

THE COVID-19 PANDEMIC AND THE EFFECTS ON THE COLLECTION AND DISTRIBUTION OF FETHAB IN THE MUNICIPALITIES OF MATO GROSSO

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Abstract

The economic repercussions caused by Covid-19 generated an abrupt drop in supply and demand in most economic activities and signs of recession worldwide. World Bank projections in 2020 show the effects of the Covid-19 pandemic, causing a 5.2% reduction in world growth in 2020. Agribusiness, through commodity exports, positively affected the Brazilian trade balance. The objective of this work was to measure the effects of the Covid-19 pandemic on the collection and distribution of State Fund for Transportation and Housing (FETHAB - Fundo Estadual de Transporte e Habitação) in the municipalities of Mato Grosso. The methodology used was the differences-in-differences model, with a cut-off from the beginning of the records of Covid-19 cases in Mato Grosso. The monthly data panel for the municipalities of Mato Grosso was built using information from the FETHAB resources extracted from the electronic address of the Secretariat of Finance of the State of Mato Grosso (SEFAZ/MT) for the period from 2019 to 2021, together with monthly export data (Siscomex) and prices (Conab). The results show that there was a 37% increase in exports. This also raised commodity prices by 73% for soybeans and 83% for a bag of corn. As a result of the increase in exports, there was also an improvement in the FETHAB collection and distribution of around 11%. The devaluation of the real against the dollar and the increase in demand for food caused an increase in prices and exports and, consequently, an improvement in the collection and distribution of FETHAB to the municipalities of Mato Grosso.

Keywords: Covid-19 Impact. Agribusiness Exports. FETHAB Collection. Economic Analysis Mato Grosso.

1. Introduction

The Covid-19 pandemic impacted various activities in the agribusiness sector. Data from IBGE on agribusiness GDP growth showed a slowdown in April and May 2020. Despite production demand interruptions in agrifood markets affecting food production and availability, agribusiness still managed to maintain active wealth and income generation, sustaining not only its productive sector but also the national economy, devastated by the economic crisis (Alpino et al., 2020). Thus, even during the Covid-19 crisis, agribusiness presented satisfactory results, mitigating the impact on the Brazilian economy, which could be key to recovery (Cirillo, 2020).

Macroeconomic prospects for agribusiness are seen positively, as indicated by IPEA, with a 1.5% growth in 2021. CONAB forecasted a 3.1% increase in grain production, highlighting a 7.1% increase for soybeans. Cotton showed a 12% reduction, while corn remained stable (Barros & Castro, 2020).

The State of Mato Grosso is the leader in national agricultural production, standing out as the largest producer of commodities like soy, corn, cotton, and beef, contributing to balancing the Brazilian trade balance (SEDEC, 2022). However, the transportation of this production is predominantly by road, representing one of the biggest bottlenecks in the sector, reducing market competitiveness. The state government, aiming to consolidate agribusiness expansion, has invested in public development policies. In this context, FETHAB is seen as a rural producers' contribution in the state to infrastructure (Mattiolo & Figueiredo, 2011).

The Covid-19 pandemic, which erupted in March 2020, impacted the global economy, and mandatory social isolation along with border closures led sectors into recession (IPEA, 2020). As part of the Covid-19 combat measures, investments were made in the health sector, creating new ICU beds and field hospitals, challenging governments financially. However, the State of Mato Grosso raised an additional 262 million through FETHAB between January and April 2020, according to the State Legislative Assembly. The use of technologies in the field allowed the sector to continue producing and showing good results even amidst the crisis (CEPEA, 2021). It is important to assess whether FETHAB's contribution was significant for health investment in Mato Grosso's

municipalities and the fight against the Covid-19 pandemic, reinforcing agribusiness's impact on the state's economy.

Given the above, the research question arises: Did the Covid-19 pandemic contribute to increasing the demand for food and commodities, thereby boosting exports from Mato Grosso and, as a result, the commercialization of exported products? Could an improvement in export figures and price increases driven by marketing affect the collection and distribution of FETHAB resources? To answer this question, the study aims to analyze the effects of the Covid-19 pandemic on the collection and distribution of FETHAB in the municipalities of Mato Grosso. Its specific objectives are to gather FETHAB collection and distribution data for municipalities from 2019 to 2021, quantify export data and commodity prices, and estimate the effects on FETHAB collection and distribution during the same period.

The agribusiness sector was one of the few that remained operational during the most critical periods of the pandemic. Therefore, research involving public policy through resource distribution to reduce regional inequality and investment of these resources to combat the pandemic is justified. In this sense, FETHAB is an important collection tool for the state government of Mato Grosso, enabling the distribution of resources to municipalities contributing to the agribusiness GDP that drives the Mato Grosso economy's various production chains.

2. Theoretical Framework

About the perception of the fund as a tax exemption is misleading, the Transport and Housing Fund (FETHAB) of Mato Grosso, established by Law No. 7.263 of 2000, is a public policy initiative for state development. Created to offset the damage caused by the exemption of ICMS (Tax on Circulation of Goods and Services) by the federal government under the Kandir Law, it necessitates taxpayers to contribute to FETHAB, even on exports that are tax-immune under the law, leading to potentially unconstitutional taxation (Sijbrandij, 2019; Cescon & Junior, 2020). It is characterized as a contribution from rural producers intended to finance resources for the planning and execution of transport and housing works and services in the state. Initially levied on soy production, it was later expanded to include other livestock, cotton, wood, fuel, and natural gas activities (Mattiello & Figueiredo, 2011).

There is a clear need for better resource distribution in a state with vast territory and leading agricultural production, yet with precarious road transport, increasing product costs and reducing market competitiveness. Therefore, a new model for the fund was proposed (SEDEC, 2022). The enactment of the new FETHAB through Law 10.353/2015 activated, in 2016, the FETHAB Board of Directors, representing society and taxpayers, and granting them decision-making power in fund utilization. This change addressed the old law's inadequacy in meeting infrastructure demands. The new law anticipates the creation of Regional Funds for the road network, with contributions from commodities (soy, cattle, cotton, and wood) earmarked for transport infrastructure improvement (SINFRA, 2016).

The nine regional funds aim for additional regional investment, approved by the FETHAB Board, marking legislative and social progress. Collections from cotton, cattle, and soy contribute to these funds, excluding wood. The new FETHAB law also allocated resources from diesel oil collection, accounting for 60% of the fund. An increase in the diesel rate, authorized by Governor Pedro Taques, from R\$0.18 to R\$0.19 per liter, was implemented to finance more projects.

The diesel collection is split: 50% to the State and the rest to the 141 municipalities, based on criteria like road paving, inverted HDI, population, and collection. Notably, 50% of the total is allocated to municipalities as per regulation: at least 35% for construction and maintenance of unpaved state and municipal highways, and up to 15% for housing, sanitation, and urban mobility (SINFRA, 2016).

Historically, Brazil has federalism as a system of government, subdividing into federative entities (Union, States, Federal District, and Municipalities), granting each governmental autonomy (Rosler, 2019). However, development support policies through tax exemptions can lead to revenue loss, as with the Kandir Law. States use ICMS exemptions to attract new investments, but this reduces state and municipal revenue, increasing dependence on resource transfers.

Thus, the need for transfers to contribute to the development of municipalities, especially smaller ones, which receive more transfers through the inverted HDI criterion, underscores the influence of FETHAB on municipal budget revenues.

3. Methodological Procedure

The coherent classification of a research depends on the adoption of criteria. According to Gil (2022) research can be classified according to the area of knowledge, purpose, general objectives, and methods used. This research is characterized as basic in terms of purpose. As for the objectives, still according to Gil (2022), the study can be characterized as descriptive research, as it seeks to analyze characteristics of the values collected by the diesel oil front and transferred by FETHAB to the municipalities of the state of Mato Grosso, as well as their effects on increasing their revenue collection.

Regarding the method employed, bibliographic research was used to develop the reference topic and the bibliographic review. The documentary research was used to obtain data regarding the collection of the municipalities of Mato Grosso. To obtain data and construct the panel, monthly data were collected from 141 municipalities over the years 2019 and 2021, for FETHAB values, exports, and prices, as well as population control variables and HDI. The monthly data panel for the municipalities of Mato Grosso was built using information from the FETHAB resources extracted from the electronic address of the Secretariat of Finance of the State of Mato Grosso (SEFAZ/Mt) for the period from 2019 to 2021, together with data monthly exports (Siscomex) and prices (Conab).

The econometric model envisaged for assessing the effects of Covid-19 consists of the differences-in-differences model for the post-pandemic period, identified through the number of case records in June 2020. The differences-in-differences model originated in the field of econometrics and, according to Fávero (2020), this model is a technique already used since the 1850s by John Snow, also known as “before and after control study” in social sciences.

$$\log Fethab_{imt} = \beta_0 + \beta_1 COVID19_{imt} + \theta X_{imt} + \lambda_{mt} + \varepsilon_{imt}$$

Where $\log Fethab_{imt}$ corresponds to the result of interest for municipality i , in month m and year t . $\beta_1 COVID19_{imt}$ is an indicator that takes the value equal to 1 for the period (month and year) in which Mato Grosso was quantitatively affected by the Covid-19 pandemic, based on the records of cases identified by the health department of the State of Mato Grosso, or that is, in June 2020, and 0 corresponds to the period (month and year) prior to the pandemic, that is, the entire year from 2019 to May 2020. θX_{imt} is a group of covariates described in the data section. λ_{mt} represents a fixed effect of time. Finally, ε_{imt} an error term. The dependent variable, or the outcome of interest, corresponds to the collection and distribution of FETHAB resources. Other dependent variables are also used. The variable corresponds to the logarithm of total exports in dollars made by Mato Grosso in the period analyzed and the second is due to the variables of log prices of soy and corn for the same period.

The differences-in-differences model represents the most appropriate method when used in conjunction with the fixed effects model. The fixed effects model makes it possible to identify the behavior of heterogeneity and interdependence considering the same β coefficients for all individuals, except β_{1i} which remains specific for everyone, which does not detract from the homogeneity of the data. Still, to statistically guarantee our results, we applied heterogeneous response tests. Heterogeneous response tests are performed through regressions with sample subgroups with

municipalities with populations above and below the average, as well as human development Index (HDI). Table 1 presents the descriptive statistics of the variables used to estimate the model.

Table 1. Descriptive statistics of the variables used to estimate the model.

variable	Obs.	average	Std.Dev.	Min.	Max
FETHAB	5076	149947	75142	40545	473487
soybean bag price	5076	111.69	40.91	60.97	170.13
corn bag price	5076	46.03	20.21	21.44	78.99
exports	5076	1.04e+07	2.67e+07	0	2.87e+08
Pop.	5076	31.596	97.754	1.525	946
HID	5076	0.684	.0381	.538	.785

Source: COMEXSTAT. Ministério da Indústria, Comércio Exterior e Serviços–MDIC (2022).

4. Presentation and Analysis of Results

The analysis of the impact of Covid-19 on exports from Mato Grosso commenced in June 2020, marking the onset of the pandemic in the state. Table 2 showcases the outcomes of this analysis, focusing on export estimates. These observations utilize the differences-in-differences model to elucidate the pandemic's effects on exports. The data in the table reveal a notable positive and significant shift in the volume of products exported from Mato Grosso post-pandemic onset, fueled by heightened external demand.

In quantifiable terms, table 2 illustrates a remarkable 37% surge in total exports for the period under review. In absolute figures, this translates to a monthly export increment of approximately US\$ 1,975,263. This information, sourced from COMEXSTAT and based on the declarations from exporters and importers, is accessible via the Ministry of Industry, Foreign Trade and Services.

Furthermore, table 3 lays out the findings related to commodity price assessments. The observations here underscore the heightened demand for agribusiness products, particularly commodities, as a repercussion of the Covid-19 pandemic. This demand spike has exerted a positive and significant influence on the prices of key commodities like soybeans and corn. This trend is predominantly attributed to the robust external demand and increased exports.

Additionally, these trends hint at a broader economic narrative. The pandemic, while presenting numerous challenges, has also unexpectedly catalyzed certain sectors. The export landscape of Mato Grosso, particularly for commodities, stands as a testament to this phenomenon. The state's ability to not only maintain but also increase its export capacity during such turbulent times highlights its strategic role in the global agribusiness supply chain. This resilience and growth amidst adversity offer vital insights into the adaptability and potential of the region's export sector in the face of global economic shifts.

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Table 2. Effects of the Covid-19 pandemic on exports from municipalities in Mato Grosso.

Variable	Exports %	Exports US\$
COVID-19 pandemic	37.***	1.975.263*
Std. Dev.	(0.072)	(900760.2)
Fixed Effects	yes	yes
covariates	yes	yes
Number of Obs.	5076	5076

Note: Standard Errors are in parentheses. *** represents significance at p<1%; ** represents significance at p<5%; * represents significance at p<10%; Fixed effects are estimated by state and municipality.

Source: COMEXSTAT. Ministério da Indústria, Comércio Exterior e Serviços–MDIC (2022).

The results in Table 3 show a 73% increase in the monthly price of a sack of soy released by CONAB (the national supply company). This increase represented an increase of R\$ 77.00 in monthly absolute values per soybean bag. Similarly, also driven by the demand for commodities, the agricultural product for export of corn increased by R\$ 36.00 after the start of the pandemic, which represented an increase of 83% compared to the pre-pandemic period (table 4).

Table 3. Effects of the Covid-19 pandemic on the bag price of soybeans in the municipalities of Mato Grosso.

Variable	soybean bag%	soybean bag price R\$
COVID-19 pandemic	73.***	77.00***
Std. Dev.	(0.017)	(2.693)
Fixed Effects	yes	yes
covariates	yes	yes
Number of Obs.	5076	5076

Note: Standard Errors are in parentheses. *** represents significance at p<1%; ** represents significance at p<5%; * represents significance at p<10%; Fixed effects are estimated by state and municipality.

Source: CONAB (2022).

Table 4. Effects of the Covid-19 pandemic on the bag price of corn in the municipalities of Mato Grosso.

variable	corn bag%	corn bag price R\$
COVID-19 pandemic	83.***	36.00***
Std. Dev.	(0.029)	(1.844)
Fixed Effects	yes	yes
covariates	yes	yes

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Number of Obs.

5076

5076

Note: Standard Errors are in parentheses. *** represents significance at p<1%; ** represents significance at p<5%; * represents significance at p<10%; Fixed effects are estimated by state and municipality.

Source: CONAB (2022).

Table 5 presents the main result of the research with effect from the beginning of cases of the pandemic in June 2020, as it allows the observation of the effects of Covid-19 on FETHAB collection through the differences-in-differences model. It is possible to observe that after the beginning of the pandemic, there was a positive and significant effect regarding the increase in the distribution of resources from FETHAB to the municipalities of Mato Grosso. The results showed an increase of 11.4% in the monthly distribution of funds. In absolute terms, it represented an increase of BRL 16,930.00 per month in distributed funds.

Table 5. Effects of the Covid-19 pandemic on the distribution of FETHAB in the municipalities of Mato Grosso.

variable	FETHAB%	FETHAB R\$
COVID-19 pandemic	11.4%***	16,930***
Std. Dev.	(0.036)	(5528.48)
Fixed Effects	yes	yes
covariates	yes	yes
Number of Obs.	5076	5076

Note: Standard Errors are in parentheses. *** represents significance at p<1%; ** represents significance at p<5%; * represents significance at p<10%; Fixed effects are estimated by state and municipality.

Source: SEFAZ/MT (2022).

Table 6 presents the results of estimations with robustness tests for population quantity, larger and smaller than the average. Robustness estimation with population information becomes important to analyze the fact that municipalities with lower population rates could alter the distribution of FETHAB resources.

Table 6. Effects of the Covid-19 pandemic on the distribution of FETHAB in Mato Grosso municipalities according to population.

Variable	FETHAB> 25.000 hab.	FETHAB< 25.000 hab.
COVID-19 pandemic	10.4%***	11.4%***
Std. Dev.	(0.036)	(0.036)
Fixed Effects	yes	yes
covariates	yes	yes
Number of Obs.	5076	5076

Note: Standard Errors are in parentheses. *** represents significance at p<1%; ** represents significance at p<5%; * represents significance at p<10%; Fixed effects are estimated by state and municipality.

Source: SEFAZ/MT (2022)

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From the estimates, it is possible to observe a positive and significant effect regarding the increase in the distribution of resources from FETHAB for the largest municipalities in terms of population of 10%, which represented in absolute values R\$ 21,146.82. For municipalities with a smaller population index, the results also registered an increase of 11% in the total distributed to smaller municipalities. In absolute values, it represented an increase of R\$ 14,915.8 in the distribution in the analyzed period.

Table 7. Effects of the Covid-19 pandemic on the distribution of FETHAB in Mato Grosso municipalities according to HDI.

Variable	FETHAB > 0.684 hdi	FETHAB < 0.684 hdi.
COVID-19 pandemic	11.%***	10.%***
Std. Dev.	(0.036)	(0.036)
Fixed Effects	yes	yes
covariates	yes	yes
Number of Obs.	5076	5076

Note: Standard Errors are in parentheses. *** represents significance at p<1%; ** represents significance at p<5%; * represents significance at p<10%; Fixed effects are estimated by state and municipality.

Source: SEFAZ/MT (2022).

Table 7 presents the results of estimations with robustness tests when considering the HDI of the municipalities, higher and lower than the average. FETHAB considers the inverted HDI, distributing greater resources to smaller municipalities.

From the estimates, it is possible to observe a positive and significant effect regarding the increase in the distribution of resources from FETHAB for the largest municipalities in terms of population of 11.3%, which represented in absolute values the amount of R\$ 16,758.98. For municipalities with a smaller population index, the results also registered an increase of 10.9% in the total distributed to smaller municipalities. In absolute values, it represented an increase of R\$ 16,192.70, in the distribution in the analyzed period.

5. Conclusion

The present work aimed to evaluate the effects of the Covid-19 pandemic on FETHAB exports, prices, and distribution in the municipalities of Mato Grosso. The methodology consisted of using data on the collection and distribution of FETHAB resources, available at the Mato Grosso State Finance Department (SEFAZ/Mt) website, which, together with data from the Ministry of Foreign Trade for export data and the Company national supply relative to commodity prices. From this, a data panel of exports and prices was built, to later apply the technique known as panel data regression model.

The results showed an increase of 37% in exports from the municipalities of Mato Grosso. This also sent commodity prices up over 70%. The export of products linked to agribusiness had a positive effect on FETHAB's collection and distribution of around 11.4%. The devaluation of the real against the dollar and the demand for food caused a price increase, with a 73% increase in the price of a sack of soybeans and an 84% increase in a sack of corn, considering the pandemic period.

6 Implications and Further Research

The results of this work provoke the debate about the pandemic, taxation of agribusiness and its possible effects on the demand for products and prices. It also discusses the consequences of the Kandir Law in the affected states, requiring changes in the tax regime to maintain the collection, in this case, FETHAB. The consequences of these results are beneficial when it comes to collecting and distributing resources. The work has limitations regarding the number of variables needed to adjust the proposed model.

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