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Economic Analysis of Law Review

Whose Beef are our Workers Subsidizing?

Nossos Trabalhadores estão Subsidiando a Carne de Quem?

Antônio José Maristrello Porto¹
FGV-Rio/CPDE

Rafaela Nogueira²
FGV-Rio/EPGE

RESUMO

Este artigo discute o impacto, sobre consumidores e produtores brasileiros de carne, dos empréstimos subsidiados pelo BNDES para frigoríficos. Este impacto é estimado utilizando uma metodologia de diferença-em-diferença. Nossos resultados preliminares indicam que esses empréstimos subsidiados aumentaram os preços para os consumidores nacionais e estes aumentos não foram transferidos inteiramente para os produtores. Os resultados também indicam que a indústria intermediária de frigoríficos pode ter tido um aumento de lucros por causa dos subsídios do BNDES.

Palavras-chave: Política Industrial; Frigoríficos; BNDES; Subsídio; Direito do Consumidor.
JEL: K29, P46; O12.

ABSTRACT

At this article we discuss what was the impact on Brazilians consumers and producers of the subsidized BNDES' loans to meat packing companies. This impact is estimated by using the difference-in-difference methodology on prices. Our surprising preliminary results indicate that such subsidized loans increased consumer prices that were not entirely transferred to producers. Ours results also show that profits into the intermediary meatpacking industry have increased because of the BNDES subsidies.

Keywords: Industrial Policy; Meatpacking Companies; BNDES; Subsidy; Consumer Protection.
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¹ Getúlio Vargas Foundation /CPDE – Direito Rio. Praia de Botafogo, 190, 22250-900, Rio de Janeiro, Brazil; e-mail: antonio.maristrello@fgv.br.

² Getúlio Vargas Foundation /EPGE. Praia de Botafogo, 190, 22250-900, Rio de Janeiro, Brazil; e-mail: rafaela.nogueira@fgv.br.

1. Introduction³

In both academia and in politics, the theme of *industrial policy* has returned to the center of discussions. Not that it had completely disappeared, but it was for some time relegated to the sidelines. The debate is controversial and sometimes heated. On one side we have those who are against any kind of industrial policy (Canedo-Pinheiro, et al., 2007). On the other, there are those who equate economic growth to industrial policies (Rodrik, 2009). At the center there are those who support "good" industrial policies.⁴ Some countries, such as France, have a long tradition in promoting industrial policies,⁵ and others, such as the United States and the United Kingdom, at least in political discourse, oppose the idea. In any case, there is evidence that it is increasingly difficult to find examples of countries that have experienced leaps in productivity in some sectors of their economies, without somehow using targeted industrial policy incentives.⁶ Countries like South Korea, China, and other Asian tigers are constantly cited as examples of countries where industrial policies have worked.⁷

In Brazil, there are increasing levels of public debate over industrial policy in the meatpacking sector. The Productive Development Policy (PDP) document that was created by the Brazilian Ministry of Development, Trade and Industry⁸ aims to "give more power to Industrial Policy, through the expansion of its scope, the deepening of the actions already undertaken and the capability to design, implement and evaluate public policies." This document specifically deals with the meatpacking industry, setting goals such as to "(i) uphold Brazil's position as the largest exporter of animal protein, and (ii) make this segment the main meat export sector of agribusiness." Furthermore, the major challenges identified in the PDP for the meat packing industry with a view to retaining Brazil's world leadership in the sector are to: (i) expand access to markets by eliminating trade barriers, (ii) improve the health status of the national livestock, (iii) modernize and expand the logistics infrastructure, (iv) ensure the supply of inputs for livestock production, (v) increase the number of cows in the national herd, and (v) add value to exported meat.

³ We thank Heitor Campos and Gustavo Sampaio for their excellent research assistance and IBRE for sharing their data. Responsibility for errors rests with the authors.

⁴ There is a consensus about industrial policies related to "research and development." The argument pro state aid in such investments is related to the idea that many types of scientific research may potentially benefit different individuals; a potential private investor would not have the correct incentives to invest socially desirable quantities on them. Nevertheless, some argue that, despite the benefits from state aid, there is a risk of crowding out of private investments in some areas of research and development.

⁵ These countries have formulated and implemented different types of industrial policies and often tried to create a "national champion" (OECD, 2009).

⁶ Subsidies, tax breaks, credit lines from public banks, use of procurement policies, preferences for national companies, among others. These are just a few examples of instruments used in promoting industrial policies.

⁷ Although the academic debate and policy admits that industrial policies were not solely responsible for the productivity gains in these economies, it is also recognized that this was an important variable in the process. See Chang (2010).

⁸ More information on: <http://www.desenvolvimento.gov.br/pdp> (last accessed in 19 August 2011).

In order to foster the PDP the Brazilian Development Bank (BNDES) started to offer subsidized loans to the meatpacking companies. Although the PDP were primarily idealized to be sector-specific (meatpacking sector) it became group-specific. Specific private groups seem to have benefited more from the PDP than others. Recent examples indicate that the Brazilian government through the BNDES' loans aimed to strengthen international mergers between Brazilian companies that produce *commodities* and other international companies that produce low-tech products. We can observe this path by examining loans from the BNDES, in the years 2008, 2009 and 2010, to Bertin, JBS / Friboi,⁹ Brazil Foods, Minerva and Mafrig groups, all of them in the meatpacking market.¹⁰ In particular, JBS / Friboi is already the world's largest distributor of animal protein, with operations in over 20 countries. Furthermore, beyond the direct loans, the equity arm of BNDES (BNDESPar) acquired almost all of the debentures issued by the JBS/ Friboi operation that allowed for the acquisition of the U.S. based chicken processor Pilgrim's Pride. In total, JBS/ Friboi raised R\$ 1.726 billion, with BNDES accounting for 99.92% of this total, or US\$ 1.724 billion. These examples indicate how the internationalization of JBS/Friboi's business and business-sector concentration is in some way linked to an official "industrial policy" implemented by BNDES, BNDESPar and pension funds.¹¹

The key question that arises is: was there any harm to the Brazilian meat market caused by the BNDES' loans? In order to shed some light on these questions we developed an empirical approach that uses the difference and difference methodology. Preliminary results show that the price received by farmers decreased and the price paid by consumers increased. These results indicate that meat producers and consumers are worse off after the PDP was implemented by the BNDES when we use price as comparison. More precisely, the PDP could have made the meat market more concentrated, allowing a handful of companies to control this market.

When analyzing the consumers paid price we found evidences that there was an increase of approximately 20% when we used coffee as a control group, 12% increase when we used orange as the control variable and 28% when we use sugar as control group. Analyzing the producers' side, there was a decline in prices of 3.9% using coffee as control, an increase in price of roughly 5.4% using orange as control group and when we use sugar as a control group we see a 20% increase in prices received by producers. Our results indicate that the increase in prices felt by consumer was not completely passed to producers.

⁹ According to the Relevant Fact published by JBS S.A., on December 31st 2009, the acquisition of Bertin was completed after approval by an extraordinary general meeting of its shareholders. As a result, JBS/Friboi and Bertin are now part of the same group. This M&A is awaiting a hearing by the Board of Economic Defense, CADE.

¹⁰ The amount of loans that each group received was: Bertin US\$ 1.7 billion, JBS / Friboi US\$ 2.7 billion, Brazil Foods US\$ 393 million, Minerva USD \$59.59million and Mafrig USD\$ 1.4 billion.

¹¹ In 2008 the four largest direct operations from BNDES in the industrial sector involved the "food/meat" sector. The Bertin group received loans worth R\$ 2.5 billion (26% of total); JBS, R\$ 700 million (14.66% of total); and Independência, R\$ 500 million (13.89% of total). Likewise, BNDES's stake in these groups, in 2008, was 26.92%, 13%, 16.66% and 13.89% respectively (Almeida, 2009).

In Section II, we explain the background behind some facts and some of our intuition. In Section III we establish an empirical approach to the questions and describe our database. In Section IV, we discuss our empirical findings. Section V contains some concluding remarks.

2. Background

In May of 2008 the Brazilian government released the Productive Development Policy (PDP) whose object was to promote the country's economic growth, driven by industrial development, obtaining results in the generation of jobs and increased competitiveness.

Among the 24 specific industry sectors that were highlighted in the PDP is the meat sector, but there is not a direct guidance indicating that the meatpacking sector, and specially the described groups,¹² should be the chosen sector. The implementation of the PDP is being carried out through partnerships and linkages between various public agencies and meatpacking industry. One of the most important public agencies in Brazil is the BNDES. BNDES has a very powerful and not very regulated project financing. As already said, the BNDES gave during the years 2008, 2009 and 2010 almost US\$ 4.8 billion to meatpacking companies, but did not disclaimed way the meatpacking companies were the chosen ones.

A first indicator to be analyzed in order to shed some light on a possible increased market power is the companies' profit. The profit of Brazil Foods in 2008, one year before the loan, was US\$ 29.5 millions. In 2009 was of US\$ 60.3 millions and in 2010 was R\$ 457 millions. So, we can see that Brazil Foods' profit was in an ascending path but we still can not say if the reason for that was the BNDES' loan, greater efficiency at the firm, increased demand for the firm's output, or something else. On the other hand, the profit of JBS in 2007, one year before the loans, was US\$ -87 millions. In 2008, the year of the first loan, the profit was US\$ 14 millions. In 2009, the year of the second loan, was US\$ 64.8 millions. But in 2010, the year of the third loan, the profit was US\$ -171.7 millions. One of the reasons for this loss was the fact that JBS was penalized by fines by the BNDES of more than US\$ 110 million. This time we can not see a clear ascending path.¹³ The profit of Minerva in 2008, one year before the loan was of US\$ -92.7 million. In 2009, the year of the loan the profit was of US\$ 37.7 million and in 2010 was of US\$ 12.5 millions. And finally, the profit of Marfrig in 2007, one year before the loans was of US\$ 13.9 million. In 2008, the year of the first loan, the profit was of US\$ -15.2 million. In 2009, the year of the second loan, the profit was of US\$ 390 million. And in 2010, the year of the third loan, the profit was of US\$ 84 million. We have to remember that one explanation for losses is the international financial crises that happened in 2008.

A second additional important information to analyze is the market value of the companies before and after the received loans. The market value of JBS in 2007 was US\$ 3.4

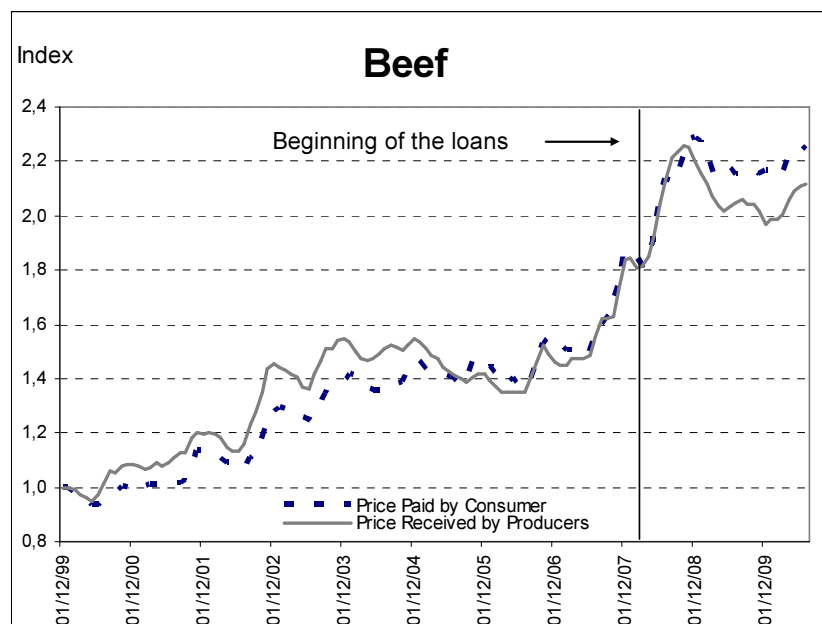
¹² See note 9

¹³ The Bertin company is not listed at the stock market, so we don't know what happened with their profit.

billion; in 2008 it was US\$ 3.4 billion; in 2009 it was US\$ 10.8 billion; and in 2010 it was US\$ 10 billion. From 2007 to 2010, JBS had a market value increase of 170%, in other words, more than tripled. The market value of Brazil Foods in 2008 was US\$ 4.4 billion; in 2009 it was US\$ 9.9 billion; and in 2010 it was US\$ 13.5 billion. So, in 3 years the market value of Brazil Foods grew 206%. The market value of Minerva in 2008 was US\$ 59.2 millions. In 2009, the year of the BNDES loans, the market value was US\$ 350 million and in 2010 was US\$ 434 million. So, after the loan Minerva had 491% increases in their market value. The market value of Marfrig in 2007 was US 2 billion. In 2008, the year of the first loan, it was US\$ 857 million. In 2009, the year of the second loan, it was US\$ 3.8 billion. And 2010, the year of the last loan, it was US\$ 3.2 billion. In three years of loans the market value of Marfrig increased 53%.¹⁴

A possible explanation for this increase in the market value of these companies could be the perception that the BNDES' loans would give these companies more market power. But this is purely speculative thinking. A good exercise to test this theory would be to look at other meatpacking companies that didn't receive any loans and compare their profit and market value with the ones that received the loans. However, this was not possible because all meatpacking listed in the stock market received loans from the BNDES.

A third central point was the possible problem caused by the PDP disrupting the internal meat market. Given that the meatpacking companies that received financial aid where not only able to grow but also to buy smaller companies that were struggling to survive the 2008 crisis. The result of these acquisitions could be a less competitive sector. This market disequilibrium could create a gap between the price farmers' received and the price paid by consumers shown below.



¹⁴ Again, we couldn't find the market value of Bertin.

The meatpackers companies that received financial aid from the government act as middlemen in the meat market, that is, they buy the animals from the farmers and sell the frozen meat to the final consumers. Therefore, if there is a market concentration in the hand of a few companies, then it is possible that this market power could turn into more profits for them. The meatpackers may be in a position to take over a largest slice of the consumer and producer surpluses.

All that we described in this section seems to be consistent with the facts and with the theory, but has not been tested empirically, and this is what we will do in the next section.

3. Empirical Approach

The goal of this empirical exercise is to measure if there was any harm to the Brazilian meat market caused by the BNDES' loans. The loans from the BNDES were made during three years, 2008, 2009, and 2010. Besides that, we do not know the exact date of the loans.

Two important events occurred in 2008 that shook the national meat market: the international financial crisis (officially beginning on September 15th with the bankruptcy announcement of Lehman Brothers¹⁵) and, simultaneously, the BNDES' loans to the meatpackers. However, since both episodes occurred almost at the same time, there is an initial impossibility to separate these effects in the price of Brazilian meat. This occurs because we don't know the precise date of the loans, and even if we knew, the effects would still be masked by the crisis, given that the events overlapped. Therefore, it is necessary to obtain a control group, i.e., a group with similar characteristics with the treatment group meatpacker but with no direct or indirect correlation with BNDES' loans. It is more likely to define a causal relationship (between the BNDES' loans and changes in the meat price in possession of a treatment and control groups), as opposed to just a simple correlation.

The choice of the control group was based upon the necessity of having similar characteristics to the treatment group (primary goods and important to Brazilian exports). It was also important that the control group has not suffered any impact from the BNDES' loans to the meatpackers. It is important to highlight that the selection of the control group must be carefully done given that it's what validates our empirical strategy. Take, as an example, the soybean industry; at first it seems to have all of the desirable characteristics that are needed to be part of the control group (important in the Brazilian exports basket, a primary good and not too important in terms of the imports basket). However, soybean is used as an input for cattle rations, therefore making it indirectly related to the BNDES loans. The same occurs with corn, another item that, in principle, seems ideal to compose the control group; however it is also used as an input for cattle rations. Based on the established

¹⁵Lehman Brothers Holdings Inc. was an investment bank and a provider of other financial services, with global activity. It was a global financial services company that, until declared bankruptcy in 2008, did business in the field of capital investments in fixed income sales, trading, and investment management. Its primary dealer was the U.S. Treasury securities Market. On September 15, 2008, the company filed for bankruptcy because it had losses caused by the subprime crisis in the United States. It is known as the biggest bankruptcy in U.S. history.

criteria, mentioned above, we will use three goods to compose our control group: oranges, sugar, and coffee.

We work with a database of over 128 observations and 8 variables. We divided the database into variables that contain prices received by farmers and prices paid by consumers. We work with one type of meat: beef. Our database therefore contains information on farmer's received price and consumer's paid price for these three types of meat. We also have three types of primary goods: orange, sugar and coffee. Analogously, we insert into the database the farmer's received price and the consumer's paid price for these three types of primary goods. The database has monthly periodicity, beginning in December 1999 and finishing in July 2010. We can thus observe the behavior of all variables before and after the BNDES loans. In section II-B, we give further details of our database.

3.1. Methodology

The application of the *difference-in-difference* (DID) methodology requires a control group and a treatment group. We were able to collect the price data of the control group (oranges, coffee, and sugar) and the treatment group (beef) from IBRE.¹⁶ The empirical strategy starts from the premise that BNDES selected a few meatpacking companies from the meat sector randomly. This premise is certainly subject to criticism; however, the BNDES does not explain why they chose some companies and not others. According to BNDES, it did not make discretionary choices with regards to the benefited sectors. Additionally, a strong hypothesis is needed for the implementation of DID methodology; we must assume that the treatment group and the control group have a common trend. This works, roughly, as parallel curves between the variables of control and the treatment group. We will try to demonstrate that these two groups (control and treatment) had the same macro trends until 2007, when the government only chose to help some companies pertaining to the treatment group.

The only way to separate the BNDES financial aid from the 2008 crisis is to compare the treatment group with the control group. They are both export goods so, presumably, they both should demonstrate similar effects before, during and after the crisis. The importance of the DID methodology relies on the ability to separate BNDES' loans effects from those arising from the 2008 crisis.

We can face the granted loans as a natural experiment once it was characterized by a phenomenon that induced a randomization between eligible agents (exports goods) to "treatment." This method is typically used to make comparisons between groups before and after the phenomenon (BNDES' loans in our case).

We assume a change in policy occurs at time $t = k$ and each individual observed before and after the policy change, at times $t = t_0 < k$ and $t = t_1 > k$, respectively. For simplicity of notation, we denote by d_i (without the time subscript) the treatment group to which individual i belongs to. This is identified by the treatment status at $t = t_1$. Therefore,

¹⁶<http://portalibre.fgv.br/>.

the group beef, pork and poultry have $d_i = 1$ and the group orange, coffee and sugar have $d_i = 0$.

The DID estimator uses a common trend assumption between the control and the treatment¹⁷ group, i.e., as if both groups presented parallel curves over time.¹⁸ Since DID is based on randomization hypothesis assumption¹⁹, therefore there is no specific factor in the treatment group that can explain a shift in its price but not in the control group's price. In other words, on average, everything that affects the treatment group, besides the BNDES' loans, also affects the control group. Hence, the groups are supposedly similar.

Under the DID hypotheses and with a little algebra²⁰ it is possible to have an estimator:

$$\hat{\alpha} = [\bar{y}_{t_1}^1 - \bar{y}_{t_0}^1] - [\bar{y}_{t_1}^0 - \bar{y}_{t_0}^0] \quad (1)$$

Where $\bar{y}_t^d$ is the average outcome over group d at time t . DID estimator measures the excess outcome change for the treated as compared to the non-treated.

The DID identification depends on the hypotheses that the control and treatment variables have the same macro trends, i.e., are subject to the same macro shocks. If this is not true, then the DID estimator won't consistently estimate the desired parameter.

3.2.Data

The database has monthly periodicity, begins in December of 1999 and finishes in July of 2010; therefore, we can observe the behavior of all variables before and after the BNDES' loans. As previously mentioned, the treatment group consists of beef. To evaluate the impact of the BNDES loans to the meatpackers, we used the producer's received price series from Fundação Getúlio Vargas – FGV: Beef (pp_b). To assess the impact on consumer we used the consumption price index (CPI) also from FGV: Beef (pc_b).

The control group consists of orange, coffee and sugar. From the producer side, the data belong to the same producer's received price series: Orange (pp_o), Coffee (pp_c) and Sugar

¹⁷i.e, $y_{it} = \beta + \alpha_i d_i + u_{it}$

where $E(u_{it} | d_i, t) = E(n_i | d_i) + m_t$

In the equation above, n_i is an individual fixed effect unobservable and m is an aggregate macro shock.

¹⁸It is not necessary to be so strict on this aspect. The explanation is merely illustrative.

¹⁹ $E(u_{it_1} - u_{it_0} | d_i = 1) = E(u_{it_1} - u_{it_0} | d_i = 0) = E(u_{it_1} - u_{it_0})$

²⁰Under DID hypothesis: $E(y_{it} | d_i, t) = \beta + E(a_{it} | d_i = 1) + E(n_i | d_i = 1 + m_t)$ se $d_t = 1$ e $t = t_1$

We can eliminate both β and the errors by doing sequential differentiations:

$$\hat{\alpha} = E(\alpha_i | d_i = 1) = [E(y_{it} | d_i = 1, t = t_1) - E(y_{it} | d_i = 1, t = t_0)] - [E(y_{it} | d_i = 0, t = t_1) - E(y_{it} | d_i = 0, t = t_0)]$$

This is precisely the DID identification strategy: $\hat{\alpha} = [\bar{y}_{t_1}^1 - \bar{y}_{t_0}^1] - [\bar{y}_{t_1}^0 - \bar{y}_{t_0}^0]$

(pp_i). From the consumer's perspective the series is, again, the CPI: Orange²¹ (pc_o), Coffee²² (pc_{cf}) and Sugar²³ (pc_i). All of the variables are in logarithms ($\ln(x)$ where x is a price variable).

4. Empirical Findings

As mentioned, DID was used as our model. The estimation was made in pars, i.e., comparisons of beef from the treatment group with the element j from the control group. Therefore, the results presented have the equation (1) structure, repeated above:

$$\hat{\alpha} = [\bar{y}_{t_1}^1 - \bar{y}_{t_0}^1] - [\bar{y}_{t_1}^0 - \bar{y}_{t_0}^0] \quad (1)$$

Where i =beef and j = orange, coffee, sugar. Note that more than one estimator can be estimated.

The estimation of equation (1) is only possible based on the assumption, among others already mentioned, that there is a common trend between the variables. To reaffirm this common tendency we shall use the following parameters as an evaluation method: (1) series' graphs (to perform a visual analysis); (2) $\rho_{x,y}$: correlation²⁴ among variables x and y ; and (3) t statistic of a simple regression²⁵- between treatment variable (y) and control variable (x) - bigger than 2.57, i.e., at 1% level of significance.

The series that presented a larger correlation than 0.75²⁶ and $\hat{\beta}$ at the 1% level of significance were considered to have the same macro trends and, therefore, were able to be estimated using equation (1). Put in another way, the variables that successfully pass criteria (1)-(3) are able to become a part of the control group.

The sequence of analysis was first to visually analyze the graphs to determine whether there were any common tendencies. Next, we verified the correlation index among the variables. And finally, we analyzed the t statistic concerning the simple regression between the treatment and control variables (Table 1).

²¹ The pera orange corresponds to about 70% of the Brazilian cultivated area.

²² We chose ground coffee instead of instant coffee due to the smaller availability of data from the last.

²³ We chose white sugar instead of coarse sugar due to less availability of data from the last.

²⁴ Correlation coefficient indicates the strength and direction of the linear relationship between two random variables. The correlation can vary between -1 and 1, where 1 indicates perfect correlation, 0 indicates no correlation and -1 indicates perfect negative correlation.

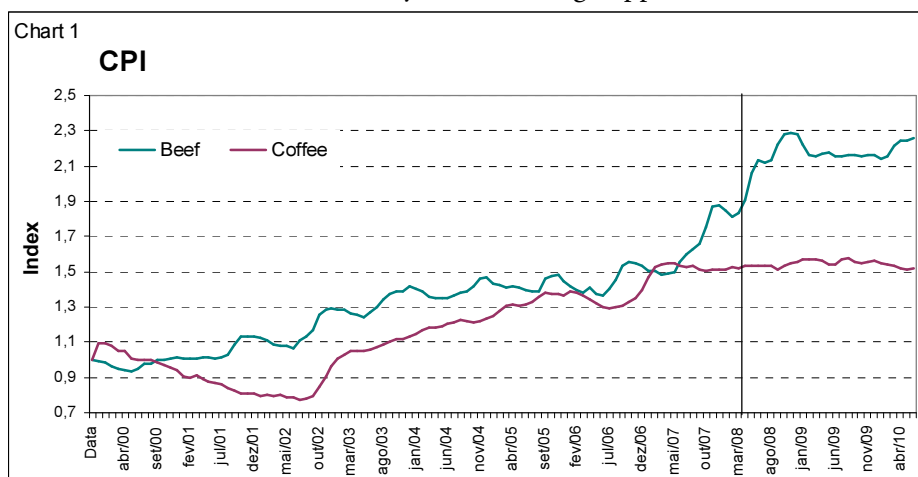
²⁵ T statistic of β comes from a simple regression: $y = k + \hat{\beta}x$

²⁶ This parameter choice was *ad hoc*.

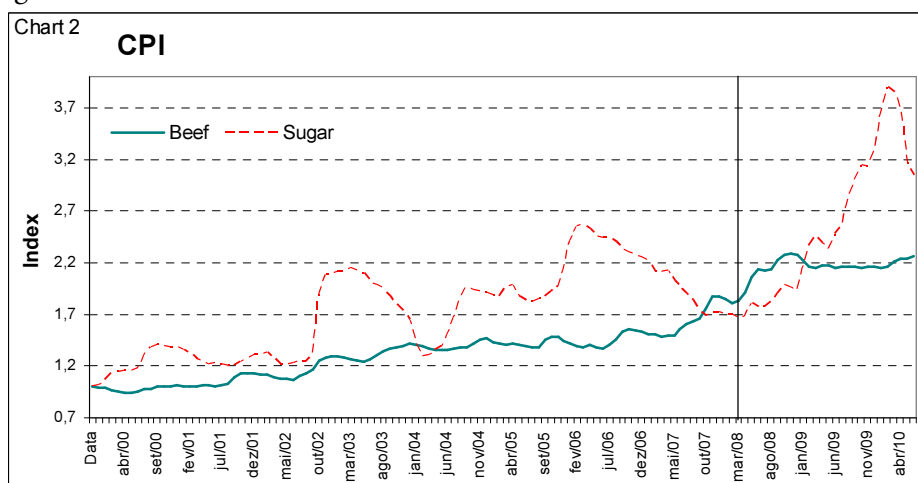
Table 1

		Beef	
		Price Paid by Consumers	Price Received by Producers
Coffee	Price Paid by Consumers	$t=14.76$	-
	Price Received by Producers	-	$t=9.09$
Orange	Price Paid by Consumers	$t=19.24$	-
	Price Received by Producers	-	$t=13.57$
Sugar	Price Paid by Consumers	$t=8.89$	-
	Price Received by Producers	-	$t=9.69$

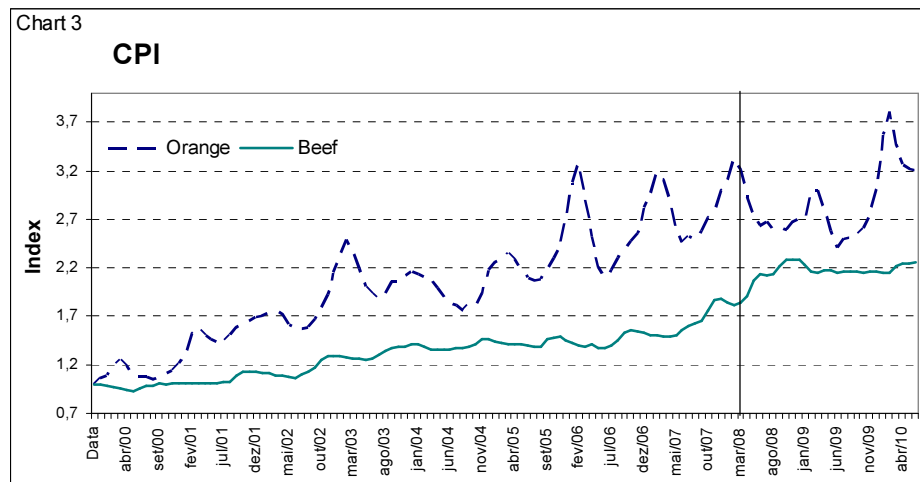
As we can see, all 6 t statistic are bigger then 2.57, therefore at 1% level significance. Let us now perform the analysis by groups: (chart 1) beef with coffee, (chart 2) beef with sugar and (chart 3) beef with orange. In the group 1, beef with coffee, it was possible to confirm the common trend before the beginning of the loans. But about one year before the loans the tendencies started to chance. So maybe, something happened before the loans.



In group 2, beef with sugar, it was not possible to confirm the common trend before the beginning of the loans.

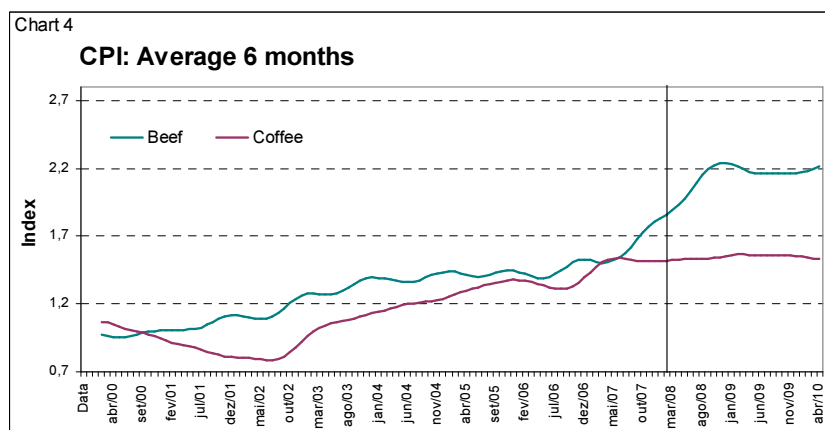


In group 3, beef with orange, it was not possible to confirm the common trend before the beginning of the loans. And even after the loans, we don't see a big change in the series.

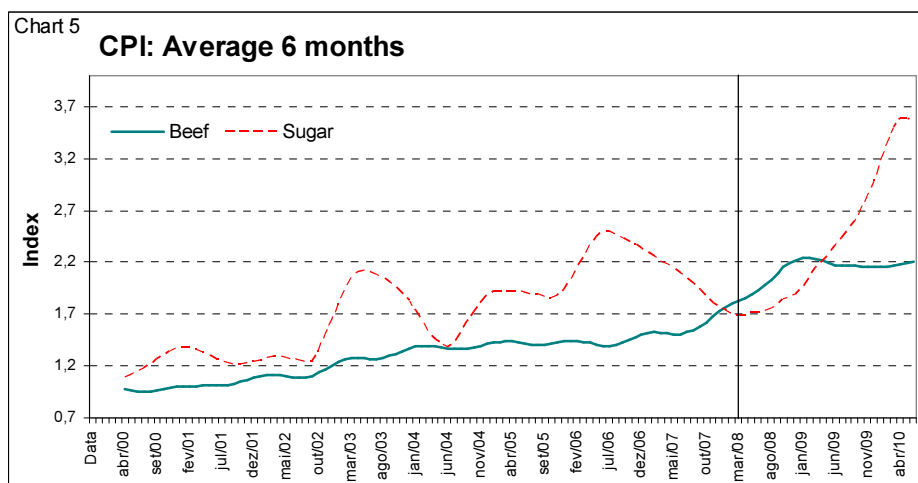


Prices might not be the best variables to compare because of their volatility. So, in order to mitigate this problem we will use the same series but with a six month running average instead of monthly data.

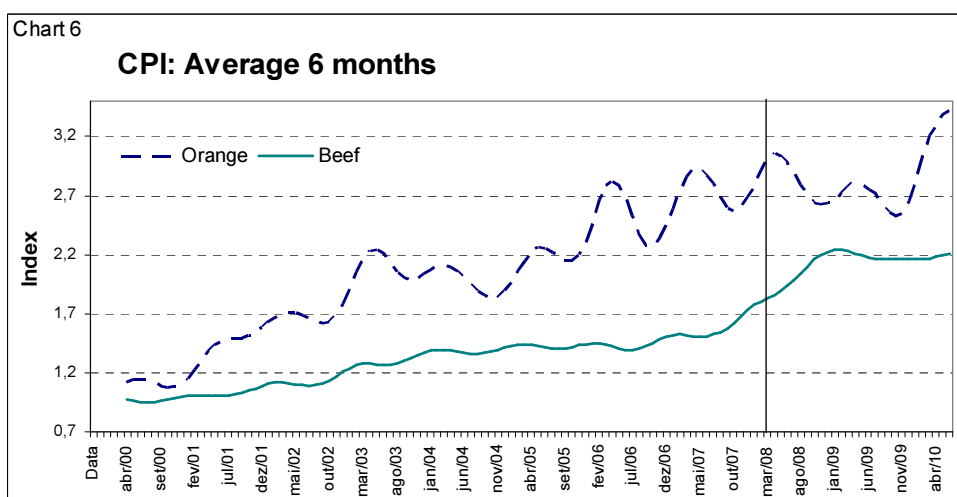
In chart 4, we can again observe a clear tendency among the series beef and coffee before the loans.



In chart 5, again we cannot see a tendency among beef and sugar.



In chart 6, again we can see an ascendant tendency among beef and orange but no important change after the loans.



The next item to be analyzed is the correlations between series. We are only interested in correlations above 0.75, as shown in Table 2.

Table 2

		Beef	
		Price Paid by Consumers	Price Received by Producers
Coffee	Price Paid by Consumers	$\rho=0.82$	-
	Price Received by Producers	-	$\rho=0.83$
Orange	Price Paid by Consumers	$\rho=0.88$	-
	Price Received by Producers	-	$\rho=0.80$
Sugar	Price Paid by Consumers	$\rho=0.66$	-
	Price Received by Producers	-	$\rho=0.69$

Correlation coefficient among line and column items. Note that it only makes sense to calculate correlations between the same types of price (or price paid by consumers vs. price paid by consumers or price received by producers vs. price received by producers).

The most correlated series with beef is oranges ($\rho=0.88$) for price paid by consumers and coffee ($\rho=0.83$) for price received by producers. This last one goes in the same direction of the charts, once they showed that coffee was the only one with the same macro trend before the beginning of the loans.

After confirming the hypothesis of a common trend, we estimated the coefficients of interest (Table 3) using equation (1). Analyzing separately, one can note that the BNDES' loans had an impact on beef prices. At the consumers paid price segment, there was an increase of approximately 20% when we used coffee (at the 1% significance level) as a control variable, 12% increase when we used orange as the control variable (at the 10% significance level) and 28% when we use sugar as control group (at the 1% significance level). Looking at the producers' side, there was a decline in prices of 3.9% (no significance) using coffee as the control, an increase in price of roughly 5.4% (no significance) using orange as the control group, and when we use sugar as the control group, we see a 20% increase in prices received by producers (no significance).

As mentioned before, most series have a common trend. So, we will only consider the parameters from the groups coffee and sugar, since they were the only ones that passed through our criteria. In all analyzed cases, the prices paid by consumers grew but the same didn't happen with the price received by farmers. The increase in meat prices paid by consumers grew more than proportionally to the increase (or even decrease) in price received by farmers. Our findings indicate that the BNDES loans' in fact disrupted the internal meat market making the consumer pay more and the producer receive less

Table 3

		Beef	
		Price Paid by Consumers	Price Received by Producers
Coffee	Price Paid by Consumers	$\alpha = 20\% (0.00^*)$	-
	Price Received by Producers	-	$\alpha = -3.9\% (0.47)$
Orange	Price Paid by Consumers	$\alpha = 12\% (0.07)$	-
	Price Received by Producers	-	$\alpha = 4\% (0.55)$
Sugar	Price Paid by Consumers	$\alpha = 28\% (0.00^*)$	-
	Price Received by Producers	-	$\alpha = 20\% (0.00^*)$

Equation (1) coefficient.

Between parentheses is the p-value. (*) Means 1% significance

Our results show that there is evidence that farmers started receiving less and that consumers started paying more and that only happened after the sector receiving BNDES loans. The loans offered by BNDES to the meatpacking industry seem to have caused a concentration of power in the meat market in Brazil. The meatpacking industry would be extracting the producers' profit and hence the consumers' surplus.

A future research could supplement the results of this article by inserting some points not yet addressed here. First, it would be interesting to use an index to verify whether there

really was a greater market concentration in meat packing industry in Brazil after the BNDES' loans, such as, the Herfindahl-Hirshman (HHI) index. It would also be interesting to try to find other control groups or complement the group that has already been used in the article.

5. Conclusion

In both academia and in politics, the theme of industrial policy has returned to the center of discussions. Not that it had completely disappeared, but it was for some time relegated to the sidelines. The debate is controversial and sometimes heated. On one side we have those who are against any kind of industrial policy. On the other, there are those who equate economic growth to industrial policies. We tried to shed some light over this debate. We empirically demonstrated the impact of BNDES' loans on the Brazilian meat market by using the difference-in-difference methodology.

Our results indicate that there is evidence that profits into the meatpacking industry have increased because of the BNDES loans. Or put another way, that farmers started receiving less and consumers started paying more because of the BNDES loans. Analyzing the beef segment, we conclude that there is evidence that the price paid by consumers increased by 20% (1% significance) and the price received by farmers fell by about 3.9% (no significance), using coffee as a control group. That means, in the period of time analyzed, consumers had to spend 20% more money to purchase beef instead of coffee, while beef producers received 3.9% less compared to coffee makers.

Even if we use oranges as a control group the prices would have been mismatched. In this case, the consumers' price increased approximately by 12% (10% significance) and the price received by the farmers increased about 4% (no significance), i.e., the gains were not passed through. The increase in the price of meat for the consumer was higher than the increase in the price received by farmers.

Numbers get closer when we take sugar as the control group. One can notice that beef price paid by consumers increased 28% while the amount received by producers raised 20%, both 1% significance. However, it is worth to remember that sugar was not chosen as a perfect control group in account of the lack of common trend between both variables.

With these results, we have incentives to discuss clear and transparent criteria for the process of decision-making for industrial policies strategies. Once the discussion is no longer whether to have an industrial policy, but at what price we should have one.

Moreover, if we assume that any form of industrial policy should be directed to gains for society and not for profit of private business groups, then we must safeguard from dubious practices and abuses, as well as, to proceed with the use of transparent and accountable instruments to promote industrial policy. We can seize the momentum of Brazil as an opportunity to think and invent alternatives regarding the goals and ways to make industrial policy. Yet, at same time, we must ensure the possibility of transparency and control mechanisms of the democratic decision making process. We have an opportunity to innovate. But we must take it responsibly.

6. Bibliography

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