources for MSEs, public banks and financial institutions play essential roles in the survival of these companies in times of crisis. Conversely, given the high representativeness of MSEs, their promotion in times of crisis is a strategy to reduce the effects of recession, as they continue to operate and maintain the employed workforce.

2.3 THE ROLE OF HE NATIONAL BANK FOR ECONOMIC AND SOCIAL DEVELOPMENT (BNDES) IN MITIGATING THE IMPACTS OF THE PANDEMIC

In a context of severe private credit constraints, public banks gain greater importance. These banks operate with the objective of stimulating economic and regional development through sectoral actions, such as in industry, the rural sector, and real estate, sectors in which private banks have less interest due to higher risks. Another important function performed by public banks is the implementation of countercyclical actions in credit provision during crisis periods.

During the 2008 global financial crisis, private banks began to restrict credit supply, leading public banks to sustain demand, acting countercyclically to reduce the impacts of the recession. This action is concentrated mainly in the most developed Brazilian regions, as these are where the largest volumes of economic activity are found. In addition, public banks are responsible for expanding banking to regions other than the Southeast and South of Brazil, given that the largest number of bank branches are concentrated in these regions (Araújo; Cintra, 2011).

During the pandemic, the Federal Government proposed a series of countercyclical measures to mitigate the economic recession in the country resulting from the closure of businesses, the main ones being the granting of credit and the extension of the deadline for the payment of tax obligations, with a view to mitigating the effects of the pandemic on SMEs (Da Silva, Do Nascimento, and Gomes, 2020). Despite the fundamental role of the measures presented by the Federal Government in the survival of companies, criticisms of them were presented by several authors. Magalhães and Cardoso (2020) highlight that they took a long time to be implemented, as they were announced about a month after the first confirmed case of COVID-19 and their implementation was not immediate. In addition, Pereira (2021) states that the resources made available were not sufficient to meet the credit demand of SMEs. Therefore, the positive impact of countercyclical actions on the economy could have been greater in the absence of the presented

points. However, Magalhães and Cardoso (2020) justify that the actions adopted imply a larger Brazilian public deficit, generating the risk of debt unsustainability.

The BNDES, founded in 1952, is the main instrument of the Federal Government for long-term financing and investments in Brazilian economic sectors. The BNDES is one of the largest development banks in the world and supports companies of all sizes in projects for modernization, expansion, and establishment of new ventures, aiming to generate jobs, income, and social inclusion in the country. Thus, the supply of loans made by BNDES aims at socio-economic regional development and the encouragement of innovation. Consequently, in times of crisis, the bank acts countercyclically, helping to resume economic growth (BNDES, 2022).

The participation of public banks was essential to achieve the emergency programs. The countercyclical action of BNDES had a temporary and focused nature, so that the emergency actions had established deadlines for completion and action on specific audiences and sectors in combating the effects of COVID-19 (Barboza *et al*., 2021).

Some emergency measures were adopted by the bank, such as the BNDES Credit Small Businesses line, which offered loans to micro, small, and medium-sized enterprises, with an annual gross revenue of up to R$90 million, aiming to maintain and generate jobs. The financing of the line took place indirectly, that is, it was negotiated, contracted, and transferred by 66 accredited agents. In addition, the interest rate of the indirect lines was determined by the financial cost, BNDES rate, and the rate of the financial agent (BNDES, 2020).

3. METHODOLOGY

This research aims to investigate the impacts of BNDES financing on micro and small enterprises in terms of employment and income, using the input-output matrix (IOM) method. This method seeks to analyze the interdependence of sectors in the economy, which allows estimating the direct and indirect impacts of economic shocks. The main information used to carry out the analysis consists of the flows of products between pairs of sectors, information present in the intersectoral transactions matrix, measured in monetary terms. Mathematically, this information consists of a system of n sectors with n unknowns, so that pairs of sectors are called z_{ij}, which

represents the demand for inputs from sector i for each sector j (Miller, 2009). Consequently, in the basic model, the demand of the government, families, and external sectors, as they are not linked to the quantity produced, constitute the final demand. Thus, the production of each economic sector can be described by the following equation:

$$\sum_{j=i}^{n} z_{ij} + c_i + g_i + I_i + e_i \equiv x_i \quad (4.1)$$

Where ci is the production of sector i consumed by families; $g_i$is the production of sector i consumed by the government; I_i is the production for investment; and e_i is the demand for exports. In the model, it is assumed that the intersectoral flow between i and j depends on the total production of sector j in the same period, so that the relationships between production and inputs, called technical coefficients, are fixed and given by:

$$a_{ij} = \frac{z_{ij}}{x_j} \quad (4.2)$$

making it possible to derive the open input-output system:

$$\sum_{J=i}^{n} = a_{ij} x_j + y_i \quad (4.3)$$

where y_i represents the final demand of sector i, and the expression can be rewritten as:

$$Ax + y = x \quad (4.4)$$

where A represents the matrix of direct coefficients; and x and y are column vectors. Thus, the total demand can be written as:

$$x = (I - A)^{-1}y \quad (4.5)$$

and its inverse as:

$$B = (I - A)^{-1} \quad (4.6)$$

In order to make household consumption endogenous, since households receive income from work and spend this income in the economy, and to make it possible to estimate the indirect effects, the model is closed in relation to households, so that the new matrix of technical coefficients can be described as:

$$\underline{A} = [A\ H_c\ H_r\ 0] \tag{4.7}$$

so that the new coefficients include income (H_r) and household consumption (H_c).

In addition, the production and final demand vectors in the closed model will be represented by:

$$\underline{X} = [X\ X_{n+1}] \tag{4.8}$$

$$\underline{Y} = [Y^*\ Y^*_{n+1}] \tag{4.9}$$

being the model represented by:

$$\underline{A} = \underline{B}+\underline{V} \tag{4.10}$$

$$\underline{A} = (I - \underline{A})^{-1} \tag{4.11}$$

Given the model described above, an increase in the demand of a sector j leads to an equivalent impact on production. However, given a higher production, more inputs from other economic sectors will be demanded. Thus, all sectors that have a relationship with sector j would have their production modified, this increase corresponding to the variation in demand multiplied by the technical coefficient. Therefore, (I - A) expresses the effects of the first round; however, the higher demand of a sector leads to a higher demand for inputs from other sectors, so that the chain is unlimited and represented by (I-A), which represents the direct and indirect effects (Guilhoto, 2004).

From the model defined in expression 4.12, it is possible to estimate the impact of the changes that occurred in demand, described in expression 4.13.

$$X = (I - \underline{A})^{-1}Y \tag{4.12}$$

$$\Delta X = (I - \underline{A})^{-1}\Delta Y \tag{4.13}$$

$$\Delta V = v\Delta Y$$

$$v = \frac{V_i}{X_i} \tag{4.14}$$

Where ΔX represents the impacts on production; ΔY represents the sectoral strategy; ΔV represents the impact on the variable of interest; and v represents the coefficients of the variables of interest, presented in expression 4.14.

The total impact on the variables is obtained by summing the vectors ΔX and ΔV. The multipliers, in turn, aim to estimate the direct and indirect impacts on the variables of interest in each economic sector for each unit produced for final demand. In this work, type II multipliers will be used, calculated from the closed Leontief model, and mathematically expressed as:

$$GV_j = \sum_{i=1}^{n} b_{ij} V_i$$

Where GV_j represents the total impact; b_{ij} represents the ij element of the Leontief matrix; and V_i the direct coefficient of the variable. From this, the following division represents the direct and indirect impact:

$$MV_i = \frac{GV_j}{V_i}$$

The key sectors of the economy are those that have backward and forward linkages greater than 1 (Guilhoto, 2004). The identification of these sectors is provided by the Rasmussen-Hirschman linkage indices, mathematically expressed as:

$$U_j = \frac{\left[\frac{B_{*j}}{n}\right]}{B^*} \qquad U_i = \frac{\left[\frac{B_{*i}}{n}\right]}{B^*}$$

Where B* represents the average of the elements of the inverse Leontief matrix; and B*j and Bi* represent the sum of a column and a row of the inverse Leontief matrix.

For the application of the described methods, the Input-Output Table (IOT), published by the Nucleus of Regional and Urban Economics of the University of São Paulo (NEREUS), will be used, which groups products and economic activities according to production, intermediate consumption, final consumption, gross fixed capital formation, changes in inventories, and components of value added, comprising the supply and demand accounts for goods and services, income, and production. The matrix published by the organization has 68 sectors and 128 products and has as a reference the year 2018.

Like other methodologies, the IOM has some limitations that result in approximate estimates. First, the IOM assumes linear and constant relationships between economic sectors, which may not reflect dynamic changes in the market. In addition, assumptions about the absence of unexpected

external shocks can affect the accuracy of forecasts. Therefore, the results are estimates due to these methodological restrictions and the need to simplify complex economic interactions.

The data on financing provided by BNDES for micro and small enterprises during the pandemic represent the final demand shocks, the application of which will make it possible to estimate the direct and indirect shocks on employment and income. The databases of the bank's operations were extracted from the BNDES Open Data Portal and include operations contracted from 2002 onwards, being them indirect automatic operations or non-automatic operations. Loans granted from the BNDES Credit Small Businesses line in the pandemic period are identified in the database based on the financial instrument "Loan Line for Micro and Small Enterprises" and the product "BNDES Automatic", between March and December 2020. For application in the IOM, the correspondence between CNAE 2.0 and the National Accounts System made available by IBGE was used, and the data was deflated based on the Broad Consumer Price Index (IPCA) for the year 2018 in the R software. The variables of interest in both bases are: customer size, amount disbursed, CNAE, sector, subsector supported, and Federation Unit (UF).

4. RESULTS

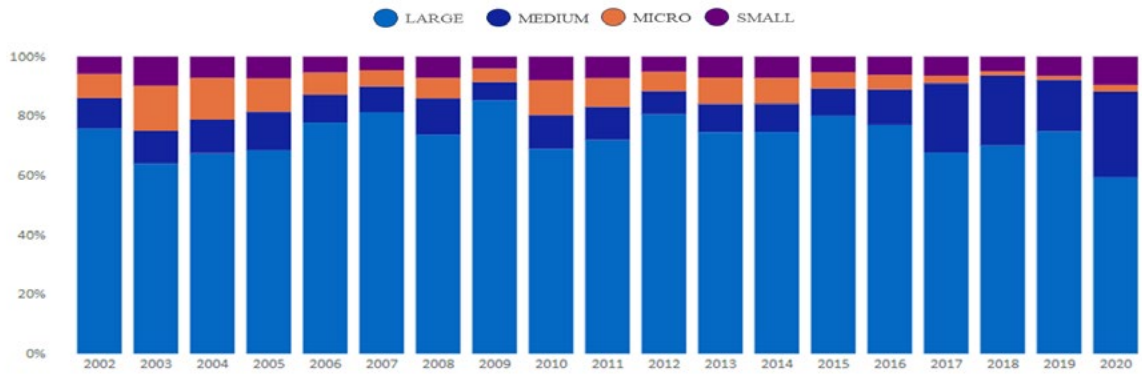
4.1 RELEVANCE OF MICRO AND SMALL ENTERPRISES IN LOANS GRANTED BY BNDES IN 2020

Historically, loans granted by BNDES have been mostly destined for large companies. Despite this, the percentage disbursed to this segment fell from approximately 80% in 2015 to 59% in 2020. In parallel, the percentage disbursed to medium-sized companies increased by 20 percentage points in the same years, going from 9% to 29%. In this period, the disbursement for micro and small enterprises increased from 11% to 12%, approximately; an increase that occurred due to an increase of 4% for small businesses and a reduction of 3% for microenterprises. Graph 1 shows the percentage of BNDES disbursements by size from 2002 to 2020.

Regarding the composition of loans by size, a significant change is observed in 2020, in which large companies contracted the lowest percentage disbursed between 2002 and 2020, while medium-sized companies acquired the highest disbursement rate in the same period, which may indicate a strategy provoked by the COVID-19 pandemic. When analyzing the participation of micro and small enterprises in

BNDES disbursements (Graph 2), it was possible to verify that 2003 was the year with the highest volume disbursed for Micro and Small Enterprises - MSEs. It should be noted that the percentage disbursed for MSEs went from 25% to 12% in 2020, indicating a reduction of approximately 13 percentage points. See Figure 1 below:

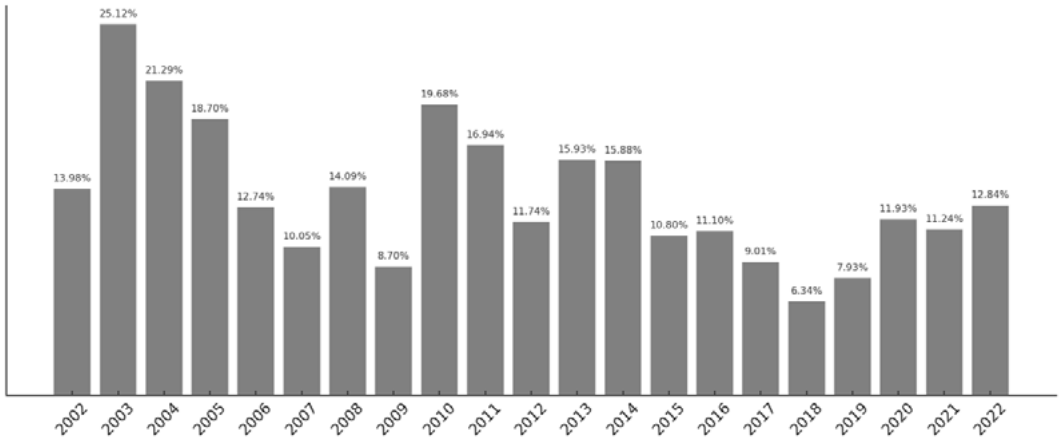
Figure 1 | Percentage disbursed by BNDES by size - 2002/2020



Source: elaborated by the authors based on research data, 2022.

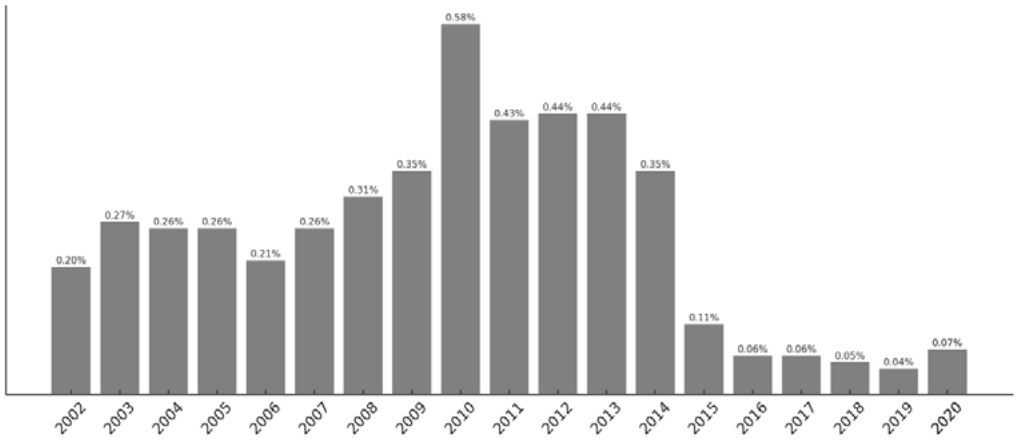
Despite the increase in the percentage disbursed to micro and small enterprises in 2020, as shown in Graph 3, financing for MSEs showed a reduction in their share of GDP. Loans went from 0.44% of GDP in 2013 to 0.07% in 2020; therefore, despite the growing percentage disbursed from 2018 onwards, the representativeness of GDP changes by only 0.02 percentage points in relation to 2020. See Figures 2 and 3 below:

Figure 2 | Participation of micro and small enterprises in BNDES disbursements



Source: elaborated by the authors based on research data, 2022.

Figure 3 | Share of disbursements for micro and small enterprises in GDP



Source: elaborated by the authors based on research data, 2022.

4.2 LOANS GRANTED DURING THE PANDEMIC PERIOD

Given the advent of the coronavirus pandemic, declared in Brazil in March 2020, the National Bank for Economic and Social Development (BNDES) decreed a series of measures to combat the effects of the pandemic in the country, which lasted, for the most part, until December of the same year. Between March and December 2020, the BNDES disbursed approximately R$40 trillion, in current values, through direct and indirect operations, which represents 0.5% of the GDP of the same year.

Financing was provided mainly to large companies, representing about 59% of the total amount, while medium-sized companies were granted approximately 30%, small companies 18%, and microenterprises 2%. This distribution is associated with disbursements made by financial instruments, among which the "Loan Line for Micro and Small Enterprises", the object of study of this work, presented the second highest value disbursed, with approximately 18% of the total.

The financial instruments aimed at combating the effects of COVID-19 were: Loan Line for Micro and Small Enterprises, Covid Account - CCEE Covid, BNDES Emergency Health, FSA Fund - Emergency and BNDES Productive Chains Credit. The loans made available through these instruments represented approximately 27% of the bank's disbursements in the period, representing about R$11 billion in financing.

4.3 ANALYSIS OF DISBURSEMENTS FROM THE SMALL BUSINESS CREDIT LINE BY REGION AND SECTOR

Regarding the financial instrument aimed at combating the effects of the coronavirus pandemic with the largest volume disbursed, the Small Business Credit Line financed, between March and December 2020, predominantly medium-sized companies concentrated in the most developed regions of the country. A total of R$7.3 billion in nominal values was disbursed for medium, small, and microenterprises; of this amount, approximately R$3.3 billion was allocated to SMEs, supporting 22,744 companies.

Spatially, financing was allocated mainly in the Southeast and South regions of Brazil. The empréstimolarger volume of credit in these regions follows the spatial distribution of small and microenterprises, as, according to Sebrae (2020d), 48% and 21% of micro and small businesses, respectively, are located in the Southeast and South regions. Table 1 associates the percentages of the credit volume and the number of companies by region. Credit grants for SMEs were concentrated both locally and sectorally. The Commerce and Services sector obtained the largest volume of credit, contracting approximately 76% of the financing for SMEs. Next, the most supported sectors were Industry and Infrastructure, representing 15% and 9%, respectively.

Table 1 | Loan Volume and Companies by Region in 2020

Region	Loans	Companies
South	41%	21%
Southeast	38%	48%
Midwest	13%	9%
North East	5%	17%
North	2%	5%

Source: elaborated by the authors based on research data, 2022.

The volume of credit provided to each sector aligns with the sectoral distribution of small businesses. According to Sebrae (2020d), in Brazil, there are 7,482,833 companies classified as micro or small enterprises; of this total, approximately 85% operate in the commerce and services sector, 9% in industry, 5% in construction, and 1% in agriculture. By applying the Rasmussen-Hirschman Linkage Indices, it was assessed that a significant portion of the financing was directed to key sectors of the economy or to sectors with strong forward or backward linkages. Figure 4 presents the main sectors that received disbursements, classified according to the National Accounts System (NAS).

Figure 4 | Disbursement by Sector - SNA Classification

Source: elaborated by the authors based on research data, 2022.

Approximately 16% of the total loan volume provided to SMEs was allocated to key sectors of the economy. Within this group, land transport and the food industry were the most significant recipients, accounting for approximately 7% and 6%, respectively, of the total credit line. Furthermore, the wholesale and retail trade sector, excluding motor vehicles, exhibited strong forward linkages and received the largest disbursement by classification, representing approximately 36% of the total.

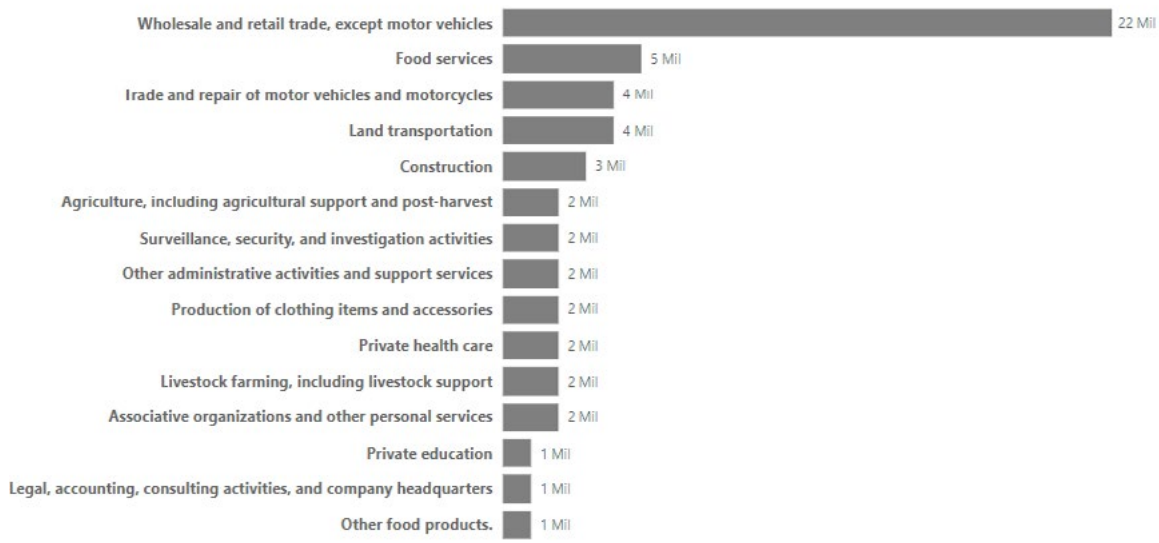
5. OVERALL IMPACT OF DISBURSEMENTS

The final demand shock resulting from the financing granted to micro and small enterprises, amounting to R$ 3.3 billion, led to an increase in production, affecting macroeconomic variables. The variation in gross value added was 2.99%, according to the results of the production decomposition; 36.20% of this variation corresponds to the income effect, 12.73% to the indirect effect, 15.72% to the direct effect, and 35.34% to the initial effect. The shock generated an increase of approximately 72 thousand jobs, R$ 3.48 trillion in value added, R$ 3.54 trillion in GDP, R$ 0.79 trillion in tax revenue, and R$ 1.35 trillion in wages. It is important to emphasize that, as mentioned in the methodological section, the results presented are estimates and are subject to the limitations and assumptions inherent in the analysis process.

5.1 IMPACT OF DISBURSEMENTS ON EMPLOYMENT

In terms of employment multipliers, the sectors that generate the newest jobs from each job created directly are: petroleum refining and coking; iron ore mining, including beneficiation and agglomeration; manufacture of automobiles, trucks and buses, except parts; and manufacture of organic and inorganic chemicals, resins and elastomers. Each job created directly generates, on average, 145, 32, 20, and 16 additional jobs, respectively, directly and indirectly. On the other hand, the wholesale and retail trade sector, except for motor vehicles; food; and repair of motor vehicles presented the highest number of jobs benefited by the loans granted, with approximately 22,000, 5,000, and 4,000 jobs, respectively. Figure 5 illustrates the volume of jobs created in the most benefited sectors.

Figure 5 | Jobs Created by Sector



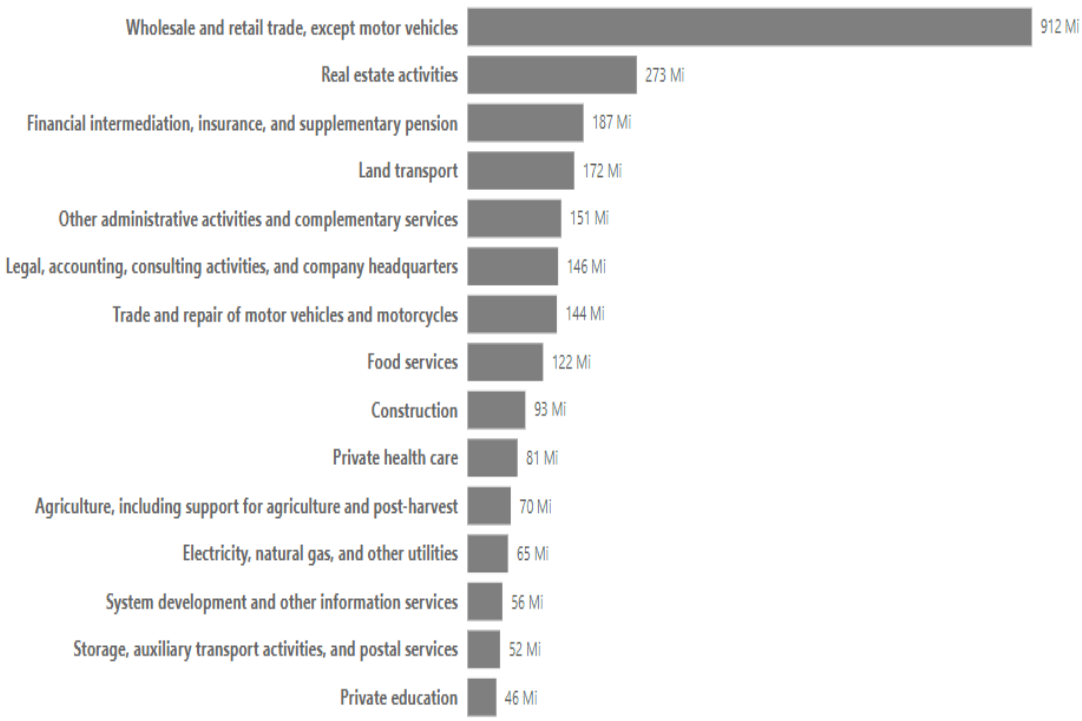
Source: elaborated by the authors based on research data, 2022.

It is important to note that, given the pandemic context, organizational and work regime measures were widely adopted to contain the spread of the virus in many sectors, enabling the adoption of remote work. This change may have resulted in changes to the sectors' technical coefficients, leading to overestimated employment multipliers for the period.

5.2 IMPACT OF DISBURSEMENTS ON VALUE ADDED

In terms of value-added multipliers, the sectors that most contribute to its increase are: manufacturing of automobiles, trucks, and buses, except parts; petroleum refining and coking; and slaughtering and meat products, including dairy and fish products. Each unit of value added created directly generates, on average, eight, seven, and seven direct and indirect jobs, respectively. However, when analyzing the increase in value added resulting from the financing, the most benefited sectors were: wholesale and retail trade, except for motor vehicles; real estate activities; and financial intermediation, insurance, and supplementary pension funds, with increases of approximately R$912 million, R$273 million, and R$187 million, respectively. Figure 6 presents these variations for the most benefited sectors.

Figure 6 | Value added generated by sector

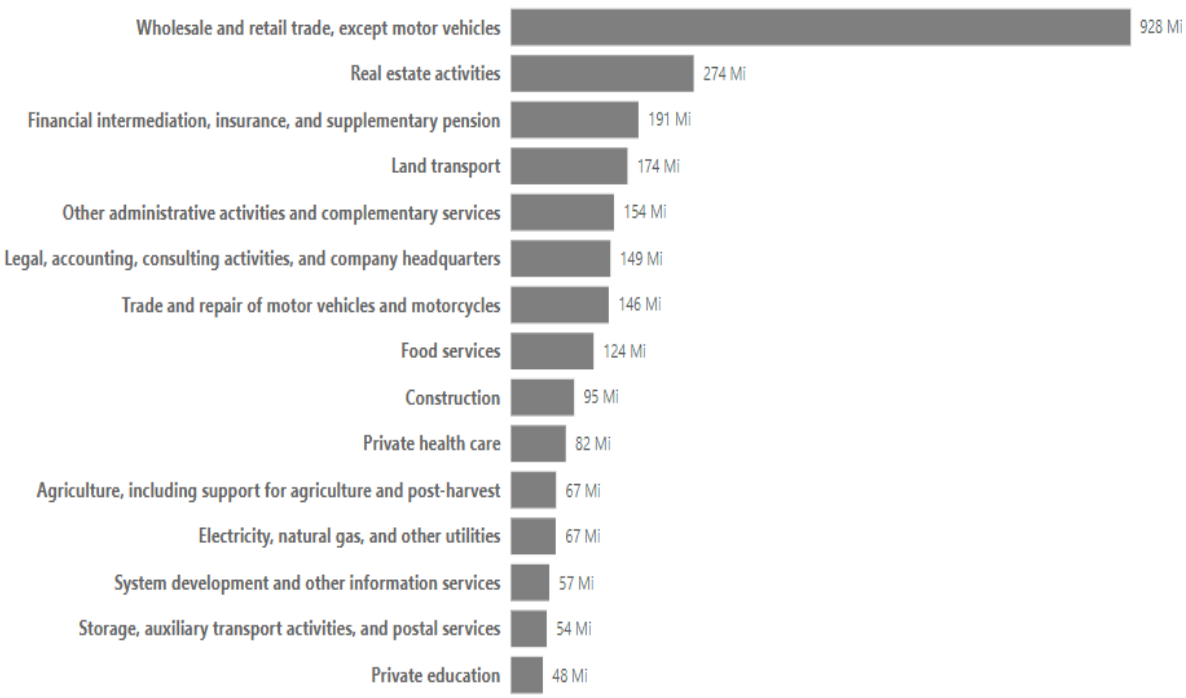


Source: elaborated by the authors based on research data, 2022.

5.3 IMPACT OF DISBURSEMENTS ON GROSS DOMESTIC PRODUCT

Relatively to the analysis of GDP multipliers, the sectors that most contribute to the increase in the variable are the same presented in the analysis of value added: Manufacturing of automobiles, trucks, and buses, except parts; Petroleum refining and coking; and Slaughtering and meat products, including dairy and fish products. Each value in the directly created GDP generates, approximately, seven jobs in each of the mentioned sectors. Analyzing the variation in GDP resulting from loans granted to micro and small enterprises, the sectors that contributed with greater intensity were analogous to those presented for value added, being them: Wholesale and retail trade, except for motor vehicles; Real estate activities; and Financial intermediation, insurance, and supplementary pension funds. These sectors contributed, respectively, with R$927 million, R$273 million, and R$190 million to the increase in the variable. Figure 7 presents these variations for the main sectors.

Figure 7 | Gross Domestic Product Generated by Sector

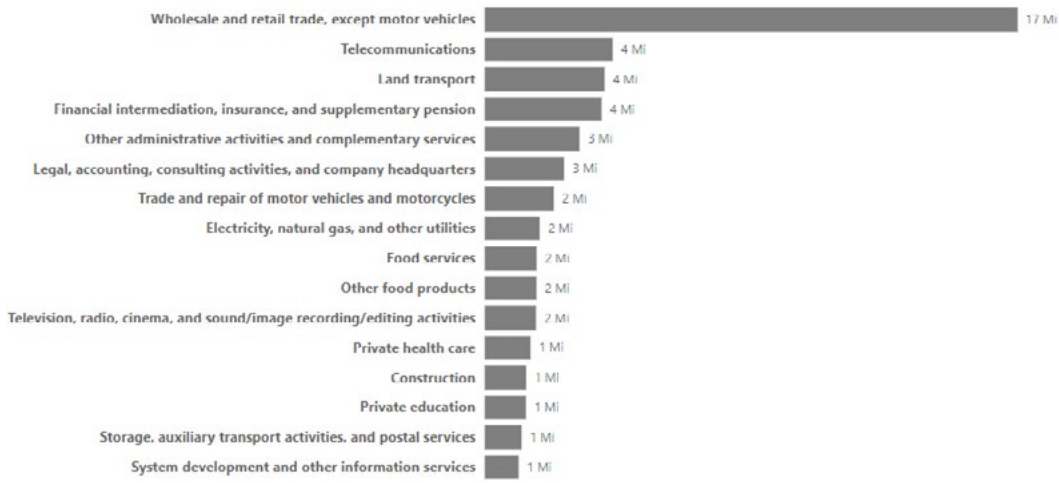


Source: elaborated by the authors based on research data, 2022.

5.4 IMPACT OF DISBURSEMENTS ON TAXES

With respect to tax multipliers, the sectors that contribute most to tax revenue are: Public education; Public administration, defense, and social security; and Other professional, scientific, and technical activities. Each unit directly created generates an increase of 311, 74, and six tax units, respectively. On the other hand, when analyzing the impact of granted loans, the sectors that contributed most to tax revenue were: Wholesale and retail trade, except for motor vehicles; Telecommunications; and Land transport, increasing tax revenue by approximately R$17 million, R$4 million, and R$4 million, respectively. Figure 8 presents the main sectors that contributed to tax revenue.

Figure 8 | Taxes Generated by Sector

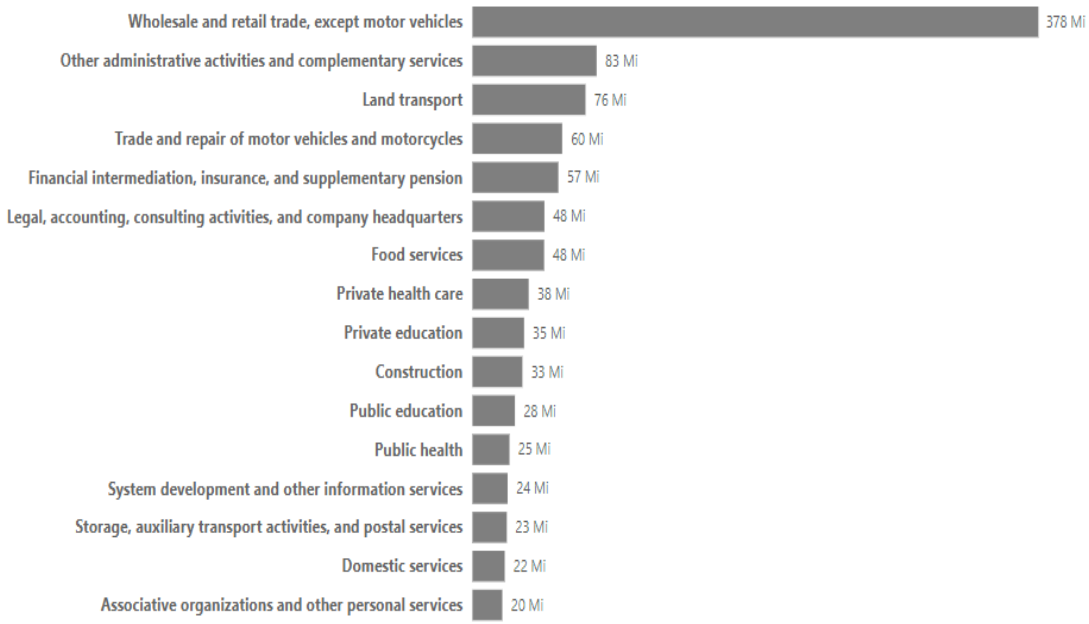


Source: elaborated by the authors based on research data, 2022.

5.5 IMPACT OF DISBURSEMENTS ON WAGES

Regarding wage multipliers, the sectors that contribute most to the increase are: Petroleum refining and coking; Iron ore mining, including beneficiation and agglomeration; and Slaughtering and meat products, including dairy and fish products. Each unit of directly created wage generates an increase of, approximately, 23, five, and five wage units, respectively. In relation to the impacts of loans on wages, the most sensitive sectors were: Wholesale and retail trade, except for motor vehicles; Other administrative and support service activities; and Land transport, generating, in wages, R$ 378 million, R$ 83 million, and R$ 76 million, respectively. Figure 9 presents the main sectors in relation to the generation of wages from loans.

Figure 9 | Wages Generated by Sector



Source: elaborated by the authors based on research data, 2022.

Overall, the loans granted through the BNDES Small Business Credit line during the pandemic played a crucial role in stimulating regional development. By providing essential capital for the survival and growth of micro and small businesses, these loans preserved local jobs and fostered economic activity, mitigating the negative effects of the economic crisis, and promoting the resilience and recovery of affected groups (BNDES, 2022).

6. FINAL CONSIDERATIONS

The objective of this study was to analyze the loans granted by the National Bank for Economic and Social Development (BNDES) to micro and small enterprises during the pandemic, through the financial instrument Loan Line for Micro and Small Enterprises, in order to evaluate their impacts on employment, value added, Gross Domestic Product, taxes, and wages.

The results found indicated the great relevance of the financial instrument in the context of BNDES disbursements during the analyzed period, which covered March to December 2020. It was found that 18% of the financing granted by the bank came from this credit line. Within this

percentage, approximately 55% of the financing was directed to medium-sized enterprises. This company size presents a lower risk of default compared to micro and small enterprises, resulting in easier access to credit in the market. As a result, the credit line in its countercyclical action did not prioritize the financing of SMEs, failing to serve a portion of clients belonging to these segments. Instead, there was a preference for financing medium-sized enterprises.

Regarding the results obtained from applying final demand shocks using the input-output matrix methodology, it was found that the financing provided to micro and small enterprises through the credit line resulted in the creation of 72 thousand jobs. Additionally, an added value of R$ 3.48 trillion was generated, contributing to an increase of R$ 3.54 billion in GDP. Collected taxes also saw an increase of R$ 0.79 billion, while wages paid totaled R$ 1.35 billion. These results represented a 4.17% variation in the analyzed variables. It was observed that the Wholesale and retail trade, except motor vehicles sector, stood out as the one with the highest forward linkage. Furthermore, it was responsible for the largest volume of loans and significantly impacted all the analyzed variables. In terms of variations in key economic sectors, the Land transport sector deserves special mention. It had the third-largest volume of financing and exhibited significant variations in the variables of interest, being among the four sectors with the most considerable changes.

The analyses carried out point to a reduction in the impacts caused by the pandemic on the Brazilian economy. It is important to highlight that the BNDES's action was part of a coordinated economic policy by the federal government, which also included emergency aid, transfers of resources to health in the states and other measures to mitigate the effects of the pandemic throughout the country. Countercyclical action played a fundamental role in this sense, preventing the GDP deficit and the unemployment rate from being even higher in 2020. However, despite the positive effect of countercyclical actions, even more significant results could have been achieved if they had been employed in greater quantity. This is due to the fact that the volume of credit offered was not sufficient to meet all the demand of micro and small enterprises. Thus, the effectiveness of the measures could have been expanded. In addition, it is important to mention that the technical coefficients extracted from the input-output matrix may present distortions due to organizational changes and the work regime during the pandemic period. These distortions can lead to an overestimation of the results of the multipliers, representing a limitation of the study.

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