

What Have We Learned About the Brazilian Development Bank?

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Abstract

This paper discusses what we have learned about the Brazilian Development Bank (BNDES), one of the largest development banks in the world, based on the available empirical evidence. We reviewed 70 academic papers that, based on the data, tried to identify causal relations involving the Bank. In general, the evidence indicates that BNDES loans are an effective instrument to increase investment, employment and exports, especially when credit borrowers are micro, small and medium-sized companies. The Bank also appears to have positive effects on economic activity and the revenues of supported firms. There is also evidence that the BNDES's operation was able to reduce deforestation in the country. However, most articles suggest that the BNDES has null effects on productivity, the profitability of companies and the share value of supported firms. The literature is not conclusive about the effects of BNDES on monetary policy power and municipal tax collection, as well as about whether there was political influence in the Bank's loans. Finally, this article discusses what we still do not know about the BNDES – which, therefore, remains an open issue for future research.

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1 Introduction

The number of development banks in the world is increasing. The *Bulgarian Development Bank* was created in 2008; France's *Bpifrance* in 2012; the *British Business Bank*, Portugal's *Instituição Financeira do Desenvolvimento* and the *Strategic Banking Corporation* of Ireland all in 2014; the Latvian *Altum Bank* in 2015; the development banks of Wales and Malta in 2017; and the U.S. *International Development Finance Corporation* in 2019.¹

Despite the immense production of development banks around the world, we know very little about the effects of this type of institution on their corresponding economies. Although there is a large body of theoretical literature on development banks (see [Amsdem, 1989](#); [Bruck, 1998](#), [Armendáriz de Aghion, 1999](#); [Torres and Zeidan, 2016](#); [Griffith-Jones and Ocampo, 2018](#); [Fernandez-Arias, Hausmann and Panizza, 2020](#)), there is no body of systematic empirical evidence on the impacts of these institutions.

In theory, there are several reasons to support development banks. They are seen as instruments to correct market failures, which would, for example, leave projects with positive externalities without financing (see [Greenwald and Stiglitz, 1986](#); [Musacchio, Lazzarini, Makhoul and Simmons, 2017](#)). These institutions also lend resources to companies that would not carry out projects in the absence of long-term funding ([Rodrik, 2004](#)). Finally, development banks can operate in a countercyclical manner, enabling economies to return to full employment in crisis situations ([Gutierrez, Rudolph, Homa and Beneit, 2011](#)).

However, there are arguments about the potential deleterious effects of development banks. These financial institutions are often accused of reducing the financial development of countries ([La Porta, Silanes and Shleifer, 2002](#)), replacing the credit that would be provided by the private sector ([Lazzarini, Musacchio, Bandeira-de-Mello and Marcon, 2015](#)), favoring certain politically connected economic groups ([Faccio, 2006](#)), causing various forms of resource misallocation ([Antunes, Cavalcanti and Villamil, 2015](#); [Buera, Moll and Shin, 2013](#)), and even conducting “zombie lending,” lending resources to firms that would die in the absence of their support ([Caballero, Hoshi and Kashyap, 2008](#)).

The arguments are contradictory. If development banks serve to correct market failures, such institutions should improve resource allocation. If development banks improved resource allocation, such institutions could not be accused of just replacing the credit that

¹Additionally: (i) Europe has been expanding its European Investment Bank; (ii) some US states have created new development banks; and (iii) the group of emerging countries composed of Brazil, Russia, India, China and South Africa has recently created the New Development Bank of the BRICS ([Stiglitz, 2019](#)). In fact, multilateral development banks are booming worldwide ([Kellerman, 2019](#)). According to [Musacchio et al. \(2017\)](#), there are 286 development banks in the world, with concentration in Asia (29.7%), Africa (24.5%) and Latin America and the Caribbean (17.8%).

would be provided by private banks. Some contrary arguments are in direct opposition to one another: if development banks just replaced financing that would otherwise be provided, they could not be accused of directing loans to politically connected companies and/or of generating misallocation of resources². In short, there are several controversies in the literature on development banks that only systematic empirical evidence – hitherto nonexistent – could resolve.

The Brazilian Development Bank (BNDES) is the main development bank in Brazil³ and one of the three largest in the world (see, for instance, [Guedes, 2018](#)).⁴ It provides mostly long-term loans focused on productive investment. Its operation was characterized (until 2017) by a lower long-term interest rate (TJLP) than market interest rates and (between 2008 and 2014) by several National Treasury loans, which totaled R\$ 440.8 billion.⁵ BNDES disbursements had a strong expansion period between 2008 and 2014, followed by a strong contraction period between 2015 and 2019 (see [Figure 1](#)). In 2019, BNDES disbursements – in relation to the gross domestic product (GDP) – reached their lowest levels since data have become available.

The BNDES case can serve as a learning experience for understanding the effects of a development bank. First, this is an institution with a very representative scope of activity in the universe of development banks, serving all sectors of the economy (infrastructure, industry, agriculture, trade and services), all company sizes (from micro to large) and several very typical segments for such institutions (innovation, green economy, exports and capital markets) (see [Além and Madeira, 2015](#)). Second, because the BNDES's operation, as seen, was characterized by state support, which is common in development banks, comprising the provision of resources in the form of subsidies, the nonpayment of taxes or even in an explicit state guarantee for its obligations (see [Luna-Martínez and Vicente, 2012](#)). Third, and mainly, because there are more than 100 academic articles assessing the effects of BNDES on some variable in the Brazilian economy, with at least 70 papers trying to identify any causal effect involving the Bank.

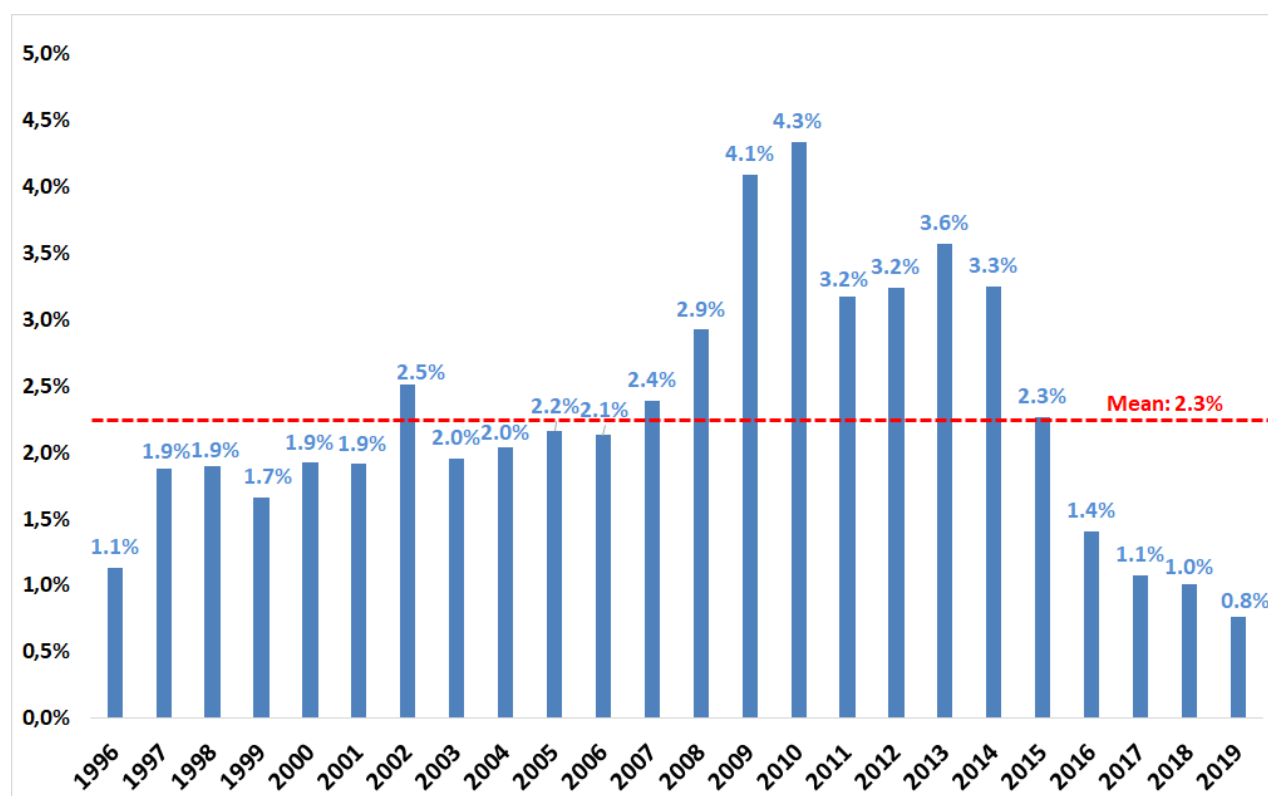
²If development banks operate based on resources that are not obtained through lump sum taxes, then some dead weight will exist as a result of their operation.

³[Holland \(2018\)](#) accounts for 18 entities in Brazil with the characteristics of development banks.

⁴The two largest in the world are the China Development Bank (CDB) and the German KfW, in that order.

⁵In 2018, the TLP was created as the new reference financial cost of the BNDES, whose value is linked to a long-term market interest rate (5-year NTN-b). In addition, the return of funds to the Treasury began in 2016, a large portion of which has already been prepaid to the Treasury. For more details, see the following BNDES link: <https://www.bndes.gov.br/wps/portal/site/home/transparencia/recursos-do-tesouro-nacional>.

Figure 1: Ratio between BNDES disbursements and Brazilian GDP



The purpose of this article is to review the large body of empirical evidence on one of the largest development banks in the world. This effort is important for (i) *policy makers* interested in evidence-based public policies and whose lack of resources and specialized training prevents them from following the results of almost a hundred academic articles (Hjort, Moreira, Rao and Santini, 2019); (ii) academics interested in supplementing theoretical knowledge on development banks through empirical evidence; and (iii) the social control of public resources that are used to maintain the activities of development banks.

In the case of BNDES, in particular, reviewing its evidence is fundamental to guide the public discussion about the Bank, which comprises contradictory opinions on different matters. For example, there are statements that range from “BNDES does not generally increase investment in the country (...) and since BNDES is unable to act to increase the economy’s investment rate, (...) the best thing to do is simply shut down BNDES” (Palhuca, 2015), to arguments claiming there is evidence that “BNDES makes a difference for investment” (Ferraz, 2014). In this context, this work systematizes what we truly know about the BNDES’s operation so far and makes recommendations for possible future studies.

As is common in systematic literature reviews (see, for example, [Piza, Cravo, Taylor, Gonzalez, Musse, Furtado, Sierra, Abdelnour, 2016](#)), choosing which works will (or will not) be considered constitutes a major challenge. To address this issue, we employed some selection criteria. We considered studies that use data and employ an estimation method to seek to identify a causal relation involving BNDES. In addition, we restricted the analysis to studies that underwent a peer review process, which include articles published in journals, studies presented at congress, award-winning studies, master's dissertations and doctoral theses.

The articles finally considered (70 in total) relate to different topics – for example, "What is the effect of BNDES on investment" or "What is the effect of BNDES on employment?" We separated each topic that had at least three studies available and discuss them in a subsection of this article, keeping the rest of the compiled evidence in the subsection called "Miscellanea".

In general, the evidence indicates that BNDES loans increase investment, employment and exports, especially when the credit borrowers are micro, small and medium-sized companies. The Bank also appears to have positive effects on economic activity (a result consistent with the positive effects on investment and exports – components of aggregate demand – and employment) and the revenue of firms that are supported by BNDES. There is also evidence that the operation of the BNDES – mainly through the Amazon Fund – was able to reduce deforestation. However, most articles suggest that the BNDES has null effects on productivity, on the profitability of companies and on the share value of supported firms. The literature is not conclusive about the effects of the BNDES on the power of monetary policy and municipal tax collection, as well as about whether there was political influence in determining the Bank's loans. Finally, there is evidence that the BNDES, over the last years, has had larger, older and less risky companies as its main clients.

Just as it is important to know what we have learned from the empirical literature on the BNDES, it is crucial to recognize what we have not learned from the available studies – and which, therefore, remains an open issue for future research. First, we do not know whether the BNDES's cost-benefit ratio was positive for society. The literature is practically silent on this topic, despite so many opinions in the public discussion. Second, we know little about the effects of the BNDES on infrastructure projects, which is one of the focuses of the Bank's operations, but for which an empirical assessment, due to its nature, is not trivial. Third, we know little about the causal effects of the BNDES on the development of the capital market. Fourth, we do not know whether the evidence collected serves as a basis for prognoses on the Bank's operation in the context of its new reference interest rate (long-

term rate – TLP), implemented in January 2018 and currently in effect. With the TLP, the profile of borrowers changes, and it is not possible to know, *a priori*, how this affects the impact.

Literature. This article is related to the empirical literature on what development banks do. [Luna-Martínez and Vicente \(2012\)](#), through a global *survey* of 90 banks in more than 60 countries, analyze the ways these institutions operate, their mandates, their services, their main clients and their governance but do not provide evidence of causality that attests their effectiveness on the economies. [Amsdem \(2001\)](#), [Fordwor \(1981\)](#) and [Ndongko \(1975\)](#) conduct qualitative case studies on development banks in emerging countries but are silent on the quantitative impacts of such institutions. [Lazzarini et al. \(2015\)](#) investigate what development banks do but focus on the case of a single experience based on data from only publicly traded companies.⁶ [Musacchio et al. \(2017\)](#) analyze the evidence of the causal impact of six development banks, but in the case of the BNDES, consider only five articles in the available literature.

In addition, this article is supplementary to other studies that try in some way to map the literature on the BNDES. [Souza, Ferreira, Hanley, Pires, Marcondes, Faria and Sakurai \(2015\)](#) conduct a quantitative mapping of all academic production on the BNDES from 1952 to 2013, but neither select articles based on evidence of causality nor draw conclusions on public policy for development banks. BNDES Effectiveness reports ([Banco Nacional de Desenvolvimento Econômico e Social, 2018; 2019](#)) contain surveys of the impact assessments on the institution, however, without discussing and analyzing the results. [Tribunal de Contas da União \(2019\)](#) synthesizes some quantitative studies on the BNDES, addressing, however, fewer topics, without restricting to studies submitted to peer review. Finally, [Bonomo, Brito and Lazzarini \(2018\)](#) present a review of the effects of earmarked credit on the Brazilian economy. The analysis addresses few articles for which the selection processes are not clear and with a more normative than positive focus.

Layout. This work is divided into four sections, including this introduction. Section 2 presents an overview of the literature, the criteria for selecting the articles and some descriptive statistics of the evidence considered. Section 3 details what we know about the BNDES in the Brazilian economy in its most diverse aspects, totaling 13 subsections. Finally, Section 4 presents some final considerations.

⁶The focus on publicly traded companies was chosen by the authors, since, at the time of writing the article, the data on BNDES loans for all companies were not publicly available.

2 Overview of the literature on the BNDES

2.1 Methodology

In this systematic review of the literature, studies that seek to identify causal relations involving the BNDES are considered, including those that assess the impacts of the BNDES's operation, as well as those that investigate what determines such operation.

Some systematic reviews of the literature consider only studies that employ random experiments or quasi-experimental methods (Escueta, Quan, Nickow and Oreopoulos, 2017; Evans, Philips and Ruffini, 2019). Since these methods depend on less restrictive hypotheses to identify causal relations, the evidence obtained based on them can be considered more reliable. However, among the published studies dealing with the BNDES, none use a random experiment; only Sztutman and Aldrichi (2019) employ a regression discontinuity design and only Cavalcanti and Vaz (2017) estimate by the method of difference in differences based on a variation that can be considered exogenous. Therefore, we decided not to adopt a restrictive criterion in relation to the method. We considered studies that use data and employ estimation methods that seek, in some way, to identify causality. By this criterion, studies that use fully calibrated models are not included, nor are those that estimate regressions without seeking to deal with selection bias.⁷

As the criterion related to the method is not very restrictive, adopting a criterion related to publication was considered important to filter good quality evidence. In this choice, there is again a *tradeoff* between the quality and the quantity of evidence. For example, among the eight articles published in journals classified by Capes⁸ to be of international excellence,⁹ none addresses the effects of the BNDES on the power of monetary policy. In this *tradeoff*, the option adopted was to favor the quantity of evidence: studies that underwent a peer selection process are considered in the literature review. This includes articles published in journals, studies presented at congress, award-winning studies,¹⁰ master's dissertations, and doctoral theses. However, book chapters, texts for discussion and institutional publications are not considered in the literature review. The choice to not include institutional publications, even if some of them have peer selection processes, was made because, in

⁷At the very least, it is necessary to discuss the issue of tracing causal effects and adopt a method that, even under restrictive hypotheses, seeks to deal with the issue – for example, a regression with fixed effects.

⁸Capes is a Brazilian institution that classifies the quality of economy journals.

⁹Journals classified by Capes as A1 or A2 in the Classification of Journals of the 2013 to 2016 Quadrennium.

¹⁰Examples of awards: Prêmio do Tesouro Nacional, Prêmio Confederação Nacional da Indústria (CNI) de Economia and Prêmio Banco Central de Economia e Finanças.

these cases, the selection is made by employees of the institution itself.¹¹ June 2019 was established as the cut-off date so that only studies published or presented to date would be considered. It is also worth mentioning that studies that are not public were not included.

In summary, the systematic literature review includes studies that simultaneously meet the following criteria:

- use data and employ an estimation method to seek to identify a causal relation involving the BNDES; and
- published in journals, presented at congresses, awarded or, in the case of master's dissertations and doctoral theses, defended until June 2019.

We mapped 70 studies that met these criteria.¹² They are classified by topic based on the issues they investigate. The same study can address more than one topic. Most themes deal with the effects of the BNDES's operations – two examples are effects on investment and productivity. There are also themes that address variables that can explain the BNDES's performance – one example is the topic of political connections. The themes addressed in at least three studies have a specific subsection, in which the main results are presented. However, if there are fewer than three studies on a topic, it is understood that the available evidence is limited. In this case, there is no specific subsection on the topic, but the study is covered in the "Miscellanea" subsection, which discusses all the topics on which there are fewer than three studies.

The analysis of the result of each study takes into account the sign and the statistical significance of the estimates obtained, without considering the magnitude.¹³ Thus, the result of each study is classified as positive (statistically significant and positive), negative (statistically significant and negative), null (statistically not different from zero) or mixed. The result is classified as mixed if it varies according to the specification, sample or method used – for example, positive and statistically significant coefficient in one specification and statistically nonsignificant in another specification. There are some cases in which the distinction between positive and mixed results can be subtle. For example, in a study in which the effects are estimated by cohort treatment, positive and significant estimates are obtained for most years, and null estimates are obtained for some years. In situations such as this,

¹¹This is the case of Revista do BNDES, for example.

¹²We consulted several databases – for example, Google Scholar and the Brazilian Digital Library of Theses and Dissertations – searching for the term "BNDES."

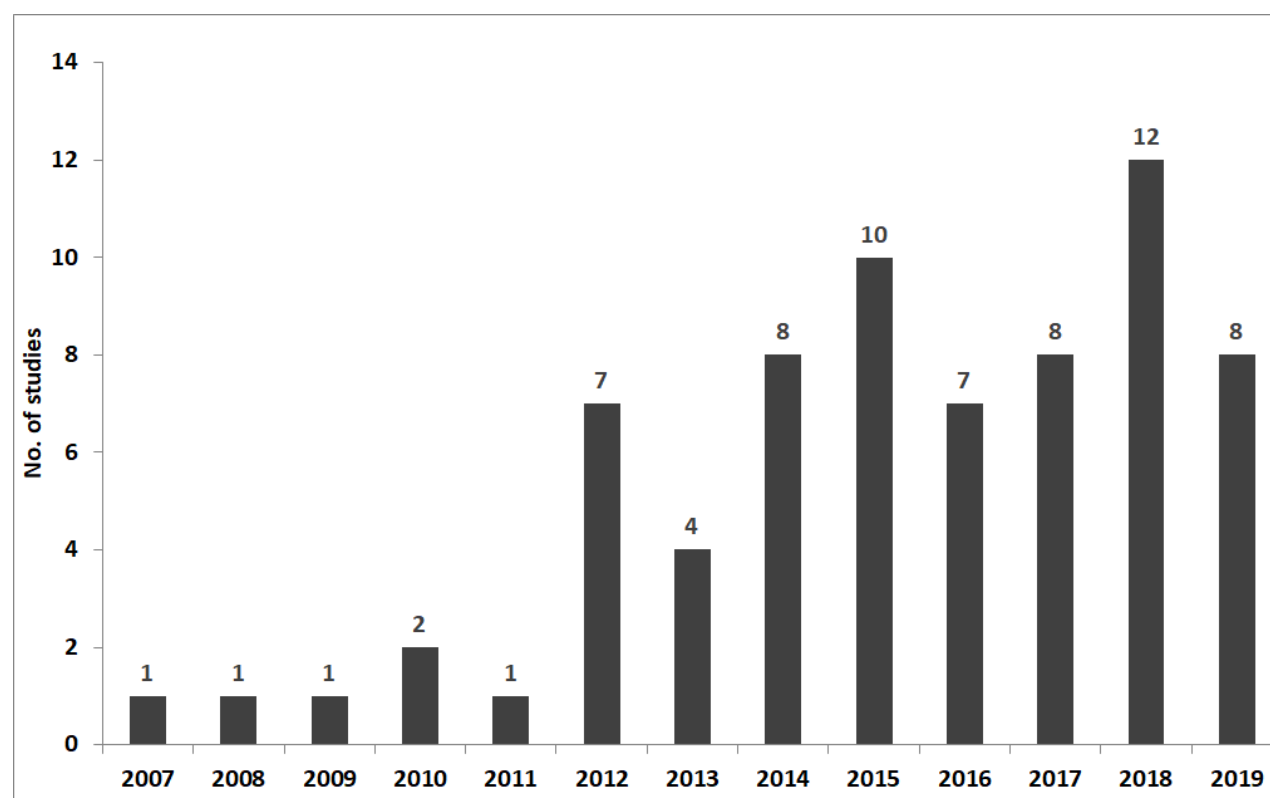
¹³It is difficult to analyze the magnitude of the estimates because the dependent variables vary across the studies. For example, among the studies that investigate the impact of the BNDES on investment, there are those that measure investment: (i) by level; (ii) by logarithm; (iii) by rate; (iv) deducted from the value of the BNDES financing.

the interpretation of the author(s) is favored. If the author(s) highlight(s) in the text that the result varies according to the cohort, then the evidence is classified as mixed. However, if the author(s) highlight(s) the positive and significant estimates found for most of the years, then the result is considered to be positive.

2.2 Description of the studies considered

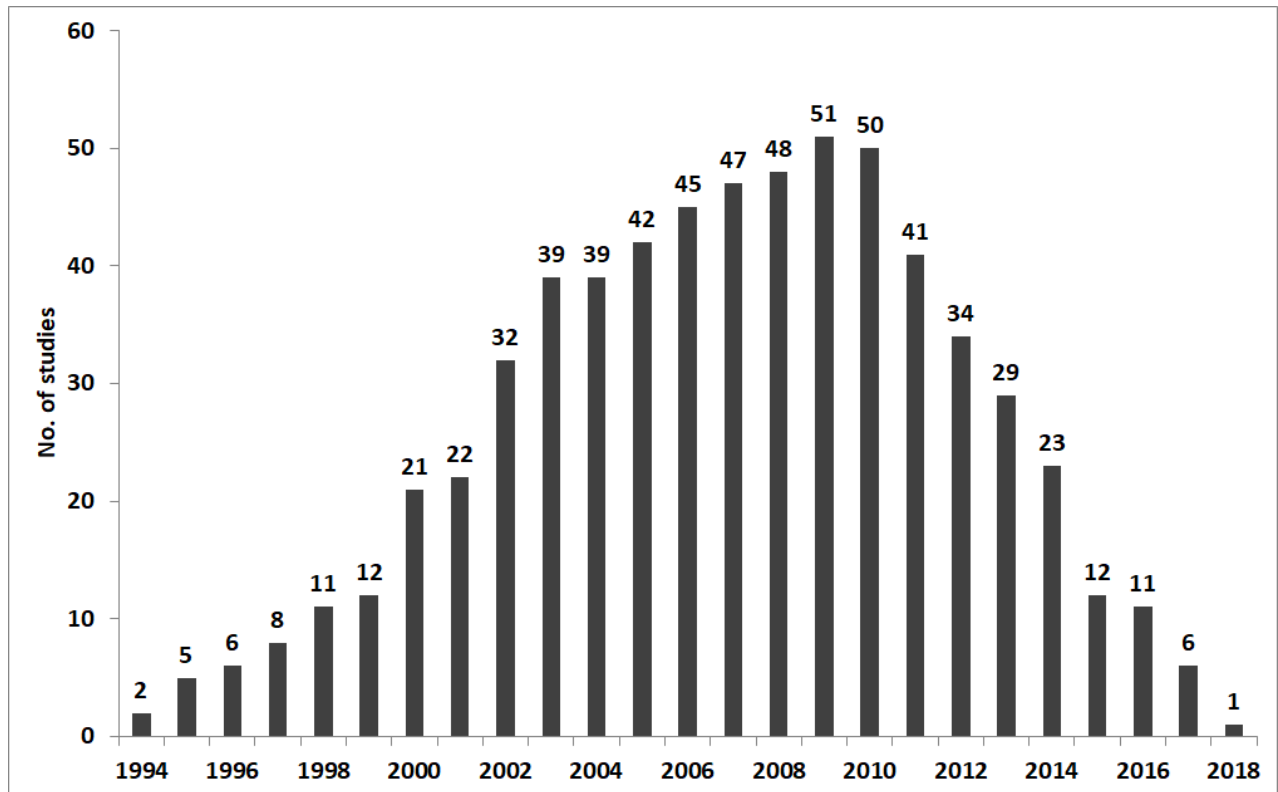
The studies included in the literature review are relatively recent. As shown in [Figure 2](#), 64 of the 70 studies were released in 2012 or later. Two factors may help explain the greater production of studies in this period: (i) growth the BNDES's disbursements, as seen in [Figure 1](#), and the discussion that ensued; (ii) the full disclosure of data on the BNDES's operations on its website.

Figure 2: Distribution of studies by year of publication



[Figure 3](#) shows, for each year, how many studies include the year in their analysis period. The most analyzed year is 2009; it is included in the analysis period of 51 of the 70 studies. However, there are fewer studies covering the 1990s and the period from 2016 onwards – the latter period is characterized by a reduction in BNDES disbursements.

Figure 3: Number of studies that include the year in their analysis period



The distribution of studies by type of publication is shown in [Figure 4](#). Among the 70 studies, 28 were master's dissertations, and 16 were presented in congresses. The articles published in journals represent approximately 25% of the studies considered.

Figure 4: Distribution of studies by type of publication

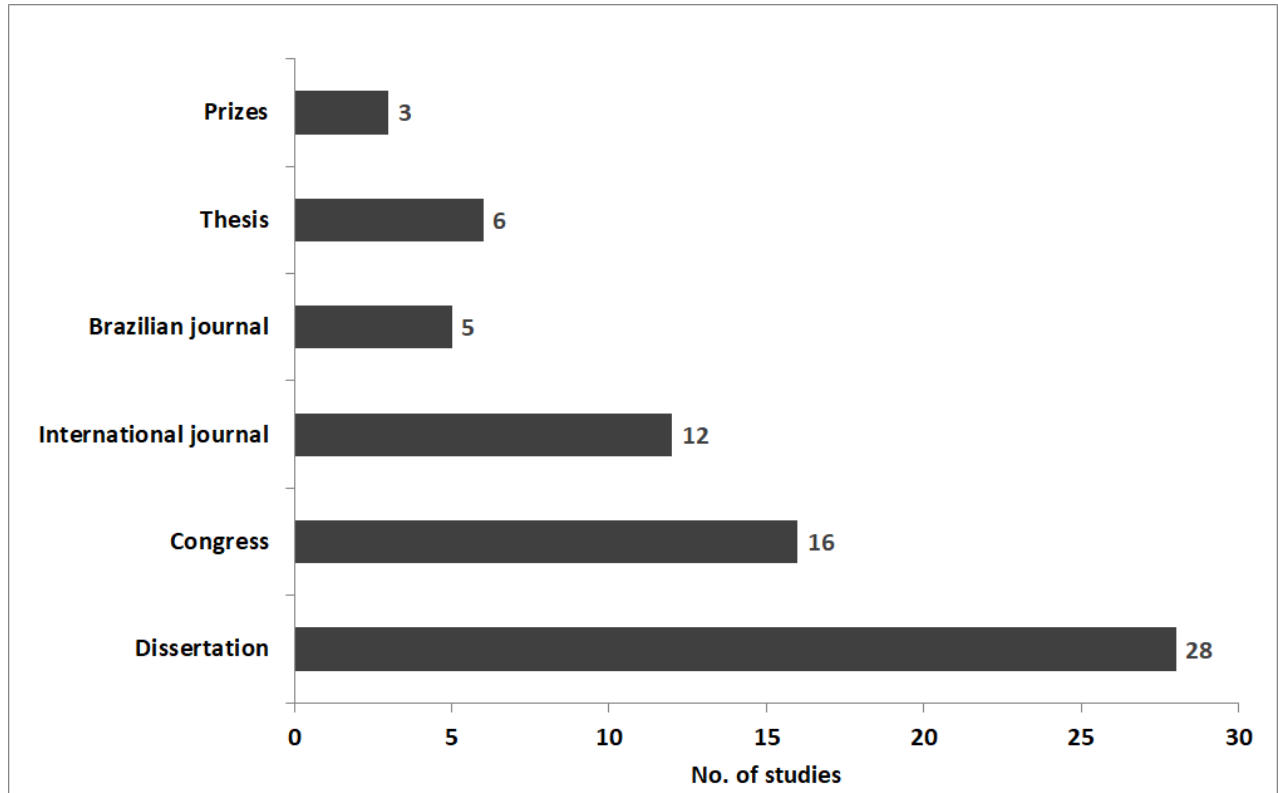
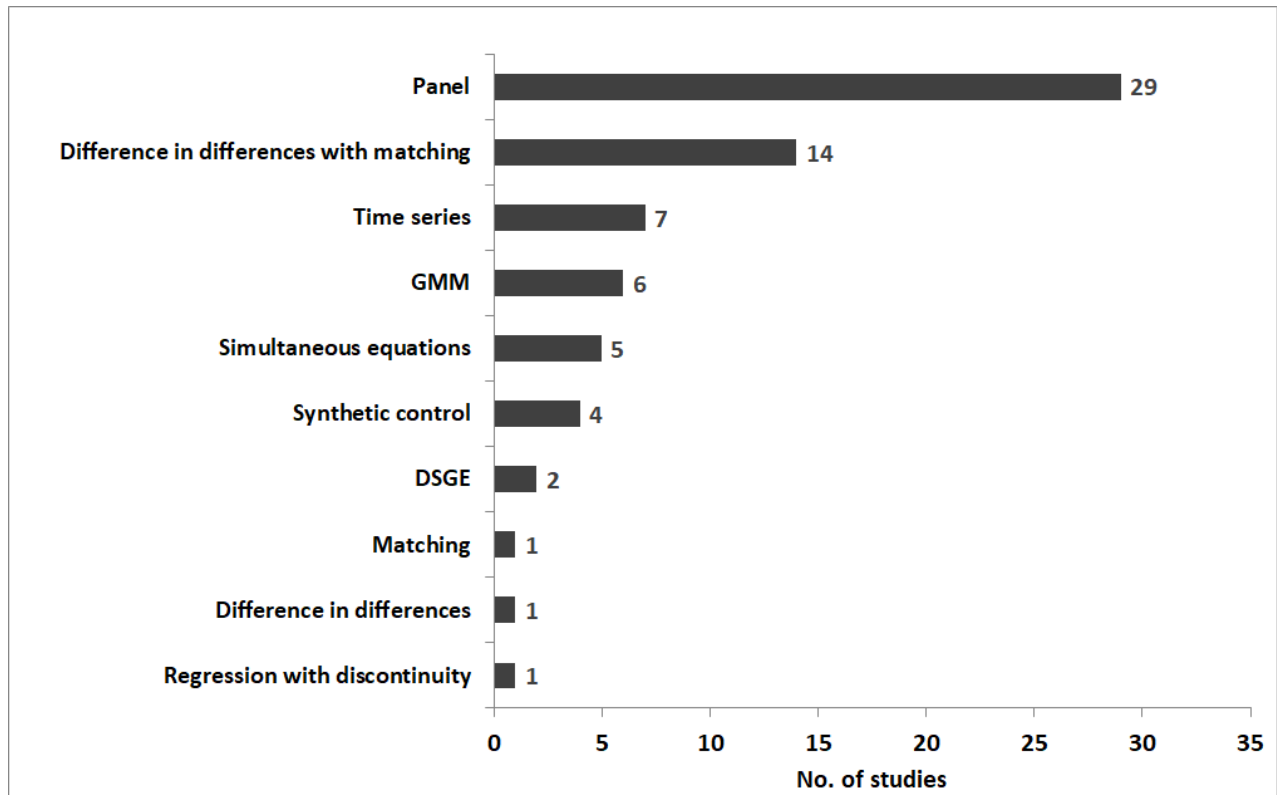


Figure 5 shows the distribution of the studies by method employed. Basic panel methods,¹⁴ such as a regression with fixed effects, are the most commonly used in the studies considered. There are also a considerable number of studies that combine matching techniques with difference in differences.¹⁵ However, there are few studies that apply the methods considered most appropriate to isolate causality: only one study applies difference in differences based on an exogenous variation, and only one employs a regression discontinuity design. This illustrates that, given the difficulty in obtaining an exogenous variation that helps identify a causal relation involving the BNDES, the literature has resorted to panel methods to deal with unobservable factors fixed over time.

¹⁴Dynamic panel methods are counted in the generalized method of moments (GMM) category.

¹⁵Several studies use nearest-neighbor matching and then apply an estimation by the difference in differences method in the paired sample.

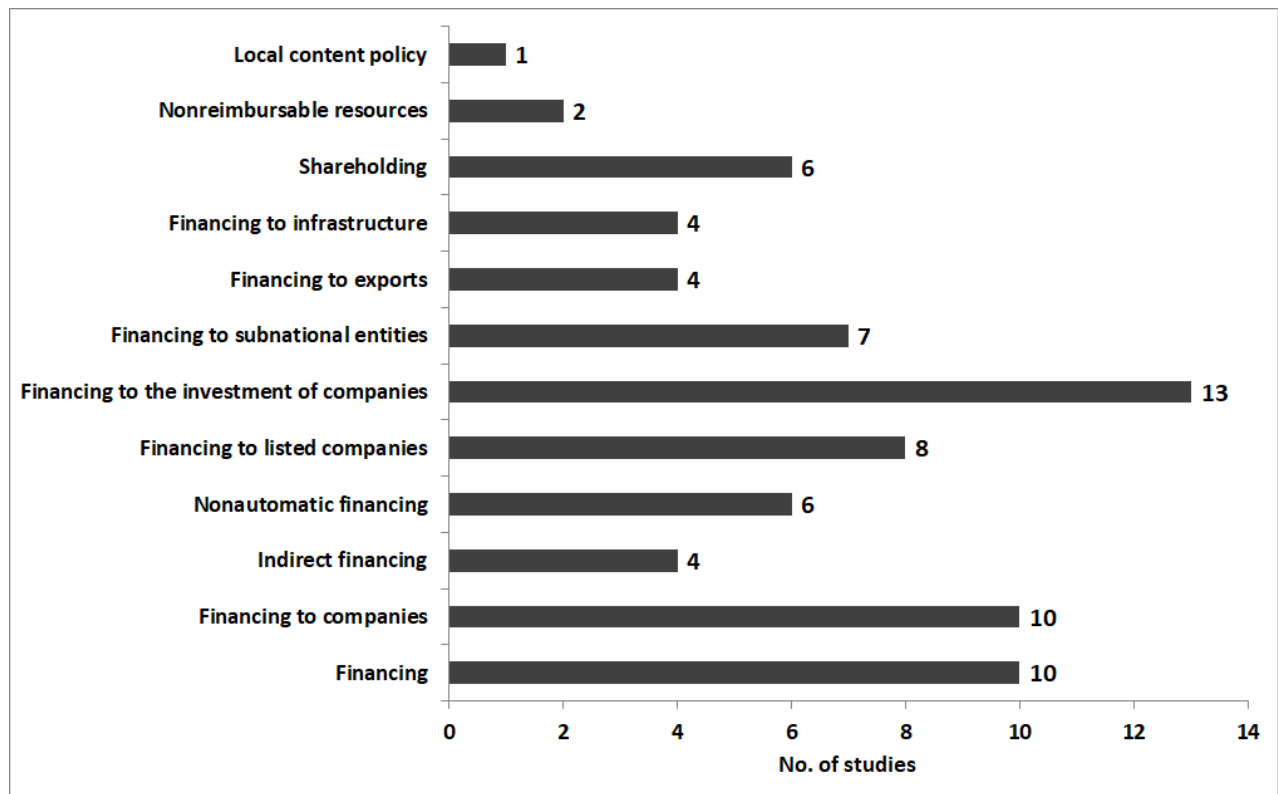
Figure 5: Distribution of studies by method employed



Notas: (1) Panel includes basic panel methods, such as fixed effects and random effects. (2) GMM stands for generalized method of moments. Dynamic panel methods are counted as GMM. (3) DSGE stands for Dynamic Stochastic General Equilibrium.

Figure 6 lists the types of BNDES support analyzed in the studies. There are several studies that do not differentiate BNDES support: 10 consider all BNDES financing ("Financing" category in Figure 6), and 10 consider all financing to companies ("Financing to companies" category). However, most studies direct the analysis to some aspect of the BNDES's operation. The selection can be based on the characteristics of the entity obtaining financing, the objectives of financing or the form of support. Although the categorization shown in Figure 6 is not exhaustive, it illustrates the diversity of selections present in the studies.

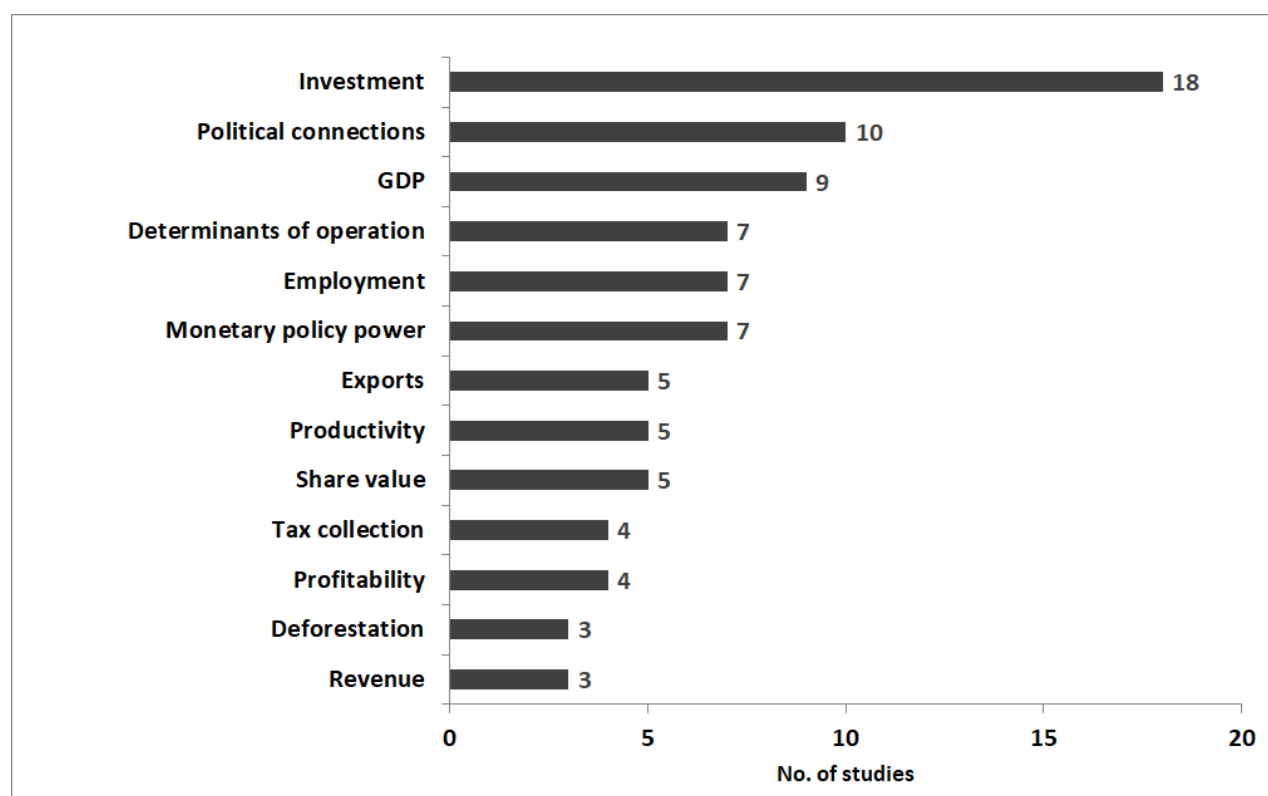
Figure 6: Number of studies by type of support analyzed



Notes: (1) The categories presented are not exhaustive and contain intersections. (2) The same study can analyze more than one type of support. (3) The “Financing” category includes studies that analyze all BNDES financing, without distinguishing between them. (4) The “Financing to Companies” category includes studies that analyze all BNDES financing to companies, without distinction between them. (5) The “Financing for business investment” category includes studies that analyze BNDES products that finance investment, such as BNDES Finame, BNDES Automático and BNDES Finem.

Figure 7 shows the number of studies that investigate each topic. As mentioned, each topic must have at least three studies. Among the 13 topics, 11 concern the effects of the BNDES, and two (“political connections” and “determinants of operation”) investigate which variables explain the operation of the BNDES. The topic with the largest number of studies is “effect on investment,” which makes sense given that most of the BNDES instruments finance investments. The effect on investment is direct, while the other effects analyzed – on productivity and profitability, for example – derive from the effect on investment.

Figure 7: Number of studies by topic investigated



Note: A study can address more than one topic, which is why the sum of the lines in this graph exceeds 70.

3 What we know: a summary of the evidence

This section is divided into 13 subsections. Each subsection refers to a topic about the BNDES.¹⁶ The choice of topics was based on the following criterion: if there were at least three empirical studies on that subject, then there was a minimum body of evidence to justify a subsection. The topics covered in fewer than three studies are discussed in the subsection entitled “Miscellanea”. In addition, it is important to be clear that all sections relate to studies based on causal effects. This means that the studies compared the result of the BNDES’s operation with what would have happened in the absence of this operation. If a causal analysis shows a positive effect, then one can speak of additionality. For example, if a study shows a positive effect of the BNDES on investment, this suggests that the Bank was able to finance an investment that would not have happened without its intervention.

¹⁶There is an exception, as one subsection deals with employment and revenue.

3.1 Effects of BNDES on investment

The BNDES is the main instrument of the federal government to support productive investment in Brazil. The Bank's mission, according to the institution's website, is "*To enable financial solutions that add investments for the sustainable development of the Brazilian nation*". Thus, it is worth asking: Has the BNDES been able to add investments to the Brazilian economy?

Table 1 shows the various articles that tried to answer this question. There are 18 studies in total, 10 of which indicate a positive effect of the BNDES on investment, while five indicate a null effect, and three show mixed evidence.

Table 1: Summary of works on the effects of BNDES on Investment

Reference	BNDES instrument	Data base	Result
Vivacqua (2007)	BNDES	Económica	Positive
Ribeiro and De Negri (2009)	Public credit for innovation	PIA and PINTEC	Positive
Inoue, Lazzarini and Musacchio (2013)	BNDES Stock Market	Económica	Mixed
Machado et al (2014)	PSI Finame	PIA	Positive
Lazzarini et al (2015)	Financing or Shareholding	Económica	Null
Bonomo, Brito and Martins (2015)	BNDES Direct	Económica	Null
Machado and Roitman (2015)	PSI Finame	PIA	Positive
Lavieri (2015)	BNDES	PIA. PAS and PAC	Mixed
Brigante (2016)	BNDES Innovation	Pintec	Null
Monteiro (2017)	BNDES Direct	Económica	Positive
Eclache da Silva (2017)	BNDES	Económica	Positive
Alves, Silva and Moraes (2017)	BNDES	Webscraping	Mixed
Machado, Martini and Gama (2017)	BNDES Innovation	Pintec	Positive
Cavalcanti and Vaz (2017)	Those used by small companies	PIA	Positive
Castro (2018)	Public credit	BCB and IBGE	Null
Santos Silva (2018)	BNDES	Económica	Null
Oliveira, F. (2019)	BNDES	Serasa and Económica	Positive
Barboza and Vasconcelos (2019)	BNDES and BNDES Finame	Monitor do PIB	Positive

Most of the evidence suggests that the institution has been able to add investments to the supported firms and to the economy. However, before proceeding, it is important to understand which BNDES products could increase the investment of the supported companies and the country. This is important, as there is a pattern in the available evidence.

The BNDES has four products that can *directly* affect investment: (i) BNDES FINAME, intended for the acquisition of machinery and equipment; (ii) BNDES Finem, aimed at larger

investment projects (currently over R\$ 10 million); (iii) BNDES Automático, for smaller investment projects; (iv) Cartão BNDES, intended to finance the investment of micro, small and medium-sized enterprises (MSME). In addition, there are products that can *indirectly* impact capital formation, such as BNDES Exim, as well as programs that seek to foster investment, with BNDES PSI – which was in force between 2009 and 2015 – being the most controversial and outstanding example.

That said, it is noted that there is a pattern among the articles: most of those that focused on assessing instruments aimed at increasing investment found positive and statistically significant effects from the Bank. In addition, most of those that found null or mixed evidence made an indistinct aggregation of several BNDES's credit lines, not focusing the assessment on instruments that were intended to expand investment.

However, what mechanisms would make the BNDES's products effective in increasing the investment of firms or of the country? There are several possible channels, and the literature does not have a clear answer: (i) in case the financed companies are credit constrained, the BNDES may have acted to alleviate the restriction, allowing a higher level of investment; (ii) in case they are companies with long-term projects, with no market willing to finance at such maturity, the BNDES may have completed the market and made the projects possible; (iii) in case of projects with positive externalities, the Bank's operation may have prevented the underinvestment that is characteristic in this type of situation; (iv) BNDES may have increased investment because it had a lower interest rate than the market, allowing a greater amount invested; (v) the BNDES may have increased banking competition, reducing *spreads* and the cost of capital and enabling more investments in the country.

Discussing the mechanisms is important, as there is a second pattern among the articles, which concerns the databases considered by each study and the results obtained (see third column of Table 1). Most studies that found the BNDES had a null effect on investment used Economática as a data source (in this case, data from publicly traded firms).¹⁷ However, most studies that found a positive effect used the Annual Industrial Survey (PIA) or the Technological Innovation Survey (Pintec), which are databases that more faithfully represent the universe of Brazilian companies, with a high concentration of small and medium-sized and private equity firms.

Publicly traded companies should not be credit constrained, as they have access to the capital market. It is natural, therefore, that the BNDES has a smaller effect (or null effect) in these cases. Smaller and/or private equity companies, however, have greater difficulty in accessing resources in the credit market. This may explain the BNDES's effectiveness in

¹⁷Note that this is different from stating that all works that used Economática found null effects

lending to this mass of clients. Given that subsidized interest rates were present in almost all loans (to public companies and to MSMEs), but a positive effect was found only in evaluations that considered mostly MSMEs, it is possible that the main (but not the only) mechanism of effectiveness of the BNDES is the easing of credit restrictions – common in MSMEs, but not in publicly traded companies.

Regarding the articles' methodologies, it is worth mentioning that there is no clear methodological pattern. The specific statistics vary. There are articles that analyze investment and others that evaluate the investment rate. In relation to econometrics, most evaluations (sixteen of eighteen) are conducted at the firm level through treatment and control groups to determine the causal effect from the BNDES's support, including regressions with fixed effects. There are only two macroeconometric evaluations, trying to measure the impact of the BNDES on aggregate investment.

It is also worth mentioning that the sample periods investigated by each article are different. This diversity could suggest that certain phases of the BNDES's operation were more effective than others, explaining the diversity of results. However, such a pattern was not found.

Finally, the important thing for public policy purposes is to quantify the BNDES's additionality, that is, how much each \$1 BRL disbursed by the Bank generated in new investments (which would not have occurred in the absence of BNDES). Unfortunately, few studies have conducted this evaluation. [Barboza and Vasconcelos \(2019\)](#) found that each \$1 BRL of BNDES loans increased the investment on average by \$0.46 BRL between 2002 and 2016. In the case of BNDES Finame loans, each \$1BRL increased the investment on average by \$0.73 BRL. [Machado et al. \(2014\)](#) obtained an additional investment from BNDES PSI of \$1.18 BRL in 2009 and \$0.58 BRL in 2010. These values suggest that the Bank has positive effects on investment (especially in times of crisis), but there is some degree of source substitution and/or *crowding-out* effect at the Bank's operation.

Thus, let us conduct a more critical analysis of the works that deal with the relation between the BNDES and investment. We will focus on the studies with the greatest academic impact (published in journals classified by Capes as A1) and with the greatest impact on the public discussion on the BNDES.

[Bonomo et al. \(2015\)](#) investigate the capacity of the Bank's direct credit to affect the investment of listed companies. The results show that access to BNDES direct credit has a statistically indistinguishable from zero effect on the investment rate of firms. This would suggest high source substitution in the Bank's operations. There are, however, some is-

sues that stand out in such an article. First, the econometric specification used considers a gap of one year between access to BNDES direct credit and its effect on investment, which is questionable, since BNDES disbursements either happen in the same year in which the investment is made or they happen *a posteriori* (reimbursing the company for the investment made). Second, the article found that access to BNDES credit does not increase the firms' investment (supposedly due to source substitution), but at the same time, it found that firms' investment is sensitive to cash flow – which would be a credit restriction indicator incompatible with source substitution. Third, the article found that BNDES credit does not reduce firms' financial expenses, contrary to the idea that companies are replacing an expensive source with a subsidized source. Fourth, the article found that the financial expenses of the firms that accessed the BNDES in the postcrisis period are higher (and not lower, as it should be the case if companies are replacing expensive sources with cheap ones). Fifth, the article found that firms' access to other earmarked credits, which include BNDES indirect credits, reduces firm investment, which is counterintuitive, given the more advantageous credit conditions.

In another work that had a great impact on the public discussion, [Lazzarini et al. \(2015\)](#) investigated whether the BNDES's operation, via credit or via *equity*, had any impact on the investment of supported publicly traded firms. The estimates suggest that the Bank has a statistically null effect on the vast majority of specifications, which would suggest source substitution. In fact, in this article, the authors found, in another estimation, that the BNDES has negative effects on the financial expenses of supported firms, which is consistent with source substitution – and different from what was found by [Bonomo et al. \(2015\)](#).¹⁸

Among the studies that found positive effects, [Cavalcanti and Vaz \(2017\)](#) stand out for using exogenous sources of variation (changes in the definition of company size) to determine the impact of better BNDES credit conditions on the investment rate of small firms. The validity of the identification strategy lies in the argument that the variation in the classification of small-sized firms occurred exogenously to the firms, which could not anticipate the change. The results of the estimates suggest that better permanent BNDES credit conditions increase the investment rate of firms by 33.9%. These results are obtained, considering fixed effects of firms and diverse controls. However, there are criticisms of the article by [Cavalcanti and Vaz \(2017\)](#). First, the magnitude of the BNDES's effect does not

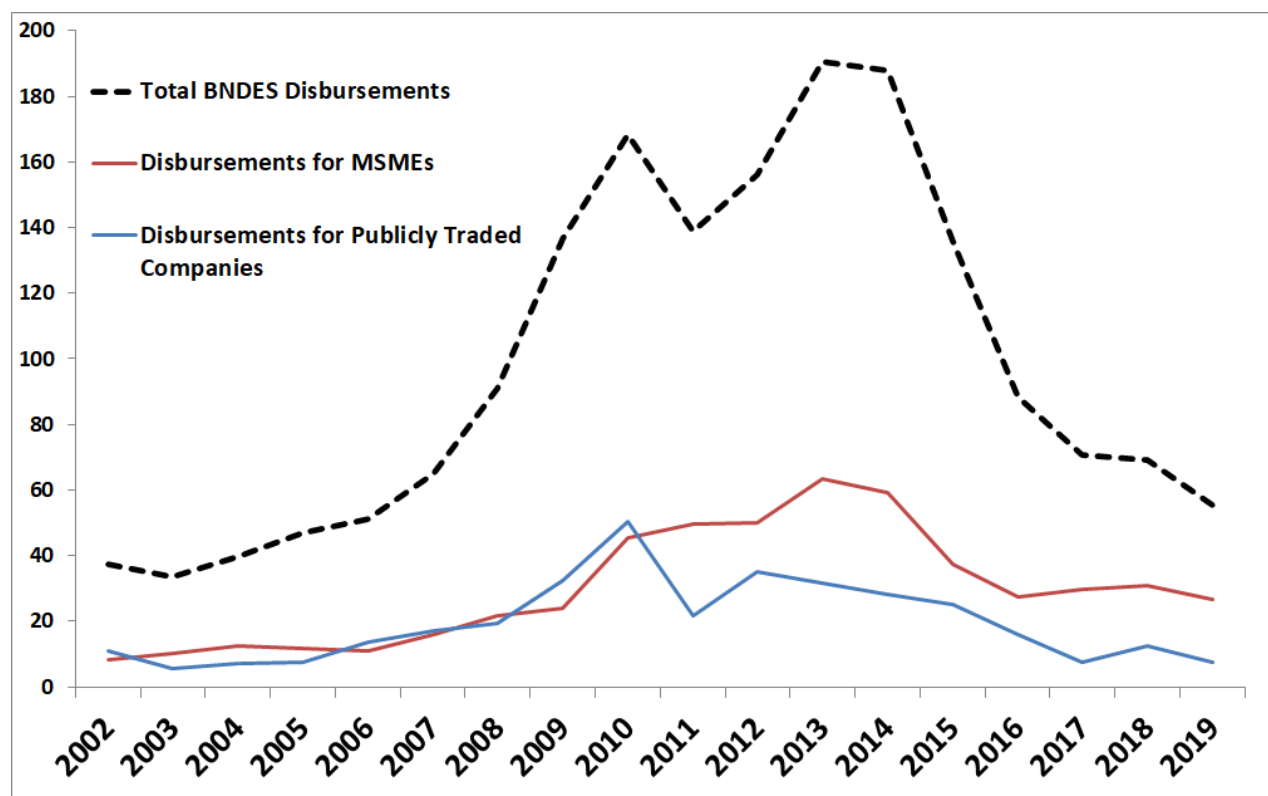
¹⁸The same null effect of BNDES on the investment of publicly traded firms was obtained by [Santos Silva \(2018\)](#), but in a work for which the determination of the effects of the BNDES is not so clear. [Castro \(2018\)](#) found evidence using a DSGE model and found positive effects, but their magnitude was so small that the author considered the effect to be null.

appear robust, with wide variation depending on the inclusion of controls and fixed effects. Second, the identification strategy does not consider the firms effectively treated by the BNDES but the entire universe of companies affected by the change in the Bank size classification, which may represent a mitigation bias, with the effects of the BNDES being potentially even greater on investment¹⁹.

As mentioned earlier, a common pattern among the studies finding that the BNDES has positive effects is the use of databases with a large number of MSMEs. On this point, it is interesting to oppose a common view in the Brazilian public discussion (that BNDES has a null effect on investment) with the available empirical evidence. The view that the BNDES does not impact investment comes from the results obtained by articles that analyze the effect of the BNDES on publicly traded companies. However, in addition to the fact that it is not correct to generalize specific results obtained at the firm level as if they were representative of the aggregate effect of the BNDES, it is important to mention that the share of publicly traded companies receiving BNDES disbursements has been much smaller than the share of MSMEs (see [Figure 8](#)). The available evidence suggests that the Bank has been effective in supporting MSMEs.

¹⁹Several other articles found positive effects of BNDES on the investment of firms. [Machado et al. \(2014\)](#) and [Machado and Roitman \(2015\)](#), in particular, analyzed the effects of the BNDES PSI on the investment of the supported companies, but restricted to the first years of the program (2009 to 2011). As credit conditions were very favorable in those years and as those years were close to the crisis, it is natural that there the BNDES had a positive effect in that period. There are doubts, however, about the validity of these results for the years following the BNDES PSI (which continued until 2015), when the economy no longer needed countercyclical action. [Vivacqua \(2007\)](#), [Ribeiro and De Negri \(2009\)](#), [Machado, Martini and Gama \(2017\)](#), [Eclache da Silva \(2017\)](#) and [Oliveira \(2019\)](#) also found positive effects of the BNDES on investment with different methodologies and estimation methods. A null effect of the BNDES on the investment of publicly traded firms was obtained by [Santos Silva \(2018\)](#), but in a work for which the determination of the effects of the BNDES is not so clear.

Figure 8: BNDES disbursements: total, for MSMEs and publicly traded companies (R\$ bi)



Sources: BNDES and Comissão de Valores Mobiliários (CVM).

To investigate the effect of the BNDES on the aggregate investment of the economy, macroeconomic investigations are necessary. The only study published in a journal classified by Capes as A1 is [Barboza and Vasconcelos \(2019\)](#). Its results are compatible with the microeconomic evidence. The additionality obtained, between \$0.46 BRL and \$0.73 BRL of new investments generated for each \$1 BRL borrowed, shows that Bank has positive and statistically significant effects on gross fixed capital formation in the Brazilian economy, but it also suggests some source substitution and/or *crowding-out* effect from the Bank. This result indicates that there would be room for a greater focus on the Bank's loans, reallocating disbursements that previously flowed to companies not restricted to credit (such as publicly traded companies) towards restricted companies (typically MSMEs).

3.2 Effects from BNDES on employment and revenue

As determined by the Constitution, the BNDES receives resources from the Workers' Support Fund (in Portuguese, Fundo de Amparo ao Trabalhador, FAT). It is natural, therefore,

that the evaluation of the impact of the BNDES on employment is highlighted in the literature. There are two lines of investigation. One analyzes the effect on employment in the financed firms. Another line of investigation studies the effect on employment without being restricted to financed firms, covering the municipality in which the investment is made or the firms producing the capital goods whose acquisition is financed.

Most evaluations focus on the effect on employment in the financed companies. The BNDES instruments analyzed in these evaluations are generally used to finance investment. Hence, two conditions must be met for these instruments to have a positive effect on employment: i) the financing must increase investment, and ii) the added investment must lead to increased employment. For example, financing obtained for the construction of a new plant has a positive effect on employment in the financed company if investment increases and if the increase in installed capacity leads the company to hire new employees. In this example, the larger scale of production would induce an increase in employment, as well as an increase in the firm's revenue. Perhaps that is why several of the studies that assess the impact of the BNDES on employment also analyze the impact on revenue, which is why this subsection analyzes the two variables.

The studies that assess the impact on financed companies are listed in Chart A of [Table 2](#). Four of the five studies analyze a wide range of financed companies of various sizes. The exception is [Gonçalves \(2013\)](#), which evaluates nonautomatic financing – for which the value exceeds a minimum threshold and which are submitted to analysis by the BNDES. In this case, the number of financed companies is relatively small²⁰, and the amount is, in general, larger. Regarding the methodology, it should be noted that [Coelho and De Negri \(2010\)](#) seek to estimate how the treatment effect varies over the distribution, which is known as the quantile treatment effect.

²⁰The number of financed companies is less than or equal to 101 – this is the number of financial transactions analyzed.

Table 2: Summary of works on the effects from BNDES on employment and revenue

Reference	Evaluated instrument	Evaluated variable	Result
CHART A: Effects on financed firms			
Ribeiro and De Negri (2009)	Public credit for innovation	Employment Revenue	Positive Positive
Coelho and De Negri (2010)	BNDES	Employment Revenue	Positive Positive
Gonçalves (2013)	BNDES nonautomatic financing	Employment Revenue	Null Null
Maffioli et al (2017)	BNDES and Finep	Employment	Positive
Tabajara (2019)	BNDES indirect financing	Employment	Positive
CHART B: Effects not restricted to financed firms			
Assunção, Costa and Szerman (2016)	Construction of hydroelectric plants	Employment	Positive
Pinto, Grimaldi and Martini (2018)	BNDES local content policy	Employment	Positive

The results obtained by four of these five studies point to a positive effect on employment in the financed companies. [Ribeiro and De Negri \(2009\)](#) and [Coelho and De Negri \(2010\)](#) also obtain evidence of a positive effect on revenue, which is consistent with the hypothesis of an increase in the activity level of financed companies. [Gonçalves \(2013\)](#) differs from the others by not finding a statistically significant impact on employment and revenue. This may be related to the profile of the firms supported through the instruments analyzed. These are larger companies, on which the evaluations of the impact of the BNDES on investment, in general, do not find positive results, as discussed in the previous subsection.

There are also studies that seek to deal with effects on employment that may not be restricted to the financed companies. The financing of an investment project may have an effect on employment in construction during the project's implementation phase. The financing may also impact employment in economic activities that produce the inputs or capital goods used in the financed ventures. The studies that do not focus only on financed companies are listed in Chart B of [Table 2](#).

[Assunção et al. \(2016\)](#) estimate, through the synthetic control method, the effect of the construction of hydroelectric plants – most of which are financed by the BNDES– on formal employment in the municipality where the construction is executed. The conclusion is that the average effect is positive in the first five years after the start of construction, although the intensity of this effect shows an increasing trajectory until the second year and a decreasing trajectory after that.

[Pinto, Grimaldi and Martini \(2018\)](#) analyzed the effect on employment in companies that

manufacture capital goods that can be acquired with BNDES financing. The Bank's financing for the acquisition of capital goods is subject to local content criteria: those that meet the criteria undergo an accreditation process and may be financed. The estimates indicate that for a company that manufactures capital goods, having accredited products positively impacts employment.

In summary, studies dealing with the effect of the BNDES on employment found, in most cases, positive results. Among those that analyze employment in financed companies, there is favorable evidence when considering instruments that are not restricted to large companies. In these cases, a positive impact on revenue is also estimated. There are also evaluations that found a positive effect on employment in the municipalities where the investments were made and on companies that manufacture capital goods that can be acquired with BNDES financing.

3.3 Effects of the BNDES on exports

In addition to having the institutional mission of adding investments to the country and, to finance this endeavor, use public resources from FAT, which keeps its focus always associated with fostering employment, the BNDES has credit lines that aim to support exports – as is common in development banks. Therefore, we should expect the Bank's operation to positively impact the exports of financed firms. This impact could occur either *directly*, that is, without being through another variable, or *indirectly*, since other support instruments of Bank may impact exports. Examples: (i) financing for investment in a new production plant may allow the expansion of the exported volume; (ii) financing for an investment that increases productivity may enable entry into the international market.

Among the five studies that investigate the effect of the BNDES on exports, presented in Table 3, four evaluate the impact of BNDES Exim, a product of export support lines. [Silva \(2012\)](#), [Schmidt \(2012\)](#), [Galetti and Hiratuka \(2013\)](#) and [Alvarez, Prince and Kannebley Junior \(2014\)](#) used data by company and considered supported those that took BNDES Exim financing²¹. There are also other similarities between the impact assessments of BNDES Exim: (i) all restrict the sample to industrial exporting companies and perform the matching; (ii) three include the period from 2000 to 2007. Although the BNDES Exim impact assessments analyze the impact on export performance, they measure export performance in different ways. As shown in [Table 3](#), positive and significant impacts of BNDES Exim

²¹In some BNDES Exim financing, the borrower is not a Brazilian company but a foreign company or government. Financing transactions when the borrower is not a Brazilian company are not included in these studies.

were found on most export performance measures. Even if, in the case of [Schmidt \(2012\)](#), the results are not maintained in all cohorts of supported companies – which is why the evidence for some variables is considered mixed – there is, in general, convergence in the conclusion that BNDES Exim has a positive effect on export performance.

Table 3: Summary of works on the effects from BNDES on Exports

Reference	BNDES instrument	Evaluated variable	Result
Silva (2012)	BNDES Exim	Number of consecutive years in which the company exports	Positive
Galetti and Hiratuka (2013)	BNDES Exim	Exported value	Positive
Alvarez, Prince and Kannebley (2014)	BNDES Exim	Number of consecutive years in which the company exports	Positive
		Number of countries to which the company exports	Positive
		Exported value per employee	Positive
Schmidt (2012)	BNDES Exim	Exported value	Mixed
		Number of products exported	Mixed
		Number of countries to which the company exports	Mixed
		% of exports to countries outside Mercosur	Positive
		% of exports of medium- and high- technology products	Null
		Number of exported medium- and high-technology products	Mixed
		Average value of exports per product	Mixed
Maffioli et al (2017)	BNDES and Finep	Average value of exports per country	Mixed
		Exported value	Positive
		Indicator that the company exports	Null

[Maffioli et al. \(2017\)](#) also investigated the impact on export performance, but the analysis covered all financing transactions of the BNDES and Finep – and not just those carried out within the scope of export support lines. There is evidence that access to BNDES or Finep credit has a positive impact on exported value but has no effect on the probability of exporting. The authors interpret this result as indicating that public credit impacts the volume exported by companies that were already exporters but does not seem to contribute to the entry into the international market of those that did not export.

In summary, the four studies that evaluated BNDES Exim obtained evidence of a positive impact on export performance. When the analysis is extended to all BNDES and Finep financing, there is a positive effect on the exported value but not on the probability of exporting.

3.4 Effects of the BNDES on the GDP

What is the effect of BNDES credit on the GDP? This question is highly correlated with what was discussed in the previous three subsections. After all, if the Bank is able to add investments, employment and exports to the economy, we should expect that the GDP would be positively affected by the institution. However, there are complicating factors in this relation. First, because the vast majority of the evidence presented occurred at the firm level, its generalization for the aggregate level is not necessarily correct (see, for example, [Castro, 2018](#)). Second, because the Bank's effects on investment and exports can be offset by other demand components (via consumption, for example), making the impact on the GDP unknown *a priori* (see, for example, [Furtado and Barboza, 2020](#)).

Therefore, it is important to assess the effective impact of the BNDES on the GDP. In the literature, there are nine articles dedicated to this task, most of them focusing on the regional GDP (especially at the municipal level) and only two focusing on the aggregate level of the Brazilian economy. A summary of the nine articles is shown in [Table 4](#).

Table 4: Summary of works on the effects of BNDES on GDP

Reference	BNDES instrument	Analyzed Variable	Result
Barbosa-Filho (2011)	BNDES	Northeast GDP	Null
Burns (2012)	BNDES	Municipal GDP	Positive
Wegelin (2014)	BNDES	Municipal GDP	Positive
Assunção et al. (2016)	BNDES Finem	Municipal GDP	Positive
Martini et al (2018)	BNDES Finem	Municipal GDP	Positive
Maitino (2018)	BNDES	Brazil output gap	Positive
Machado (2018)	BNDES Infra	Regions GDP	Mixed
Barboza and Vasconcelos (2019)	BNDES	Brazil GDP	Positive
Zanchi (2019)	BNDES Direct and Indirect	Municipal GDP	Mixed

BNDES instruments, the affected variables, the evaluation methods and the sample period are very different between the articles. There are, for example, studies that use data on infrastructure construction at the municipal level, through synthetic control, and aggregate studies that investigate the effects of total credit on the output gap in Brazil.

[Barbosa-Filho \(2011\)](#) investigates the relation between BNDES financing and the northeast region's GDP. To that end, it uses annual data on BNDES disbursements (between 1994 and 2010) and estimates some vector autoregression models (VAR) in search of impulse response functions. The results obtained for the effects of the BNDES on the northeast

GDP are, according to the author, statistically nonsignificant.²².

Machado (2018) also estimates the effects of the BNDES on the regional GDP, but through a panel model with fixed effects (between 2003 and 2014) and focuses on infrastructure loans for all regions of the country. Unlike Barbosa-Filho (2011), it was found that BNDES disbursements have a large positive effect on the northeast region. The same positive effect would occur in the north, but not in the south, southeast and midwest, which receive most of the institution's disbursements.

Zanchi (2019) also uses a panel model to investigate the effect of the BNDES on GDP *per capita*, but at the municipality level, considering a sample of 5,504 Brazilian municipalities between 2007 and 2016. In addition, the model separates the effects of BNDES direct and indirect credits and considers the possibility of *spillover effects* between municipalities. The estimates obtained indicate that BNDES indirect credit is an effective instrument to increase municipal GDP *per capita*, with each additional \$ 1,000 BRL credit *per capita* increasing the GDP *per capita* of the following year by 0.35%. BNDES direct credit, however, did not prove an effective instrument in the analyzed period, with effects on GDP *per capita* statistically indistinguishable from zero.

Wegelin (2014) investigated the effect of the BNDES on the GDP of municipalities but, for this, used the method based on propensity score matching. The results indicate that between 2006 and 2011, the GDP and GDP *per capita* of the municipalities varied positively because of the treatment. In quantitative terms, the GDP and GDP *per capita* grew, on average, 0.4% more per year in the units that experienced an increase in disbursement growth, and the benefit generated for each \$1 BRL of BNDES disbursement was, on average, an \$0.29 BRL increase in the GDP.

Burns (2012) also assesses the effects of BNDES disbursements per capita on municipal GDP *per capita*, but for the period from 2000 to 2008 and through a *generalized* propensity score. The results suggest a positive and significant relation between the analyzed variables. The magnitude indicates that, assuming that one municipality had disbursements *per capita* 10% higher than the other and that both have the same propensity to obtain credit, the former would have a GDP *per capita* approximately 1% higher.

The BNDES's operations are often linked to the infrastructure sector, which is a permanent goal of the institution. In this sense, Martini et al. (2018) and Assunção et al. (2016) assessed the effects of infrastructure construction on local economies. Martini et al. (2018) focused on the construction of wind farms, and Assunção et al. (2016) focused on the construction

²²The impulse response functions graphs presented by the author do not allow for analyzing the degree of statistical significance of the northeast GDP response.

of hydroelectric plants. Given the relatively small universe of these types of operations, both studies used the synthetic control methodology to obtain an adequate counterfactual. The results of the two evaluations suggest that the construction of energy infrastructure (wind or hydroelectric) has temporary effects on GDP *per capita*, increasing local activity during the first years of the work but dissipating over time, following an inverted U shape.

In quantitative terms, [Martini et al. \(2018\)](#) observed median effects on municipal GDP *per capita* between 7.1% and 9.4%, with a *peak* between two to three years after construction started, using a sample of 34 wind power plants. The effects were more intense for relatively poorer municipalities that received larger parks. [Assunção et al. \(2016\)](#) also found effects on the activity level more focused on the short term, with the construction of 82 hydroelectric plants increasing the growth of the affected municipalities in the first years after construction started. The peak of the median effect occurs in the year following the construction of the work and with a positive magnitude of 6.5% difference in relation to counterfactual growth. This difference starts to decline in the second year and becomes 8% negative in the fourth year after construction. In the fifth year, GDP growth rates *per capita* for treated and control municipalities are almost identical.

Therefore, the evidence suggests that the construction of energy infrastructure (in this case, wind and hydroelectric) has positive effects on local activity while spending in the region lasts, and this effect is more intense in the first years of construction. Although these works may have long-term benefits for the country, due to an increase in energy generation, there were no permanent impacts on the growth rate of the municipalities directly affected by these constructions when in operation.

Regarding the aggregate effects of BNDES disbursements, the available evidence is positive, as seen at the municipal level. [Maitino \(2018\)](#), for example, estimates several IS curve specifications for the Brazilian economy, including regressors that represent BNDES loans. The estimates, made with data between 2003 and 2017, suggest positive and statistically significant effects of the BNDES disbursements on the output gap in various specifications tested. The positive effect of the BNDES on Brazil's GDP was also found by [Barboza and Vasconcelos \(2019\)](#). Although the objective of the article is to determine the effects of the BNDES on investment, the LBVAR model allows for obtaining impulse response functions for several variables in the model.

In summary, most of the available evidence suggests that increases in BNDES disbursements have stimulating effects on local and aggregate activity. This result is consistent with the evidence obtained for investment, employment and exports. In addition, this result legitimizes BNDES to be considered a possible instrument for countercyclical action within

the list of available public policies, as is usual in the literature on development banks (see [Gutierrez et al. 2011](#)).

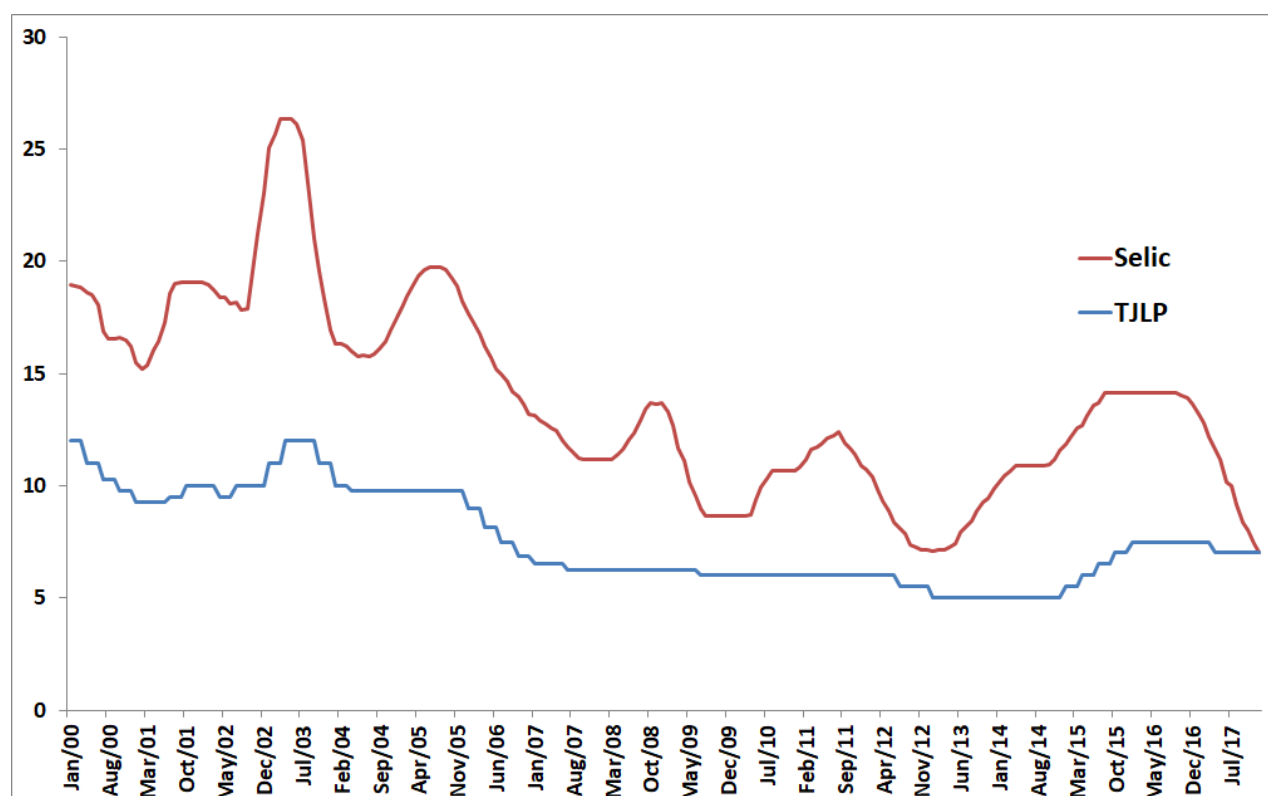
3.5 Effects of the BNDES on the power of monetary policy

One of the controversies regarding the BNDES's operation concerns the impacts of this bank on monetary policy power, that is, on the Central Bank's ability to control economic activity and inflation through the interest rate. If the BNDES reduces monetary policy power, then larger changes in the Selic rate are necessary to stabilize the economy in the case of shocks, generating greater volatility in the monetary policy instrument²³.

However, why would the BNDES reduce monetary policy power? Basically, for a long time (between 1995 and 2017), the BNDES based its loans on the TJLP, a rate lower than Selic and relatively insensitive to changes in that rate ([Figure 9](#)). This design made part of the credit market immune to monetary policy, reducing the power of the monetary authority to stabilize the product and inflation.

²³Note that this argument is different from stating that the BNDES increases the level of interest rates in Brazil, which is common in the public discussion, but without evidence in the literature on the BNDES that meets our criteria for selecting articles.

Figure 9: Selic rate *vs* TJLP



Sources: BNDES and Central Bank of Brazil (BCB).

It is good to make it clear that this discussion on the relation between the BNDES and monetary policy power is dated. The TJLP ceased to be the reference financial cost of BNDES loans in 2018 and was replaced by the TLP, which is based on 5-year NTN-B. Since the TLP is a market interest rate, sensitive to changes in the Selic rate, the discussion on whether the BNDES reduces monetary policy power no longer makes sense.

That said, this subsection seeks to investigate whether the empirical evidence available in the literature corroborates the view that the BNDES, for a long time, reduced the power of monetary policy in Brazil. In total, there are seven articles on this topic, with different approaches (microeconomic or macroeconomic) and with different analysis methods (Table 5).

Table 5: Summary of works on the effects of BNDES on the monetary policy power

Reference	Analysis method	Result
Vivacqua (2007)	Fixed effects	Mixed
Bonomo and Martins (2016)	Fixed effects	Reduces power
Perdigão (2018)	FAVAR	Reduces power
Maitino Neto (2018)	IS curves	Reduces power
Rosignoli (2015)	DSGE	Does not reduce power
Castro (2018)	DSGE	Does not reduce power
Vieira (2019)	State-dependent local projections	Does not reduce power

The first article that investigated this issue was [Vivacqua \(2007\)](#), which analyzed whether the BNDES changes the effect of monetary policy on the investment in fixed capital of companies in Brazil. Employing fixed effects regression in panel data, the author concludes that *“the exercises carried out to test the influence of the BNDES’s subsidized financing on the traced effect did not present conclusive results.”* It is worth mentioning, however, that the determination of the effects of the BNDES in this work is questionable, since, in the absence of data on the BNDES’s share in the credit of the companies for all years of the sample, the author uses only the year 2005 as representative for the entire period between 1995 and 2005.

Almost a decade later, [Martins and Bonomo \(2016\)](#) analyzed the potential effects of earmarked credit as a whole (a group that includes the BNDES) on the transmission of monetary policy at the firm level²⁴. Using a database with almost 300,000 firms, the authors estimate regressions with instrumental variables and fixed effects, trying to determine whether, in the case of a variation in the Selic rate, access to earmarked credit would alter the variation of paid interest rates, the growth in the volume of credit and employment in companies.

The results of [Martins and Bonomo \(2016\)](#) suggest that an increase of 1% in the Selic rate (i) increases by 1.15% the interest rate of firms without access to earmarked credit and increases by 0.64% the rate paid by firms with access; (ii) reduces by 3% the growth in the volume loaned to firms without access to earmarked credit and reduces by 2% that of firms with access; and (iii) reduces by 1.19% the employment growth of firms without access to directed credit and reduces by 0.46% that of firms with access to directed credit. The weakness of the article is the identification of monetary shocks with data on an annual basis.

[Perdigão \(2018\)](#) also analyzes the potential effects of earmarked credit on the transmission

²⁴Although the assessment is not strictly focused on the BNDES, this bank is considered the largest financing agent for firms in the Brazilian directed credit segment.

of monetary policy, but at the sectoral level and under more convincing hypotheses regarding the determination of monetary shocks (with monthly data). The article aims to determine whether the heterogeneity of the share of earmarked credit in the credit of the different sectors influences (or does not influence) the effects of monetary policy on interest rates, production, employment and price levels. To this end, the study uses a FAVAR model, which allows for obtaining impulse response functions for a large number of sectoral variables. The estimates indicate that for a monetary tightening of 0.50% in the Selic rate, each 10% increase in the share of earmarked credit in the sector's total credit weakens (i) the response of the sectoral loan rate between 0.22% and 0.38% after two to 12 months; (ii) the response of industrial production of the sector between 0.34% and 0.47% after two to eight months; (iii) the response of admissions between 0.56% and 1.13% up to two months after the shock; and (iv) the response of the price level between 0.11% and 0.18%.

The results obtained by [Martins and Bonomo \(2016\)](#) and [Perdigão \(2018\)](#) could suggest that earmarked credit reduces monetary policy power at the aggregate level – the relevant level to discuss monetary policy power. However, the results obtained at the firm or sector level cannot be directly transposed to the macroeconomic level, as there are general equilibrium effects potentially disregarded in this transposition. The demonstration of this statement can be seen in [Castro \(2018\)](#)²⁵.

In addition, the power of monetary policy, as seen, concerns the Central Bank's capacity to affect activity and inflation. This is important because [Martins and Bonomo \(2016\)](#) analyze whether earmarked credit changes the effect of monetary policy on the employment of firms but not on the price level (given the unavailability of data). In theory, it is possible that the existence of earmarked credit (and of the BNDES) has different influences on employment and inflation – see [Castro \(2018\)](#). [Perdigão \(2018\)](#), however, finds deleterious influences of the BNDES on the transmission of monetary policy both on employment and on inflation.

To measure the aggregate effects of the BNDES on monetary policy power, it is necessary to assess not only its effect on the firms and sectors supported but also on the firms and sectors that did not obtain support and that were indirectly affected in some way. To compute these aggregate effects, macroeconometric investigations and/or dynamic stochastic general equilibrium (DSGE) models can be used.

[Maitino \(2018\)](#) investigates the aggregate influence of the BNDES on the power of monetary policy, but through the estimation of some IS curve specifications for the Brazilian economy.

²⁵It is worth mentioning that [Perdigão \(2018\)](#) at least captures the effects of intrasectoral general equilibrium, and is thus an extension of [Bonomo and Martins \(2016\)](#).

The author takes some care to deal with the problem of endogeneity (present in the fact that BNDES disbursements respond to macroeconomic variables) and finds a positive effect of the Bank's disbursements on the output gap, which is interpreted as evidence that the BNDES hinders monetary policy power.

The problem with the evidence of [Maitino \(2018\)](#) is that the econometric specification used does not allow for investigating whether the BNDES reduces the power of monetary policy but whether the BNDES has (or not) any effect on economic activity. To analyze the effect of the BNDES on the power of monetary policy, it would be necessary to interact, in some way, the BNDES operation with the effect of the interest rate on economic activity, which is not done in this study. In addition, it would be important to assess the Bank's effects in a complete model, which had, in addition to the IS curve, a Philips Curve and a monetary policy rule.

[Rosignoli \(2015\)](#) seeks to investigate the impact that earmarked credit can have on the economic system in the case of monetary shocks. To that end, earmarked credit is incorporated into a DSGE model with a banking market based on [Gerali, Neri, Sessa and Signoretti \(2010\)](#). Using this model, the author obtains impulse response functions (IRFs) of macroeconomic variables selected in two different cases: when earmarked credit is present in the model and when earmarked credit is absent. Based on the comparison of the IRFs, the author concludes that earmarked credit has no impact on the effects of monetary shocks; that is, the monetary policy power is not affected.

Some details of the model should be highlighted. First, it is worth noting that [Rosignoli \(2015\)](#) deals with earmarked credit for investment and does not focus specifically on the BNDES. Second, it is observed that in the model, there are two conditions for earmarked credit to have an impact on the credit market and on the economic system: (i) banks have to lend earmarked resources on a compulsory basis; and (ii) the interest rates on earmarked loans cannot be controlled by banks. In the case of the BNDES, there are no compulsory funds that the other banks – or the BNDES itself – have to lend. In addition, few financial products of the institution have a fixed final rate, that is, which is not freely chosen by banks (only the Cartão BNDES and, between 2009 and 2015, the BNDES PSI, but both are not compulsory). A third issue, which may affect the results obtained, is the fact that the author considers the earmarked credit rate based on a *mark-down* on the basic rate of the economy. In this case, the earmarked credit rate moves according to the basic rate, and it is difficult to imagine that there could be an impact on the monetary policy power in this context. Finally, it should be noted that the author used credit portfolio balance data. It is unclear to what extent they should use these data or those related to the flows. In models

where financial assets have a maturity period, it is always difficult to define when to use stock or flow measures. From an empirical perspective, the fact that the term of earmarked credit operations is much longer than that of free credit operations generates a considerable discrepancy between flow and stock measures.

[Castro \(2018\)](#) also investigates the extent to which earmarked credit for investment would reduce the power of monetary policy. To this end, the author incorporates a subsidized and exogenously determined interest rate (differently from [Rosignoli](#)), used to finance investment, into the structure of a DSGE model based on [Smets and Wouters \(2007\)](#). Through the model and its Bayesian estimation, it is possible to obtain IRFs of monetary shocks for different shares of earmarked credit in investment, and the results suggest negligible effects of this credit on the power of monetary policy. However, [Castro \(2018\)](#) points out that such a result does not imply that the work of the monetary authority becomes more difficult in the presence of earmarked credit. In fact, as earmarked credit reduces the impact of monetary shock more on output than on inflation, the sacrifice rate of a disinflationary policy is reduced, improving the short-term *tradeoff* between activity and inflation. In this sense, the work of the monetary authority could be understood as easier (and not more difficult) in the presence of earmarked credit.

It is noteworthy that the different shares of earmarked credit in investment financing change very little the quantitative results of the model estimated by [Castro \(2018\)](#). This suggests that the modeling option conducted by the author does not have margin for such credit to affect monetary policy or that investment is not the main variable that determines inflation, due to its small weight in demand and its characteristic of increasing productive capacity, which does not reduce the expected marginal cost but rather consumption.

Finally, [Vieira \(2019\)](#) tests the hypothesis that Brazilian public banks (a group that includes BNDES) reduce monetary policy power in the country. To that end, the author uses state-dependent local projections ([Jordà, 2005](#)) to compare the power of monetary policy between high-credit periods of public banks and high-credit periods of private banks. The results obtained do not suggest that monetary policy is less potent in high-credit periods of public banks – in line with [Rosignoli \(2015\)](#) and [Castro](#) .

Considering the above, it is noted that the literature on the effects of the BNDES on monetary policy power is quite ambiguous. Studies that measured this effect at the firm level found a reduction in the power of monetary policy arising from the BNDES's operation; however, studies that investigated the topic at the aggregate level found that the BNDES either has no effect or negligible effects on the Central Bank's impacts on the economy.

3.6 Effects of the BNDES on productivity

Historically, BNDES instruments were designed with the objective of expanding investment. Most instruments did not have, in their conception, an explicit focus on the challenge of increasing productivity. However, as productivity is a key element in economic development, it is important to assess the BNDES's impact on this variable.

The BNDES's effect on the productivity of financed companies tends to occur through investment, since a large portion of the Bank's credit in recent years was allocated to finance investments. For there to be a positive effect on productivity, it is necessary not only that BNDES financing increases investments but also that the added investments lead to increased productivity. This depends on the characteristics of the investment projects carried out and of the capital goods acquired. For example, if the investment consists of the installation of a new productive plant identical to the plant that the firm already operates, there may even be, under specific conditions, an increase in labor productivity, but there will hardly be an increase in total factor productivity (TFP).²⁶ However, the installation of a new plant with superior technology, which reduces costs and/or improves the product, is capable of leading to an increase in labor productivity and TFP.

Evaluations that study the topic focus on the effects on the productivity of the financed firms. There are five studies in total, as shown in [Table 6](#). Four of these studies are similar in terms of the data used: (i) they use data from the Annual Industrial Survey (PIA), conducted by the IBGE;²⁷ and (ii) they analyze financing provided until 2005 and monitor the performance of companies for several years after financing.²⁸ The use of PIA data is justified because the information present in this survey allows the calculation of capital stock, without which it is not possible to estimate TFP. Tracking companies' performance for several years after financing is important because the effect on productivity may not be immediate.

²⁶The increase in TFP involves producing more with the same quantities of all input factors.

²⁷The exception is [Araújo \(2014\)](#), which uses data from a financial institution. In this database, the number of companies is much smaller than that available in the PIA.

²⁸The exception is [Araújo \(2014\)](#), which investigates financing from 2008 to 2012 and considers the companies' performance only in the year following the financing.

Table 6: Summary of works on the effects of the BNDES on productivity

Reference	BNDES instrument	Evaluated variable	Result
Ribeiro and De Negri (2009)	Public credit for innovation	TFP Labor productivity	Null Null
Coelho and De Negri (2010)	BNDES	TFP Labor productivity	Mixed Positive
Araújo (2014)	Finame, BNDES Automático and Finem Finame	Labor productivity	Null Null
Cavalcanti and Vaz (2017)	Those used by small companies	TFP Labor productivity	Positive Positive
Sousa and Ottaviano (2018)	BNDES Finem and BNDES Automático	TFP Labor productivity	Null Null

[Cavalcanti and Vaz \(2017\)](#) stand out because of the methodology used. The authors use a change in the company size classification adopted by BNDES and compare companies benefiting from the change with those not affected. The estimation by difference in differences is, therefore, based on an exogenous variation, an approach considered more appropriate for identifying causality than the panel methods and/or propensity score estimation, widely used in BNDES impact assessments.

As shown in [Table 6](#), [Araújo \(2014\)](#) investigates labor productivity and finds no evidence of an impact on this variable. The other four studies analyze both labor productivity and TFP, and the results obtained by each for the two productivity measures, in general, point to the same direction. [Ribeiro and De Negri \(2009\)](#) conclude that the effects on labor productivity and on TFP are not significantly different from zero. [Sousa and Ottaviano \(2018\)](#) also do not obtain evidence of impact on either of the two productivity measures. However, [Cavalcanti and Vaz \(2017\)](#) estimate positive effects both on labor productivity and on TFP. [Coelho and De Negri \(2010\)](#) estimates suggest a positive impact on labor productivity and constitute mixed evidence in relation to TFP.

Therefore, most studies that investigate the effect of the BNDES on productivity do not find evidence of impact. [Cavalcanti and Vaz \(2017\)](#) deviate from this pattern and obtain positive results for both productivity measures. Possible explanations for this are differences in the type of support analyzed and in the methodology. [Cavalcanti and Vaz \(2017\)](#) investigate support for small companies, while the other studies analyze supports that cover different company sizes. In addition, as previously mentioned, they use an exogenous variation to identify the causal effect, which does not occur in the other studies.

Based on these results, it is possible to affirm that if most evaluations that analyze company growth measures – investment, employment, revenue – suggest positive effects of

the BNDES on these variables, the same does not apply to evaluations that investigate the Bank's impact on productivity. This contrast is explicit in [Ribeiro and De Negri \(2009\)](#) and in [Coelho and De Negri \(2010\)](#), who obtained evidence of a positive impact on the growth of supported companies but not on TFP.

3.7 Effects of the BNDES on the profitability of firms

A relatively common topic in the literature on BNDES is whether the Bank was able to increase the profitability of supported companies. In theory, it can be imagined that loans with subsidies, as was the case of BNDES with the TJLP, could reduce the financial cost of firms and, thereby, increase their profitability. In practice, however, there are some difficulties in determining this mechanism.

The main difficulty in determining the effects of BNDES on profitability concerns the indicators used to measure the profitability of firms. A common pattern in this literature is the use of return on assets (ROA) as a representative indicator. The problem with this form of investigation is that we should not expect BNDES's operation to increase the firms' ROA. In fact, the effect expected from BNDES should be unknown *a priori*.

Considering that the ROA is generally accounted for by the ratio between net profit and assets, then we can think of three counterfactual possibilities. First, if the company were not going to invest in the absence of BNDES, then the Bank's financing would increase both the firm's assets, as well as its operating revenue and its operating and financial expenses. In this case, the effect of BNDES on the ROA is undetermined. Second, if the company were already going to invest in the absence of BNDES, financed by another debt, then the presence of BNDES with its subsidy would reduce the firm's financial expense. In that case, the ROA should increase. Third, if the company were already going to invest in the absence of the BNDES, financed by *equity*. In this case, BNDES increases the company's financial expense and reduces the ROA. Together, these various options suggest that we should not expect an increase in ROA *a priori*.

In total, four articles investigated the effects of BNDES on the profitability of firms. [Table 7](#) summarizes the main results of these works.

Table 7: Summary of works on the effects of the BNDES on the profitability of firms

Reference	Evaluated instrument	Variable	Result
Araújo (2014)	Finame, BNDES Automático and FINEM	ROA and ROE	Null
Lazzarini et al (2015)	BNDES	ROA and EBITDA	Null
Inoue, Lazzarini and Musacchio (2013)	BNDES Stock Market	ROA	Mixed
Gonçalves (2013)	BNDES nonautomatic financing	ROA	Null

In general, it can be observed that the most common result in [Table 7](#) is a null effect from BNDES on the profitability of supported firms. This result, however, is in line with what we should expect from these investigations. Such results, in fact, are obtained through several methods for estimating causal effects, ranging from multilevel models (as in the case of [Gonçalves, 2013](#)) to panels with fixed effects (as in the cases of [Araújo, 2014](#); [Lazzarini et al. 2015](#); [Inoue et al. 2013](#); [Lazzarini et al. 2015](#)). The results, therefore, do not allow one to affirm that BNDES lines have an impact on the profitability of the firms

The only work that finds different evidence is [Inoue et al. \(2013\)](#). These authors investigate whether BNDES's operation through the role of minority shareholder can improve the profitability (ROA) of companies, including those that are part of an economic group. However, since BNDES does not choose to buy shares at random, but chooses based on some criteria, the authors deal with selection bias through both fixed effects and propensity score matching (PSM). Although the panel data suggest that firms that have BNDES as minority shareholder have ROA 11.1 pp above other firms, this result is not robust to the change in method (PSM).

3.8 Effects of the BNDES on firm's share value

If BNDES is a development bank that corrects market failures, then we should expect that its operation would eliminate restrictions on the growth of supported companies. For example, if a firm wants to make a long-term investment, but there is no private bank willing to lend funds at that maturity, then BNDES's operation would serve as a lever for the firm's growth. If BNDES allows greater future cash generation and profitability, then it should have positive effects on the company's share value.

If BNDES only substituted sources, leading companies to replace a more expensive credit in the market with its cheaper credit, in this case BNDES should improve the firms' cash generation (via lower financial expenses), increasing the share price. Finally, if BNDES,

instead of lending resources, injected capital into firms, this should also increase the value of their shares (by improving the prospects for future earnings). Therefore, it is worth asking: does the evidence corroborate this expected result?

There are five articles that somehow address the Bank's influence on the companies' share value. By its nature, this is a discussion focused only on publicly traded companies, which is why all works use Economática as data source. [Table 8](#) summarizes the main characteristics of these various studies.

Table 8: Summary of works on the effects of the BNDES on firm's share value

Reference	Evaluated instrument	Variable	Result
Pereira (2010)	BNDES Stock Market	Tobin's Q	Positive
Inoue, Lazzarini and Musacchio (2013)	BNDES Stock Market	Market-to-book	Null
Lazzarini et al (2015)	Financing or Shareholding	Tobin's Q	Null
Bellegard (2016)	BNDES	Share price	Null
Barbosa and Matos (2018)	BNDES Stock Market	Excess return on Ibovespa	Null

It is important to mention that the variables that measure share value are different between studies. There are studies that effectively focus on share price [([Bellegard, 2016](#))], others that use Tobin's Q ([Pereira, 2010](#); [Lazzarini et al. 2015](#)) and studies that analyze the market-to-book ratio ([Inoue et al. 2013](#)) or the excess return of the share in relation to the benchmark ([Barbosa and Matos, 2018](#)). In methodological terms, all works use panel with fixed effects to try to identify the causal effect.

In general, it can be seen that the available evidence does not bring results in line with expectations. Four of the five studies find null effects of BNDES on the value of shares of supported companies. [Pereira, 2010](#) is the only exception. These results could be interpreted in two different ways. First, that BNDES did not cause the growth of these publicly traded companies and, therefore, the price of their shares did not increase. This interpretation would be compatible with the evidence discussed in subsection 3.1, which suggests that BNDES support does not increase the investment of publicly traded companies, precisely the group analyzed here. A second interpretation is that the null effects may be due to the difficulty in tracing the determinants of the value of a company's share, especially in annual databases, as is common in the works mapped here.

3.9 Effects of the BNDES on municipal tax collection

BNDES has financed, at least since the 1990s, projects to modernize tax management in Brazilian municipalities. The Tax Management Modernization Program (Pmat) was created by BNDES in 1997 and, since then, the scope of what can be financed has been expanded to include actions aimed at improving the quality of public spending. The impact of BNDES on tax collection is analyzed by four studies that assess the Pmat, listed in [Table 9](#). These studies investigate the impact of BNDES support on some measure of municipal tax collection – total or in some taxes, such as Urban Land and Property Tax (IPTU) and Municipal Service Tax (ISS).

Table 9: Summary of works on the effects of the BNDES on municipal tax collection

Reference	Evaluated instrument	Variable	Result
Barbosa Filho (2013)	BNDES PMAT	Tax collection IPTU ISS	Positive Positive Positive
Bast (2015)	BNDES PMAT	Tax collection IPTU ISS	Null Mixed Null
Oliveira, R. (2015)	BNDES PMAT	IPTU ISS	Mixed Null
Gadenne (2017)	BNDES PMAT	Tax collection	Positive

Among the four studies that assess the impact of the PMAT on tax collection, two – [Barbosa Filho \(2013\)](#) and [Gadenne \(2017\)](#) – find positive effects and two – [Bast \(2015\)](#) and [Oliveira, R. \(2015\)](#) – obtain, predominantly, null results. As the literature does not seem to point to a clear answer regarding the impact of Pmat, it is important to examine the studies to trace differences that may explain the divergent results.

Regarding the sample, there are differences in the set of municipalities taken into account due to the authors' choices. [Bast \(2015\)](#), for example, does not consider municipalities that received support from PMAT more than once during the period under study. As for the methodology, [Bast \(2015\)](#) and [Gadenne \(2017\)](#) estimate the propensity score, but there are differences in the period considered in their estimation – one year or the entire period of analysis – and in their use – in the matching or weighting of observations. [Oliveira, R. \(2015\)](#) uses observable characteristics, such as submission of proposal to BNDES and geographic location, to select unsupported municipalities with characteristics similar to those supported. [Barbosa Filho \(2013\)](#) considers all unsupported municipalities in the control group.

Differences in specifications do not seem to explain, by themselves, the divergences between the results obtained. Different tax collection measures are tried – total, IPTU and ISS – and, for each of them, the results vary between studies

3.10 Effects of the BNDES on deforestation

Assessing the impact of BNDES's operation on deforestation in the Amazon is justified by three reasons. First, the Bank is the manager of the Amazon Fund, which supports, with nonreimbursable resources, actions to prevent, monitor and combat deforestation in the region.²⁹ Thus, assessing the impact of the Amazon Fund on deforestation corresponds to analyzing whether its objective is being met. The second reason is related to the financing that BNDES grants to investment projects in the region. Although relevant to other objectives – energy security or physical integration of markets, for example – these projects may have undesired effects on deforestation. The third reason concerns the growing importance of the subject for society.

Two studies analyze the impact of the Amazon Fund on deforestation. In [Bouchardet, Porsse and Junior \(2016\)](#), several projects of the Amazon Fund are taken into account: the authors compare municipalities in which there is a project with municipalities in which there is none. [Simonet et al. \(2019\)](#), on the other hand, assess the impact of a specific project³⁰, comparing rural establishments of communities that participate and do not participate in the project. The estimates obtained in the two studies indicate that the Amazon Fund contributes to the reduction of deforestation.

[Assunção, Costa and Szerman \(2017\)](#) assess the impact of the construction of hydroelectric power plants (HPPs) in the Amazon on deforestation in the vicinity of these projects. Using the synthetic control method, the authors obtain estimates of the impact generated by each HPP. The evidence obtained is mixed: some HPPs cause an increase in deforestation in the surroundings, but others contribute to its reduction.

In summary, the literature evaluating the impact of BNDES on deforestation in the Amazon is small – there are only three studies, as shown in [Table 10](#). Two of them indicate that the Amazon Fund has been effective in reducing deforestation. And one study shows evidence that the construction of HPPs has heterogeneous effects on deforestation – it can contribute to its increase or decrease, depending on the case.

²⁹The Amazon Fund's resources come from donations.

³⁰Projeto Assentamentos Sustentáveis na Amazônia (Sustainable Settlements in the Amazon Project).

Table 10: Summary of works on the effects of the BNDES on deforestation

Reference	Evaluated instrument	Variable	Result
Bouchardet, Porsse and Junior (2016)	Amazon Fund	Deforestation	Reduces deforestation
Assunção, Costa and Szerman (2017)	HPP construction	Deforestation	Mixed
Simonet et al (2019)	Amazon Fund	Deforestation	Reduces deforestation

3.11 Political connections and the BNDES's operation

In the previous subsections, studies that investigate the effects of the BNDES on some variable of interest were presented. There is also a set of studies in which the BNDES, instead of being the explanatory variable, is the dependent variable. The interest, in this case, is to analyze how some variables affect the BNDES's operation – be it the allocation of its financings and shareholdings or its level of disbursement. Among several elements that can affect the performance of the BNDES, one was the focus of several studies: political connections. This interest in the topic can be attributed, at least in part, to the literature that argues that public banks can be used to serve the personal interests of governing politicians (Shleifer and Vishny, 1994; La Porta et al. 2002).

The ten studies that empirically investigate whether political connections affect the BNDES's operation can be divided into two groups: (i) seven examine whether the companies' political connections affect the BNDES's allocation of financing and shareholding, and (ii) three investigate whether the political alignments of mayors and governors with the President of the Republic affect the BNDES's allocation of financing.

The seven studies that analyze the companies' political connections are listed in Chart A of Table 11. Five of them analyze types of support that undergo analysis by the BNDES and measure political connections based on electoral donations made by companies. Even so, there are specificities in the way electoral donations are taken into account: some studies consider donations to candidates that won elections; others take into account the totality of donations – those allocated to candidates, parties and campaign committees – without distinguishing between donations to winners and losers.³¹

³¹In the case of donations to parties and campaign committees, it is not possible to know to which candidates they end up being allocated. Therefore, it is not possible to distinguish between winners and losers

Table 11: Summary of works on political connections and BNDES

Reference	Political connection	Instrument	Result
CHART A: Political connection of companies			
Sztutman and Aldrighi (2012)	Donation to winning candidates that ran for federal deputy	Financing	Positive
Sztutman and Aldrighi (2019)	Donation to winning candidates that ran for federal deputy	Financing	Null
Lazzarini et al (2015)	Donation to winning candidates that ran for president, governor and senator	Financing	Null
	Donation to winning candidates that ran for federal deputy	Financing	Positive
	Donation to winning candidates that ran for president, governor and senator	Shareholding	Null
	Donation to winning candidates that ran for federal deputy	Shareholding	Null
Astorino (2015)	Presence in the Board of Directors of a person who held a senior management position at BNDES	Nonautomatic indirect and direct financing	Null
Lopes (2016)	Donation to winning candidates that ran for federal deputy	Nonautomatic indirect and direct financing	Positive
	Donation to winning candidates that ran for president and senator	Nonautomatic indirect and direct financing	Negative
	Donation to candidates, parties and campaign committees	Nonautomatic indirect and direct financing	Negative
	Donation to candidates, parties and campaign committees of the government base	Nonautomatic indirect and direct financing	Positive
Kuronuma et al (2018)	Donation to candidates, parties and campaign committees	Financing	Positive
Tabajara (2019)	Donation to candidates, parties and campaign committees at the federal level	Indirect financing by federal public banks	Positive
CHART B: Political alignment of mayors and governors			
Coniaric (2014)	Mayor's party belongs to the president's support base	Financing to municipalities	Null
Carvalho (2014)	Governor's party belongs to the president's support base	Financing to private companies	Positive
Pinto (2018)	Mayor's party is the same as the president's party and is different from the governor's party	Financing to municipalities	Positive

The results of these studies vary according to the political connection measure adopted,

the type of BNDES support considered, and the method employed, as shown in Chart A of [Table 11](#). [Sztutman and Aldrighi \(2012\)](#), [Lazzarini et al. \(2015\)](#) and [Lopes \(2016\)](#) find evidence that making donations to candidates for federal deputy offices who end up elected increases the volume of financing that the BNDES grants to the company in the years following the election. However, this result is not maintained when [Lazzarini et al. \(2015\)](#) and [Lopes \(2016\)](#) consider donations to candidates elected for other offices, nor when [Lazzarini et al. \(2015\)](#) analyze the effect on BNDES shareholdings. [Sztutman and Aldrighi \(2019\)](#) also examine donations to candidates elected for federal deputy offices, but they use a regression discontinuity design, which is more appropriate for isolating causality. Comparing companies that donated to a candidate for a federal deputy office who was elected by a few votes with companies that donated to a candidate for a federal deputy office who was not elected by a few votes, [Sztutman and Aldrighi \(2019\)](#) found no statistically significant difference in the average volume of BNDES financing. [Lopes \(2016\)](#) and [Kuronuma et al. \(2018\)](#) estimate the effect of total donations, which include not only those made to candidates, and obtain divergent results: [Lopes \(2016\)](#) estimates a negative relation between donations and BNDES financing, while [Kuronuma et al. \(2018\)](#) find a positive relation between the two variables. The result of [Lopes \(2016\)](#) changes when the effect of donations to candidates, parties and campaign committees of the government base is estimated: in this case, the author finds that more donations are associated with more BNDES financing.

Although the results obtained vary between studies, something common among them is the fact that they do not deal with transmission mechanisms. Thus, finding evidence that politically connected companies have more access to BNDES financing does not allow us to conclude that political influence occurs, necessarily, through the BNDES. [Lazzarini et al. \(2015\)](#) and [Sztutman and Aldrighi \(2012\)](#) suggest an alternative hypothesis in which political influence occurs through the signing of contracts with the government, and the object of these contracts ends up being financed by the BNDES.

Although also investigating the political connections of companies involving BNDES financing, [Tabajara \(2019\)](#) seeks to answer a different question: Do companies that make electoral donations at the federal level receive more indirect financing from the BNDES through federal public banks (Banco do Brasil, Caixa Econômica Federal, Banco do Nordeste and Banco da Amazônia)? The interest, in this case, falls on the BNDES's financial agents, who select the borrowers and assume the credit risk of the financing. The conclusion of [Tabajara \(2019\)](#) is that making a donation in federal elections increases the likelihood that the company will receive indirect financing from the BNDES through federal public banks.

Astorino (2015) differs from the other studies by the political connection measure used: a company is defined as politically connected if any member of its Board of Directors held a senior management position at the BNDES. Astorino (2015) finds no evidence that this type of political connection affects BNDES financing.

Chart B of Table 11 presents the three articles that deal with the political alignment of mayors and governors with the president. Coniaric (2014) and Pinto (2018) analyze BNDES financing to municipal public administrations. Coniaric (2014) finds no evidence that municipalities governed by mayors allied to the president receive more financing from the BNDES. However, the results obtained by Pinto (2018) indicate that the municipality is more likely to receive BNDES financing if the mayor belongs to the president's party, and the governor belongs to another party. Carvalho (2014) investigates whether political alignment between the governor and the president affects BNDES financing to private companies in each state. The estimates obtained indicate that BNDES disbursements are higher for states governed by political allies in years close to the electoral race in which the governor is running for reelection.³²

In summary, for the two issues investigated – political connection of companies and political alignment of mayors and governors – there is no consensus among the studies. Some studies find evidence that political connections affect the allocation of BNDES financing, but others do not obtain evidence of this.

3.12 Determinants of the BNDES's operation

This subsection deals with studies that investigate other elements – in addition to political connections – that may affect the operation of BNDES. This set includes studies that analyze the characteristics of companies and states that receive support from BNDES. Also included in this group are studies that investigate how BNDES disbursements respond to macroeconomic variables.

We saw in the introduction that two relevant issues for development banks are: (i) whether these institutions are (or are not) promoting a misallocation of resources in the economy,

³²In another section of the article, Carvalho (2014) investigates how political alignment affects the companies' decisions. The data used in this section does not allow for the identification of companies supported by the BNDES. Instead, a company is considered a priority if the sector to which it belongs is listed in Decree No. 2,233/1997. Foreign-controlled companies in these sectors can receive public credit. However, belonging to these sectors is not a necessary nor sufficient condition for a company to receive financing from the BNDES. The result obtained is that companies in priority sectors expand employment in states governed by politicians allied to the president about a year before the electoral race in which the governor is running for reelection.

through loans to companies with poor performance (“*zombie lending*”);³³ (ii) whether such institutions are focusing their credit on companies more susceptible to market failures or if they are substituting credit sources for firms that would not need state support.

Lazzarini et al. (2015) use a database of 286 publicly traded companies to investigate whether BNDES, either via credit or via *equity*, would be lending resources to low-performing companies. The evidence, however, does not support the hypothesis that the Bank is helping to sustain underperforming companies. Strictly speaking, in some specifications, the authors find that performance variables *positively* affect the probability of obtaining support from BNDES, but this result is significant only at 10%.

Bonomo et al. (2015) find results close to those of Lazzarini et al. (2015), but with two advantages over the previous work. First, because they use a rich database, which represents the entire population of Bank loans in the country, with more than one million companies. Second, because their results allow us to answer not only whether BNDES would be practicing *zombie lending*, but also to map which company profile would be most likely to obtain support from BNDES.

The model estimated by Bonomo et al. (2015) is a *logit* that seeks to trace the factors that contribute the most to the companies’ access to BNDES direct resources. The evidence obtained suggests that larger, older and companies with lower risk (as measured by the default rate and the amount of interest paid) are more likely to obtain credit from BNDES. Albuquerque (2015) finds that BNDES finances larger, older, more transparent companies with more tangible assets. These results are important for the discussion on BNDES for two reasons: (i) because they show that the Bank did not practice *zombie lending*, as found by Lazzarini et al. (2015) – which weakens the argument that the BNDES’s operation promoted misallocation;³⁴ (ii) because they suggest that there was, at least between 2006 and 2016, a problem of focus on BNDES credit, mainly supporting firms with characteristics that are opposite to those that would be associated with credit restriction, which is in line with some degree of source substitution in the institutions’ loans, as seen in subsection 3.1.³⁵

³³According to Claessens et al. (2008), companies with poor performance would have greater incentives to seek political connections to benefit from state support. Lazzarini et al. (2015) situate this discussion in the context of what they call political view.

³⁴Correa and Barbosa Filho (2017) estimate that the productivity of companies that are 20% less efficient in Brazil is lower than that observed in companies that are 9% less efficient in Mexico and 5% in Chile. Therefore, there would be a “fat tail” of inefficient companies in the country.

³⁵Strictly speaking, the results of Bonomo, Brito and Martins (2015) could be interpreted as if BNDES was lending to large infrastructure companies and, thus, addressing market failures resulting from projects with positive externalities. However, an analysis carried out by Frischtak et al. (2017), although it does not fit the criteria of this review (as it is descriptive), suggests that only 22.3% of BNDES disbursements were made for

Another interesting issue in the discussions on development banks, in general, and on BNDES, in particular, is whether these institutions lend resources to subnational entities with fiscal imbalances. It is the equivalent of *zombie lending*, but applied to states (and not to companies). On this subject, the evidence is still scarce, but [Matos and Jesus Filho \(2019\)](#) investigate the determinants of BNDES credit for state governments between 2009 and 2014, a period of strong expansion of these loans. Through a dynamic panel model, the authors find that “healthier” states have greater capacity to obtain credit. This result is opposite to the idea that BNDES credit goes to states with fiscal imbalances.

Still on the operation of development banks, a topic that mobilizes the public discussion is whether these institutions have an anticyclical action, expanding their credit in times of contraction of private credit and vice versa. On this, the evidence of [Cardoso \(2014\)](#) suggests that the expansion of BNDES credit occurs in periods of decline in the general level of credit, which would characterize its operation as anticyclical. However, it is worth saying that [Cardoso \(2014\)](#) considers a sample between 1999 and 2012, therefore not considering the PSI period, usually seen as an anticyclical action that extended beyond what was required to return the economy to full employment, and also the post-2015 period, when the institution’s credit contracted in context of negative product gap.

Regarding the macroeconomic variables that affect BNDES disbursements, [Marchezan \(2008\)](#) suggests that increases in the Selic interest rate and that devaluations in the exchange rate positively affect the Bank’s disbursements, while increases in inflation negatively affect decisions concerning investment with resources of the institution. According to the author, this would be due to the attractiveness of the TJLP, which would keep the Bank attractive in situations of macroeconomic instability. [Menegário \(2012\)](#), on the other hand, suggests that shocks in the country risk premium and in the international interest rate have positive effects on BNDES Finem disbursement, but this result should be viewed with caution, since the statistical significance of the impulse response functions is not reported by the author.

In general, the evidence in this block suggests that BNDES does not appear to have focused most of its credit on companies that are more susceptible to market failures and does not appear to have sustained inefficient companies or subnational entities in poor financial circumstances. In addition, it seems to have had an anticyclical action, expanding its operations in times of greater macroeconomic weakness.

activities with clear positive externalities (which is the case of some infrastructure sectors), with 49.2% of the credit being for activities without clear externalities.

3.13 Miscellanea

This last subsection compiles all the evidence that did not fit in the previous subsections. Although the body of knowledge here is less dense, it is information that cannot be wasted by public policy, since little evidence is better than no evidence and also because little evidence suggests possible paths for future research. Therefore, each paragraph that follows will deal with a varied subject, which is why this subsection is called miscellanea.

There are two studies ([Pereira, 2010](#); [Zorman, 2012](#)) that assess the effects of BNDES on the corporate governance of companies supported by BNDESPAR (BNDES shareholdings subsidiary). Both use panels with fixed effect and model of simultaneous equations to determine the impacts of the Bank. The evidence obtained suggests that BNDESPAR had positive effects on the governance of investee companies. The results are in line with expectations, as BNDES demanded these improvements from investee.

There are three studies that assess the effects of BNDES on different financial indicators of the firm. [Bonomo et al. \(2015\)](#) investigate the Bank's effects on leverage and on financial expenses of firms. The authors find that BNDES has positive effects on indebtedness, but null effects on financial expenses. [Lazzarini et al. \(2015\)](#) also investigate the Bank's effect on the firms' financial expenses, but find negative effects. Finally, [Tortoli and Moraes \(2016\)](#), through a panel with fixed effects, analyze whether the Bank has effects on the companies' cash balance. The idea of this study is that BNDES should increase the cash resources, since subsidies reduce the opportunity cost of idle resources, encourage the arbitrage of rates and the accumulation of cash equivalents. However, the results obtained are statistically indistinguishable from zero.

Regarding the relation between BNDES credit and private credit, [Borça Jr., Sant'anna and Souza \(2016\)](#) point out that an exogenous shock of BNDES credit has a positive effect on total credit, even controlling for the effects of variations in bank demand (*crowding in*). [Menegário \(2012\)](#), on the other hand, indicates that increases in the primary issuance of debentures in the country increase the disbursements of BNDES Finem, which would also suggest *crowding in*. [Barboza and Vasconcelos \(2019\)](#) show that a shock in BNDES disbursements has a bullish effect on the economy's interest rate, which may be interpreted as evidence of *crowding-out* effect.

[Goldemberg \(2014\)](#) assesses the impact of BNDES support to the cinema exhibition park. Using the synthetic control method, [Goldemberg \(2014\)](#) finds no evidence of a positive impact on the number of theaters or on the cinema audience of the supported exhibitors.

[Porto and Nogueira \(2012\)](#) attempt to quantify the effect of BNDES credit on Brazilian

meat consumers and producers. Using a difference-in-difference model, the authors state that their preliminary results suggest that BNDES loans raised prices for consumers and these increases were not transferred entirely to producers. This suggests that the BNDES's support policy resulted in greater concentration and market power in the meat industry in Brazil.

Finally, [Castor and Ribeiro \(2018\)](#) investigate the margins of financial agents in BNDES indirect operations. The authors find evidence that: (i) variations in the Selic rate are followed by opposite variations in the margins; (ii) variations in the TJLP are followed by similar variations in the margins.

4 Conclusion

There are more than 70 studies providing evidence on the main development bank of Brazil. This broad information set represents what we know today about the BNDES's operation. We know, for example, that the BNDES is, in fact, a public policy instrument to foster investment, exports and economic activity in the country, especially when its credit is focused on MSMEs. We also know that the BNDES has had positive effects on the revenue of firms and on employment, which is important, given that the Bank is financed by FAT resources. In addition, we know that the BNDES's operation, especially via the Amazon Fund, is important for reducing deforestation. However, most articles showed that the BNDES had null effects on the profitability of supported firms, the value of their shares and productivity, which is a point of attention for public policy focused on development. It can also be stated that the literature is not conclusive about the effects of the BNDES on the power of monetary policy and on municipal tax collection, as well as about whether there was political influence in determining Bank loans. Finally, we learned that the BNDES, over the last few years, had as main clients larger, older and less risky companies, as well as subnational entities with a better fiscal situation.

Regarding the controversies surrounding development banks, it can be said that on the one hand, the largest development bank of Brazil was able to add investments to the economy, in line with what is expected from an institution that corrects market failures; on the other hand, there is evidence that there was some degree of source substitution, especially in loan operations with companies that have access to the capital market. In addition, it can be said that, on the one hand, the BNDES had larger, older and better rated companies as its main clients; on the other hand, however, there is no evidence that the BNDES has practiced "*zombie lending*," supporting companies that should be liquidated by market processes,

and it is not clear that political connections have been an unequal channel for companies to access the BNDES.

The evidence systematized here allows us to reach three conclusions. First, both development bank enthusiasts and their critics have a share of truth in their statements. Second, the evidence suggests that there is room for improvement in the operation of the BNDES. Third, studies with designs that allow a causal analysis subject to less restrictive hypotheses, are still lacking. It would help in this way if the design of the support instruments already considered a kind of evaluation.

How can the evidence presented here be used to guide future public policies?

First, it is important to highlight that the evidence that a certain type of BNDES support has a positive effect on some variable is not sufficient to justify this support. The justification, *ideally*, would depend on a cost-benefit analysis and a comparison with the cost-benefit of alternative public policies. It would be necessary to calculate, for each type of BNDES support, the benefit, in monetary terms, and cost. The calculation of the monetary benefit would involve (i) estimating the effects on all relevant variables; (ii) converting the benefits into monetary values; and (iii) aggregating these values. This calculation is not executed in any of the studies, which illustrates the complexity involved. In addition, only 1 of the 70 studies – [Wegelin \(2014\)](#) – includes an estimate of the cost of the BNDES support that it analyzes.³⁶ Although less complex than estimating the monetary benefit, calculating the cost requires information about financial flows and the average cost of issuing public debt.

Although the studies do not contain cost-benefit estimates, it is possible to develop some reflections on the subject. From 2009 to 2014, for example, the National Treasury granted loans to the BNDES, and the Investment Support Program (BNDES PSI) was in effect. The implicit subsidies in the National Treasury's loans to the BNDES totaled, between 2009 and 2019, approximately R\$ 181 billion ([National Treasury Secretariat, 2020](#)).³⁷ The explicit subsidies in PSI financing totaled, from 2009 to 2019, approximately R\$ 76 billion ([National Treasury Secretariat, 2020](#)).³⁸ Since BNDES financing that used resources from the National Treasury and that were part of the BNDES PSI involved a high cost, only positive effects of

³⁶[Machado, Grimaldi and Albuquerque \(2018\)](#), although not meeting the article selection criteria of this bibliographic review, deserve to be mentioned as a work that undertook to calculate the cost-effectiveness of the BNDES PSI in its first two years.

³⁷Such implicit subsidies result from the difference between the National Treasury's cost of raising funds and the contractual cost of loans granted to the BNDES. The calculation is made at constant values of Dec 31, 2019.

³⁸Such explicit subsidies result from the difference between the interest rate received by the lender and the interest rate paid by the borrower. The calculation is made at constant values of Dec. 31, 2019 and includes equalizations to the BNDES and Finep.

a great magnitude could guarantee a benefit greater than the cost. In other words, when analyzing the period from 2009 to 2014, it is particularly important to note that the positive effect is not sufficient to guarantee a cost-benefit ratio that justifies the intervention.

It is important to note that, for financing granted by the BNDES from 2015 onward, the costs involved are substantially lower for three reasons: (i) the BNDES PSI ended in 2015; (ii) since 2016, the BNDES has been advancing the repayment of loans to the National Treasury; and (iii) in 2018, the TLP came into force, in which there are implicit subsidies that decline every year until they are zeroed in 2023.

Because of its importance, cost-benefit analysis is a topic that should be addressed in the future by the literature on the BNDES. Another essential issue will be to investigate the transmission mechanisms that explain the results obtained. For example, the evidence indicates that the BNDES has a positive effect on the investment of micro, small and medium-sized companies, but the studies present little discussion on what explains this effect – if it is the credit restriction of these companies, the longer term of financing, the interest rate below market or another mechanism. It would also be interesting to explore the reasons why some studies find a positive impact on investment but do not find effect on labor productivity. In addition, to guide future public policies, a change in the mentality of action of the Bank, and of public entities would be crucial, in which evaluation is integrated into the design and implementation of policies. This will enable a better ex post evaluation, with results less dependent on restrictive hypotheses.

There are also some topics that, due to their importance, require more evidence. Among the four studies on BNDES support for infrastructure, three assess impacts on the locality where the infrastructure was installed. A research agenda for the future consists of investigating broader effects of BNDES support for infrastructure – on the energy matrix, on the integration of markets or on exports, for example. The BNDES's local content policy is another topic that deserves further study. Its effects have been evaluated only once, despite the controversy surrounding the subject. A topic not explored in the literature is the impact of the BNDES on the development of the capital market. It would be important to examine the issue empirically, since sometimes the hypothesis arises that the BNDES restrains the development of the capital market.

Finally, it is worth mentioning that the literature on the BNDES will necessarily follow the changes that the institution has been going through. These changes involve not only the financing cost – since 2018, tied to the TLP – but also Bank's very strategy. The trend is that the BNDES expands its role in privatization processes and the structuring of projects to the detriment of traditional financing segments. Therefore, it is possible that some topics

that have been the object of studies in recent years lose their relevance and, in parallel, new research questions receive attention in the literature.

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