

Assessing Brazil's Fiscal Deficit Financing Strategy during the COVID-19 Pandemic

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Abstract

The purpose of this paper is to analyze the financial channels to finance Brazil's fiscal expansion during the COVID-19 pandemic. We emphasize the changes in the financing conditions of Brazil's fiscal deficit, showing that an increase in government's expenditures resulted in the expansion of Brazil's monetary base and in Brazil's Central Bank open market operations. Moreover, we developed a financial agent model to demonstrate how the transmission mechanisms led to the monetary financing of Brazil's fiscal strategy during the COVID-19 pandemic.

Keywords

Fiscal Deficit Financing, Brazil, COVID-19 Pandemic

1. Introduction

The Brazilian government adopted an aggressive fiscal response in order to address the impact and economic challenges and risks imposed by the COVID-19 Pandemic. According to the Ministry of Economics, the size of the fiscal stimulus package amounted to 7.5% of Brazil's GDP. This fiscal stimulus package took the form of an across-the-board tax reduction and an increase in government expenditures. It is important to note that Brazil's fiscal incentives were much higher than the average for emerging economies, 4.3% of GDP, and more similar to the ones experienced by developed nations, 7.1% of GDP. Brazil's fiscal stimulus package, coordinated with a monetary and exchange rate policy, played a vital role in keeping Brazil's economic activity, employment, and income at a somewhat reasonable level during the COVID-19 pandemic. For instance, in 2020, Brazil's GDP contracted by only 4.1%, a much better performance than many other emerging and developed economies. On the other hand, Brazil paid

a heavy price as a result of a deep fiscal imbalance (Baldwin & Weder di Mauro, 2020; Eichenbaum et al., 2020; Pineda, Valencia, & Andrian, 2020).

Table 1 showcases the deterioration of Brazil's fiscal standing. For instance, Brazil's domestic debt increased from 74.26 of its GDP in 2019, to 89.28% of GDP in 2020. In all, Brazil saw a dramatic worsening of its fiscal standing as a result of the COVID-19 pandemic (Paula, 2021; Secretaria de Política Econômica, 2022).

In 2019, according to the IMF's criteria and methodology, Brazil's public debt accounted for 74.26% of Brazil's GDP. Brazil's public debt/GDP ratio was well above emerging countries' average public debt/GDP ratio of 52.6% (Deloitte, 2020, 2021; United Nations, 2020; Samaddar & Barua, 2021; World Bank, 2021). This highlights the fact that Brazil was already in a fragile fiscal standing before the COVID-19 pandemic affected Brazil's economy (IMF, 2021).

Figure 1 illustrates a number of developed and emerging countries compared, when came to their public debt versus fiscal stimulus as a share of GDP during the COVID-19 pandemic.

Even though Brazil had a high Public Debt/GDP ratio in relation to others

Table 1. Selected fiscal indicators.

	% GDP	
	2019	2020
Public Primary Revenues/Expenditures	-0.84	-9.49
Public Fiscal Revenues/Expenditures	-5.79	-13.7
Overall Public Debt	74.26	89.28

Source: Banco Central do Brasil (2020a).

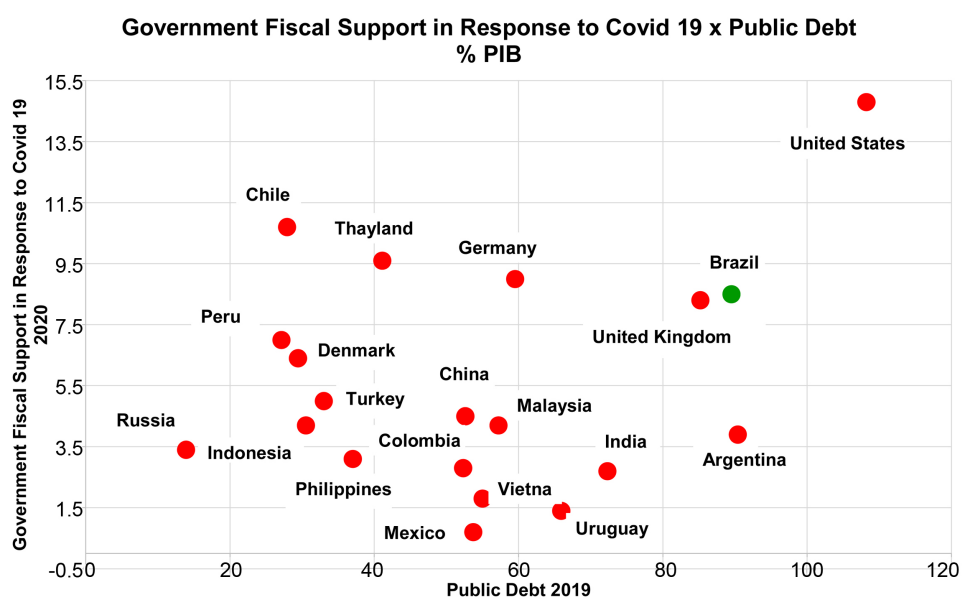


Figure 1. Government fiscal support in response to the COVID-19 pandemic versus public Debt/GDP. Source: Elaborated by the authors based on data from the IMF (2020).

emerging economies, Brazil implemented a fiscal stimulus package to address the

COVID-19 pandemic economic threats and challenges (Secretaria do Tesouro Nacional, 2020; Srivastava et al., 2020; Banco Central do Brasil, 2021a). Brazil's actions had an effective impact on Brazil's economy, when compared to other emerging economies and developed countries, such as the U.K. and Germany (Vescovi & Franca, 2021). Brazil's income transfer programs aimed at Brazilian households and productive sectors reached 8.0% of Brazil's GDP in 2020 (Figure 1).

Brazil's public sector high need for financing, coupled to an increasing public debt, and fiscal policy uncertainties in 2021, led to an increased risk aversion, leading to a liquidity preference by economic agents. This tendency became more prevalent after March of 2020. This behavioral change by economic agents deeply affected Brazil's financial markets. For instance, Brazil saw an increase in rates of interest on long-term bonds. This led Brazil's National Treasury to opt for short-term bonds in order to avoid a long-term impact on Brazil's public debt service (Banco Central do Brasil, 2021b).

Under these circumstances, Brazil's Treasury in order to retain its effectiveness and functioning made use of its "Unique Account" with Brazil's Central Bank. It is clear that by using its Unique Account with Brazil's Central Bank, it resulted in the expansion of Brazil's monetary base (Lawson & Feldberg, 2020). As a result, Brazil's Central Bank had to sterilize a portion of this monetary base expansion in order to keep the Selic interest rate within the band established by the Brazilian Monetary Committee—COPOM. For this reason, operations with short-term bonds in possession of Brazil's Central Bank expanded rapidly (Banco Central do Brasil, 2021c). In 2019, these operations accounted for 13.1% of Brazil's GDP, increasing to 16.7% by December of 2020 (Banco Central do Brasil, 2021e).

Brazil's monetary expansion, however, was not fully sterilized (Banco Central do Brasil, 2021d). There was an expansion of Brazil's money supply as a result of an increase in currency demand in 2020 resulting from income transfer social programs. Many of the recipients of these income transfer social programs do not possess bank accounts. It is estimated that close to 34 million Brazilians do not have bank accounts. As a result, there was a substantial increase in the money supply in the form of currency printing. This strategy has been called "Helicopter money" i.e., a massive injection of cash into Brazil's consumer base (Carneiro, 2021; Galí, 2020).

From our discussion it is clear that Brazil's increasing public expenses and its domestic government debt was financed by the printing of money and by Brazil's Central's Bank special transactions. These Brazilian Central Bank special transactions, or very short **open market operations** are considered to be "quasi-monetary" liabilities.

The increasing switch to short-term financing for Brazil's government debt allied to Brazil's Central Bank's **open market operations** has resulted in an increasing deterioration of Brazil's ability to keep on financing its public sector. Brazil's Treasury had to constantly rely on market transactions, but also entice the migration of resources to other financial assets in case there was an increase in risk premiums.

The goal of this paper is to analyze the financing channels utilized by the Brazilian government for the fiscal expansion purpose experienced by Brazil during the COVID-19 Pandemic period. We address the changes in the financing conditions of Brazil's fiscal deficit, showing that the increase in government expenditures led to an increase in Brazil's monetary base, especially currency printing, and in the increase in Brazil's Central Bank's **open market operations**. Moreover, we analyze the transmission mechanisms that led to the monetary financing of Brazil's fiscal expansion during the COVID-19 period.

2. Risk & Liquidity Indicators

A new economic literature emerged in Brazil during the COVID-19 pandemic, in order to analyze the Brazilian economy characteristics and performance during the COVID-19 pandemic period. From a financial perspective we can cite [Andrade \(2022\)](#). His work analyses how financial agents were rating and assessing Brazil's economy. The [Banco Central do Brasil \(2020b\)](#) undertook a number of research studies analyzing Brazil's main indicators of liquidity and credit as well as levels of capital required by Brazilian financial institutions. [Bonomo et al. \(2022\)](#) studied Brazil's monetary policy transmission mechanisms during the COVID-19 pandemic. [Carvalho and Nechio \(2023\)](#), studied the costs of deflation, especially in cases where policy-makers lose credibility in their attempt to restore economic stability. [Harris \(2022\)](#) analyses "disanchoring of inflation expectations." [Mendes \(2022\)](#) analyses and assesses the effects and costs of Brazil's social programs during the COVID-19 pandemic. And lastly, but not least, [Nechio and Serra Fernandes \(2022\)](#) assess Brazil's fiscal and monetary policies during the COVID-19 pandemic period.

In order to characterize the period when that was an increase in risk aversion and preference for liquidity, we made use of indicators for risk aversion and liquidity preference. Graphs 2 and 3 illustrate both indicators.

We observe that from March 2020 to September, these two indicators show an increasing aversion to risk (See [Figure 2](#)) and an increasing preference for liquidity (See [Figure 3](#)) by Brazilian economic agents. Beginning in October, we start to see a reversal, but from a much higher level.

[Figure 2](#) and [Figure 3](#) also shows that from September of 2020 on, Brazil saw a reduction to risk aversion and the normalization of Brazil's bond market.

In conclusion, the March to September of 2020 period is characterized by an increase in risk and by a preference for liquidity as a result of the COVID-19 pandemic's economic stress. This development was responsible for the partial shutdown of Brazil's bond market during the period under study ([Fuje, Quattara, & Tiffin, 2021](#)). The next section will analyze the retraction of demand for public bonds by using a financial agent model.

3. Financial Agent Model

Several economic models have analyzed the response of economic agents to the

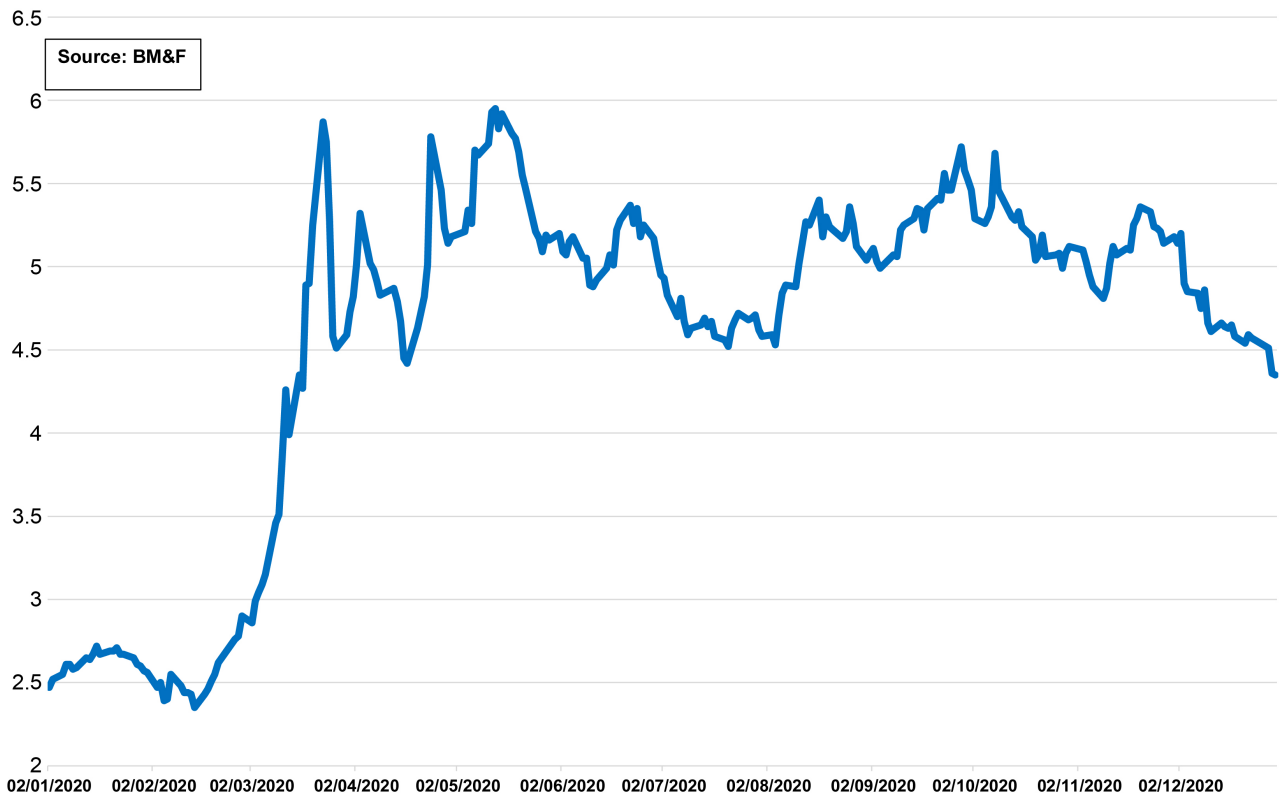


Figure 2. Difference between 10-year and a 1 year interest rates. Source: Bolsa mercantil e de futuro (BM & F).

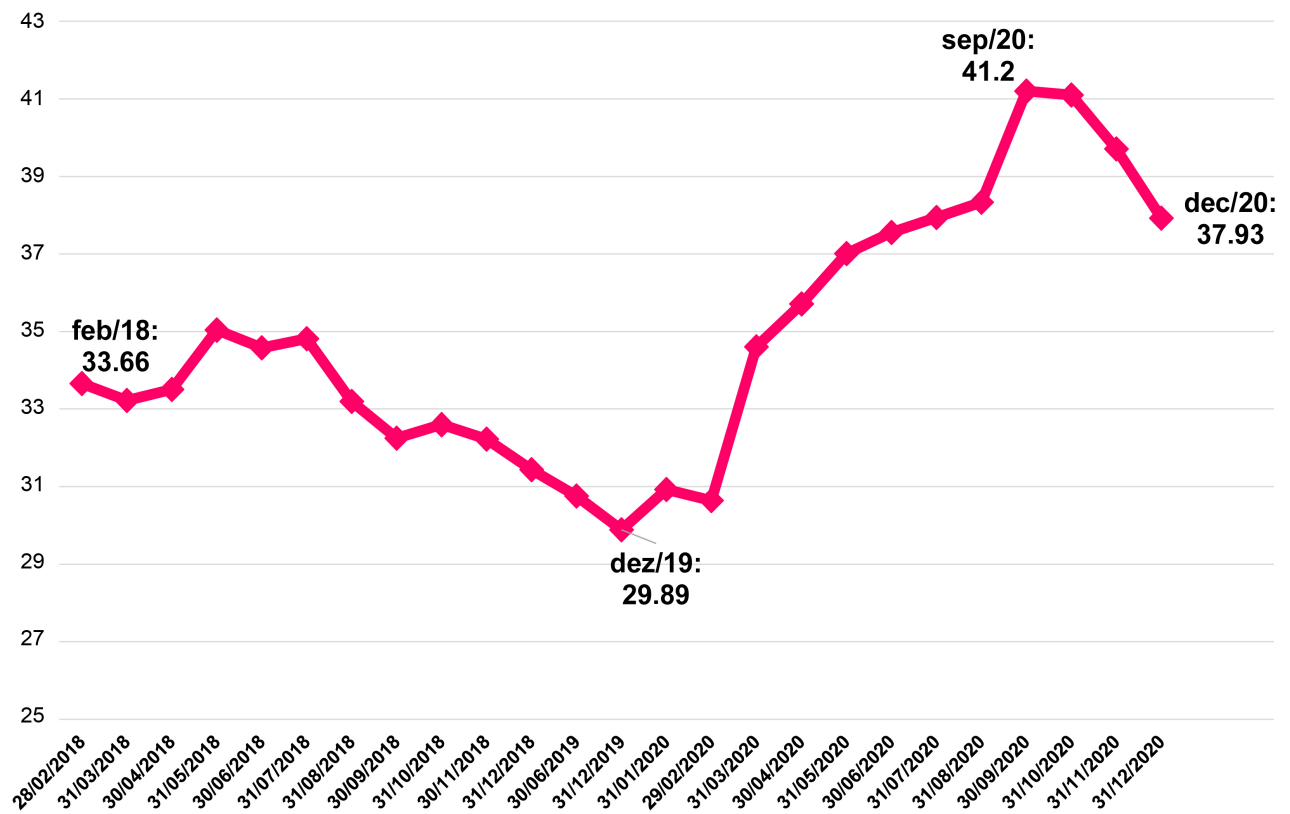


Figure 3. Percentage of the public debt due in up to 12 Months. Source: Banco Central do Brasil (2021b).

economic and financial uncertainties promoted by the COVID-19 pandemic. Several academic papers have developed economic models to understand and synthesize the COVID-19 pandemic impacts. For instance, [Biron, Cordova, and Lemus \(2019\)](#) study the behavior of banks' loan behavior when confronted by monetary shocks. [Céspedes, Chang and Velasco \(2020\)](#) study credit market imperfections and credit payment uncertainties. [Eichenbaum, Rebelo, and Trabandt \(2020\)](#) study the relationship between economic decisions and pandemics. [Fornaro and Wolf \(2020\)](#) analyze how pandemics may create economic stagnations "traps" induced by pessimistic entrepreneurs. [Brodeur, Gray, Islam, and Bhuiyan \(2021\)](#) review the economic literature related to the economic consequences resulting from the COVID-19 pandemic, countries' economic responses. These studies served as the inspiration for the "Financial Model Agent" developed in this paper.

In this section we studied the behavior of a financial agent facing risk and liquidity issues as a result of the COVID-19 pandemic. We use a financial agent model to illustrate these liquidity and risk issues.

We assume that a commercial bank may have government bonds issued by the Brazilian Treasury or a compromised transaction issued by Brazil's Central Bank, in its portfolio. These two financial assets are not perfect substitutes as a result of the fact that compromised transactions are characterized by shorter time periods and lower rates of interest ([Pellegrini, 2017](#)).

We propose that compromised operations are financial assets with different characteristics than government bonds and that they possess more liquidity and lower risk. Thus, we can analyze the demand for these financial assets from the point of view of a commercial bank.

The Financial Agent Theoretical Model

The COVID-19 pandemic affected economic agents' preference towards risk, increasing the degree of aversion to risk and preference towards liquid assets. We develop a banking model to formalize this financial behavior and strategy. Our model allows us to describe and explain the financial agent's decisions regarding the changes in the composition of their portfolios. Thus, we are able to understand financial agents' preference for Brazil's Central Bank's compromised transactions, instead of government bonds issued by the Brazilian Treasury.

Let W is the commercial bank portfolio, D is the demand for government bonds from the Treasury and C the demand for compromised operations from the Central Bank.

Then: $W = D + C$.

Be $\theta = D/W$ the share of government bonds in the commercial bank portfolio.

Thus: $\theta + (1 - \theta) = 1$.

Let's consider that D is a financial asset with risk. Its average return is $E(r_D) = \rho$ and its average return variance is $\text{var}(r_D) = \sigma^2$. For the sake of simplicity D is a financial asset without liquidity and its liquidity premium is $L_D = 0$. On the other

hand, C is a financial asset without risk. Its return is i ($e \ i < \rho$). C is a liquid financial asset, and its liquid premium is $L_c > 0$.

Let R be the commercial bank portfolio's return, $R = \rho\theta + i(1 - \theta)$.

The commercial bank's return is equal to the weighted average of the two assets: the risky asset and the riskless asset. The weighted average is defined as: $\theta = D/W$, that represents the share of public bonds in the commercial bank's portfolio.

Let L be the commercial bank portfolio's liquidity premium, $L = L_c(1 - \theta)$. And last, let us suppose that the commercial bank's utility function be defined as¹:

$$U(R, L) = R - (\lambda/2)R^2 + \varphi L$$

In finance is acceptable to define the utility function as a quadratic utility function in R , in order to obtain first linear order results. It is justified by its simplicity, allowing for an easier interpretation. Quadratic functions have all the properties needed in a utility function. Where λ is a parameter that indicated the risk aversion by commercial banks, and φ is a parameter that indicates the commercial bank preference for liquidity.

Thus, the commercial bank needs to find the ideal composition of its portfolio that will maximize its expected utility:

$$\max_{\theta} E(U) = [i + (\rho - i)\theta] - \frac{\lambda}{2}\theta^2\sigma^2 + \varphi(1 - \theta)L_c$$

Being: $\frac{\partial E(U)}{\partial \theta} = 0$. The solution for the ideal composition of the commercial's bank portfolio can be expressed as:

$$\theta = \frac{(\rho - i) - \varphi L_c}{\lambda \sigma^2}$$

We can conclude that an increase in aversion to risk (λ) or the bank's preference for liquidity (φ), will increase the demand for the bank's compromise transactions ($1 - \theta$) and lower the demand for government bonds (θ).

4. Public Debt Financing

In times of economic normality, the Brazilian Treasury finance its fiscal deficit by selling bonds in Brazil's primary financial market. The price, maturity, and other characteristics of these bonds depend on the demand created by buyers and by the Brazilian Treasury necessities. During the COVID-19 pandemic, the demand for these bonds diminished considerably, forcing the Brazilian Treasury to utilize financial resources from its Unique Account ([Banco Central do Brasil, 2021f](#)).

Next, we will analyze how the Brazilian Treasury finance its deficit. The Bra-

¹In Finance, it is common to assume that the utility function is quadratic in R , because it allows linear first-order conditions to be obtained. The justification is to find a simple result that can be interpreted more easily. We highlight that a quadratic function has all the necessary properties to be considered a utility function.

zilian Treasury can finance its deficit by selling bonds (D) or by utilizing its National Treasury Account in the Brazilian Central Bank. Thus:

$$\text{NFSP} = \Delta D + \Delta \text{CUT}$$

where NFSP stands for the Treasury financing needs, ΔD stands for changes in the Treasury government debt, and ΔCUT stands for changes in the **National Treasury Account**.

When the Treasury makes use of its **National Treasury Account** in the Brazilian Central it means and results in an expansion of Brazil's monetary base, increasing the liquidity in Brazil's financial markets. This monetary expansion could result in lower levels of interest rate in the inter-bank market (Selic), affecting the target established by Brazil's Committee for Monetary Policy—COPOM. As a result, in this case, the Brazilian Central Bank steps in to sterilize this monetary expansion by using **open market operations**.

There is target for the Selic rate, setting the procedure for the sterilization by the Brazilian Central Bank. The sterilization is a function of the demand for reserves from Brazilian commercial banks and by Brazilian's population demand for print money. It is expected that the Selic rate will be reduced, and in fact it was reduced by Brazil's Central Bank during the COVID-19 pandemic, and that the demand for bank reserves and demand for printed money increases, inducing the Brazilian Central Bank to diminish the use of sterilized operations in order to keep the Selic rate (Banco Central do Brasil, 2021f).

Given the Brazilian Central Bank's inflation target, in order to reach the Selic's interest rate, the Brazilian Central sterilizes a share of the increase in the monetary base resulting from the use of the National Treasury Account, by using open market operations. Thus,

$$\Delta \text{CUT} = \Delta M + \Delta C$$

where ΔM is the change in Brazil's monetary base and ΔC is the change in the **open market operations** by the Brazilian Central Bank. Thus, inserting this equation in the previous one, we have:

$$\text{NFSP} = \Delta D + \Delta M + \Delta C$$

In sum, the Brazilian fiscal deficit may be financed by adjusting or fine tuning the levels of Brazil's public debt, resulting from monetary base expansion or by resorting to **open market operations**.

Table 2 shows that during the period March through September of 2020, commercial banks make a clear decision to avoid risk and embrace liquidity, close to 89% of all NFSP was financed by **open market operations**, reflecting the Brazilian Treasury issues and difficulties in placing government bonds in the marketplace and forcing them to use resources from **National Treasury Account**.

Figure 4 clearly illustrates the correlation between the Government's financing needs and the use of **open market operations**, especially between March and October of 2020. Beginning in October of 2020, the Brazilian government

Table 2. Public debt financing, in millions of Reais.

	2019	Jan/set 2020	2020
NFSP (Federal Government and BCB)	399.014	989.381	1.011.923
ΔD	15.720	21.446	365.463
ΔM	14.537	92.150	93.612
ΔC*	368.757	875.785	552.848

Source: Banco Central do Brasil (2020b).

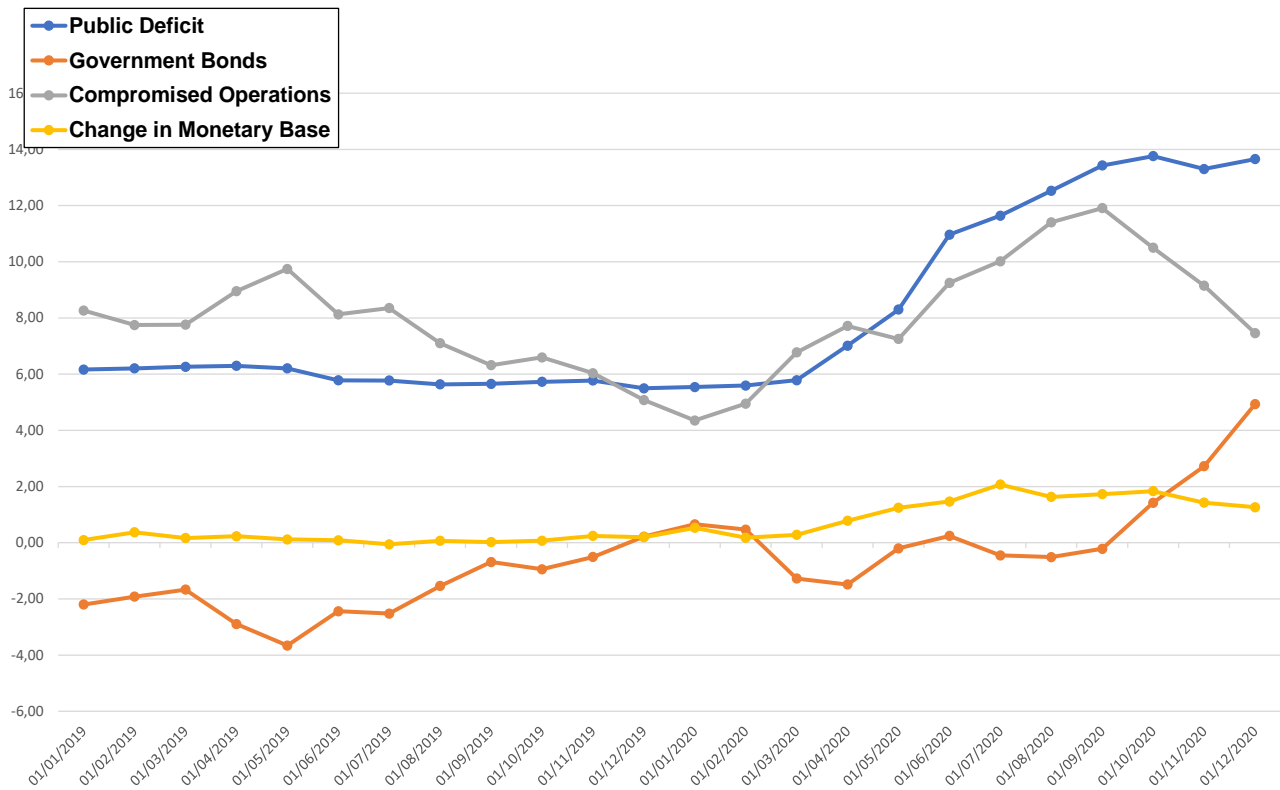


Figure 4. Deficit public financing, flows in 12 months, % GDP. Source: Brazilian Central Bank.

goes back to a more classic approach to public debt financing by selling government bonds in the marketplace. This signals a financial environment that was begging to recover from the economic impacts of the COVID-19 pandemic and also as a result of Brazil’s ability to create a more stable fiscal momentum (Banco Central do Brasil, 2021b).

Section V will address how the Brazilian private sector addressed its main financial challenges during the COVID-19 pandemic.

5. Brazil’s Private Sector Adjustment to the COVID-19 Pandemic

The increase in Brazil’s government’s deficit was mirrored by an increase in the private sector’s savings. Between the months of February and October of 2020,

there was a substantial increase in the private sector's financial (F) and non-financial (NF) savings. **Figure 3** showcases that the net financial wealth of Brazil's private sector during the COVID-19 pandemic increased by 12.2%, reverse mirror of Brazil's government deficit, or TN + BCB. It is important to note that the Brazil's foreign sector net wealth increase was not meaningful, giving the global economic recession during the COVID-19 years. Thus, most of the government deficit adjustment was made possible by Brazil's private sector (Pires de Souza, 2021).

This net wealth adjustment shows that the private sector increased its demand for financial and non-financial assets and a share of this demand was related to compromised operations from commercial banks (**Table 3**). In sum, the counter face of Brazil's fiscal expansion was made possible by an increase in Brazil's private sector's savings, made possible by the compromised operations offered by Brazilian commercial banks (Pires de Souza, 2021).

6. Main Findings

The COVID-19 pandemic resulted in a substantial increase in Brazil's fiscal deficit between March and October of 2020, and in an increasing aversion to risk by economic agents. During this period, Brazil's financial markets did not buy government bonds after March 2020, leading the government to utilize the National Treasury Account. This monetary strategy used to finance Brazil's increasing fiscal deficit was sterilized by Brazil's Central Bank, by using open market operations. During this period between March and October of 2020, Brazil's government debt faced a portfolio change, i.e., made of a smaller share of government debts issue by Brazil's Treasury, since these bonds could not be renewed, and an increase in the Brazilian Central Bank liquidity. Thus, between March and October of 2020, economic agents did not buy Brazilian Treasury bonds, but opted to accept liquid assets.

On the other hand, the increase in Brazil's fiscal deficit implied in a reduction in the public sector's savings, Brazilian Central Bank and Brazilian Treasury, what resulted in an increase in Brazil's private sector's savings. The increase in demand for compromised operations was done by Brazilian financial institutions, mostly banks. Thus, the financing of Brazil's largest fiscal deficit was facilitated by Brazilian private economic agents. Thus, Brazil's private sector savings increased between March and October of 2020. Uncertainties regarding future income and consumption restrictions led families to increase their savings.

Table 3. Net wealth by sector as a percentage of Brazil's share of GDP.

Sectors	Change February-December of 2020
Private Sector (F + NF)	12.2
Government Sector (TN + BCB)	-13.1
Foreign Sector	0.9

Source: Pires de Souza, F. E. (2021).

The COVID-19 pandemic resulted in an increase in the Brazilian fiscal deficit, a strong monetary expansion sterilized by the Brazilian Central Bank, an increase in the public sector debt that includes open market operations, and an increase in the Brazilian private sector assets. As a result, Brazil started to face inflationary pressures around the second semester of 2020.

As we discussed in Section III, we assume that government bonds issued by Brazil's Treasury are risky assets and without liquidity, but carry high levels of profitability, (ρ). On the other hand, Brazil's Central Bank's compromised operations are liquid assets without risk, but carry low levels of profitability, (i). These hypotheses allow us to analyze how commercial banks build their portfolios with these two different assets in order to balance their returns, risk, and liquidity. During the COVID-19 pandemic, higher levels of uncertainty led banks to opt for assets carrying lower levels of risk and higher levels of liquidity. This behavioral change by commercial banks explains commercial banks preference for Central Bank's compromised operations that carry lower risk and higher liquidity, rather than opting for more profitable public bonds.

During the period between March and October of 2020, during the first eight months of the COVID-19 pandemic, the increase in Brazil's fiscal deficit resulted in higher levels of public debt. **Figure 4** showcases this period where we can see a negative rate of growth of Brazil's Treasury bonds emissions, as well the increase in growth of open market operations, in parallel with Brazil's fiscal deficit. This means that commercial banks opted for open market operations instead of acquiring public bonds. This behavior by commercial banks is explained by their aversion to risk, and preference for liquid assets. Thus, the Brazilian government expanded its debt relying on open market operations. The Brazilian market was closed for Treasury bonds between the period of March of 2020 through October of 2020. After October of 2020, commercial banks started to acquire Treasury bonds again, when Brazilian markets went back to normal operations and transactions.

In sum, Brazilian commercial banks played an instrumental role in allowing the Brazilian government to increase its public debt by agreeing to accept to engage in Brazil's Central Bank compromised operations. What explains commercial banks resistance to accept Treasury bonds was a change in behavior by commercial banks and private investors jittered by the economic implications of the COVID-19 pandemic on the Brazilian economy.

7. Final Remark

The COVID-19 pandemic deeply affected the Brazilian government's ability to finance its government deficit, mainly between the months of March and September of 2020. What made Brazil's experience unique was the use of Brazil's Central Bank Unique Account, by the Brazilian Treasury and by the compromised operations by Brazil's Central Bank. Thus, the Brazilian Central Bank played a key role in financing Brazil's fiscal deficit. But it was only made possible

by Brazil's private banks acceptance of Brazil's Central bank financial operations.

Compromised operations played a key role in providing low risk financial assets that allowed the private sector to adjust its wealth portfolio during a period of high financial stress. Without these operations would not be able to sterilize the expansion of Brazil's monetary base resulting from the use of Unique Account and the increase in reserves that kept the domestic interest rate, Selic, at low levels. Brazil's Central Bank's credibility with Brazil's commercial banks allowed the government to cross this very volatile economic period without provoking severe ruptures in Brazil's financial markets, and only affecting the size and structure of Brazil's government debt.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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