# Theoretical analysis and empirical evidence of countercyclical economic policies implemented during the subprime and COVID-19 crises: The Brazilian case

Eliane Araujo (State University of Maringa and CNPq, Brazil), Elisangela Araujo (State University of Maringa, Brazil) and Fernando Ferrari Filho (Federal University of Rio Grande do Sul and CNPq, Brazil)

**Abstract**

This article offers a theoretical and empirical investigation of the countercyclical economic policies, in particular the fiscal and monetary ones, implemented by the Brazilian Economic Authorities (BEAs) in response to the International Financial Crisis (IFC) of 2007-2008 and the current COVID-19 crisis of 2020. The main objective is to evaluate the effectiveness of those policies in different contexts, under the hypothesis that they are fundamental in times of recession. This is in line with the main arguments of Keynesian macroeconomics, which supports the theoretical framework of this analysis. The empirical part of the article analyzes the effects of shocks on fiscal (government spending) and monetary (interest rate) policies in the period between 1996 and 2019, using an MS-VAR model that considers two different regimes: high and low growth in Brazil. The main results indicate that the effects of monetary and fiscal policies are more pronounced in recessive contexts than in normal situations, supporting the centrality of activism in monetary policy and, particularly, in fiscal policy in reversing the crisis and uncertainty scenario as emphasized by Keynes.

## 1. Introduction

As is well known, in the last years the world economy has faced two several economic crises: the first one was the 2007-2008 international financial crisis (IFC) that resulted in the 2009 Great Recession (GR); and, recently, 2020, the lockdown restrictions due to the COVID-19 pandemic initiated the largest economic recession in the history of world economy, involving both the financial and the commodity markets.

The effects of these crises were not neutral in economic and social terms, mainly because the crises have substantially altered the dynamic process of the international economy and have represented a major turning point. Governments of both the G7 countries and the emerging countries have responded to the IFC, and COVID-19 crisis with massive countercyclical fiscal and monetary policies.

In the Brazilian case, at the time of the IFC, the response of the Brazilian Economic Authorities (BEAs) was swift and involved important monetary, credit, financial, exchange rate and, especially, fiscal policy measures, while, in the context of the current COVID-19 pandemic, the BEAs, though not as swiftly, resorted to monetary policy, mostly to provide liquidity and capital to the financial system, but predominantly to fiscal policy.

Given the above, the objective of this article is to analyze the countercyclical economic policies, specifically the fiscal and monetary policies, implemented by the BEAs in response to the IFC, and COVID-19 crisis, as well as to evaluate the impact of them on the Brazilian economy.

To achieve this aim, this article is divided into following sections. Section 2 briefly presents the Keynesian macroeconomic policies. Section 3 presents, analyzes, and compares the countercyclical macroeconomic policies implemented in Brazil in both crises – the IFC, and COVID-19. Section 4 empirically evaluates the effects of shocks on fiscal and monetary policies in the Brazilian economy in the period 1996 to 2019, paying close attention to the impacts of these economic policies in times of crisis and normality. This result asserts the centrality of activism in monetary policy and, principally, in fiscal policy in reversing the scenario of uncertainty as was the case in the IFC, and COVID-19 crisis, supporting the Keynes' ideas.

## 2. Keynesian macroeconomic policies

As is well known, in short, in the Keynesian theory investment is the key variable to determine the trajectory of the economic system. Entrepreneurs base their investment decision-making on expectations about real outcomes in the future. However, if the outcomes of these future prospects are uncertain, money is preferred to capital goods. Evidently, the entrepreneurs' preference is for liquidity, and, as a result, there is insufficient effective demand which cools economic activity down, culminating in recession and unemployment.

To avoid this scenario, Keynes (2007: 379) states that, "the central controls necessary to [expand aggregate demand and] ensure full employment will, of course, involve a large extension of the traditional functions of the government." The main component of these central controls is macroeconomic policies, since they serve as an anchor to the entrepreneurs' expectations by signaling the general tendency the government is pursuing.

Macroeconomic policy is thus the true 'market signal' in Keynesian economics, serving as the basis upon which entrepreneurs can formulate well thought out expectations to make sound investment decisions. However, the success of the macroeconomic policies is not assured, considering the uncertainty that prevails.

As Keynes (1971: 35) warned, "even if such a policy were not wholly successful, either in counteracting expectations or in avoiding actual movements, it would be an improvement on the policy of sitting quietly." Hence, Keynes (2007: 378) argued that, "a somewhat comprehensive socialization of investment will prove the only means of securing an approximation to full employment." According to Ferrari Filho and Conceição (2005), the idea of 'socialization of investment' concerns the creation of endogenous institutional mechanisms, such as the State, its regulation and intervention, and, mainly, its macroeconomic policies, specifically fiscal, monetary and exchange rate policies. In the same vein, Marcuzzo (2010: 190) argues that Keynes proclaimed what needed to be done in order "to sustain the level of investment, but it should be interpreted more in the sense of 'stabilizing business confidence' than a plea for debt-financed public works."

### 2.1. Fiscal policy

Fiscal policy has direct impact on aggregate demand – more specifically on consumption and investment – and constitutes the main instrument of State economic intervention. It is anchored in tax policy, on the one hand, and in public expenditures, on the other hand.

As Keynes (1972, 2007) pointed out, tax policy, on the one hand, serves to increase available income, thus fostering expansion of effective demand, and, on the other hand, it can also be used to improve income distribution. In his words, to moderate the gains of the rentiers in the financial and exchange rate markets, Keynes (1971: 55) argued that "capital levy must surely be preferred on grounds both of expediency and of justice," while in his GT he suggested an inheritance tax because "a fiscal policy of heavy death duties has the effect of increasing the community's propensity to consume" (Keynes, 2007: 373).

According to Keynes (1980), public expenditures are related to the funds necessary to maintain the basic services the State provides to its population, as well as the resources necessary to stabilize, automatically, the economic cycles. The public spending management has to be split into two budgets: the ordinary, or current, and the capital. The former relates to the funds necessary to maintain the basic services the State provides to its population, whereas the latter accounts for expenditures regarded as automatically stabilizing economic cycles. Although Keynes (1980) believed in the importance of these ordinary expenditures in fostering effective demand, he also argued that the current budget should be in surplus or, at least, in equilibrium.

Given that, how would Keynesian countercyclical fiscal policy be achieved? According to Keynes, there would be a number of rules regarding the capital budget operation. For instance, (a) it may run into deficit but, in general, the surpluses obtained on the current budget would have to finance it, (b) capital budget public investments cannot compete with private investments, but they should be complementary to them (Keynes, 1972), (c) these investments should be made by public or semi-public institutions and are normally related to social inversions, which "are [those] made by no one if the State does not make them" (Keynes, 1972: 291), and (d) fiscal policy cannot merely be an instrument of last resort. Thus, its main goal, as an automatic stabilizer, is to prevent fluctuations by means of a capital budget that finances a stable and on-going program of long-term investments.

Given the Keynes' idea regarding the fiscal policy as an instrument of State intervention, Minsky (2008) argued that private investment deficiencies need to be balanced by public spending, called 'Big Government'. In his words, 'Big Government' must be big enough to ensure that swings in private investment lead to sufficient offsetting swings in the government's deficit so that profits are stabilized" (Minsky, 2008: 297).

In summary, for Keynes, fiscal policy has a strong macroeconomic role to pursue economic growth and income distribution. It must be implemented over time to prevent both peaks and slumps, avoiding entrepreneurs' lack of confidence.

## 2.2. Monetary policy

For Keynes, monetary policy should be conducted by managing the base interest rate in the economy to promote economic growth as its ultimate objective, instantaneously bringing investment and employment levels under the central bank's surveillance.

In addition to its ultimate objective, monetary policy has four additional goals. First, it aims at keeping inflation under control, mainly because inflation affects expectations inasmuch as it devalues wealth, shortens the long run, and unleashes liquidity preference, all of which are likely to lead the economy to an insufficient effective demand. Second, according to Arestis and Sawyer (2013), it has to be focused on financial stability. Third, it supervises and controls the liquidity of the economic system. This means that monetary policy needs to avoid a shortage of liquidity, as well as prohibiting banks from creating money in excess. Moreover, when controlling liquidity, central banks act as lenders of last resort, preventing bankruptcy of financial institutions and its financial contagion risks. Fourth, monetary policy has to stabilize the exchange rate, mainly because exchange rate movements have a vast influence not only on expectations, but also on a firm's financial and operational stances.

Given those multiple goals, two questions arise: What are the monetary policy instruments? What are the monetary policy channels?

Concerning the monetary policy instruments, the central bank's base interest rate is the price at which the monetary authority supplies reserves to banks. This rate is the cornerstone of the financial system yield-curve. After establishing its interest rate, the central bank conducts its monetary policy in the money market to keep the rate at the announced level. To do so, monetary policy uses either the discount window or open market operations. The discount window is the supply of reserves that central banks provide to banks that become illiquid due to more withdrawals than deposits of resources. Open market operations make the central bank's interest rate effective, in accordance with the intentions of monetary policy. They are performed by the purchases and sales of bonds undertaken by the central bank in the money market. By these means, monetary policy manages the supply and demand for money and administers the yield-curve.

Monetary policy, that is, the interest rate, has various transmission channels into effective demand and, consequently, economic growth and employment. These channels are portfolio, credit, wealth, exchange rate and expectations. The portfolio channel is the most important one for interest rate transmission, due to its direct impact on the investment opportunity cost. Following Keynes' asset pricing theory (2007: Chapter 17), this channel acts by virtue of how economic agents and banks allocate their portfolios, based on the assets' expected return, cost of carrying it all, and liquidity. The second transmission channel is the credit channel, which produces its effects by means of how financial institutions set the interest rate they charge their customers, which is a mark-up over the central bank's base interest rate. The third transmission mechanism is the wealth channel that relies on the impact that interest rate shifts have on the market price of financial assets and depends on the degree that households use this changed price to finance their consumption. The fourth transmission channel is the effect of interest rate changes through the exchange rate. In addition to the expected variation in the exchange rate level, the differential between domestic and foreign interest rates is the variable that external capital investments seek when deciding which assets to buy. Hence, modifications of the local interest rate in relation to world interest rates change capital flows and thereby the exchange rate, impacting conjointly the cost of inputs, foreign attractiveness of domestic production, and the financial position of firms with external liabilities. The last transmission channel of the interest rate is expectations. In relation to it, Keynes (2007: 197-198) pointed out that it is "important to distinguish between the changes in the rate of interest which are due to changes in the supply of money [...] and those which are primarily due to changes in expectation affecting the liquidity function itself." If expectations are as stable as required for conducting monetary policy, the difference of judgments that economic agents have about the future

interest rates would set their liquidity preference in different degrees, motivating them to negotiate debt contracts. Nevertheless, diversity of individual expectations only happens if the central bank is able to maintain a safe state of expectations in the economy as a whole. Otherwise, if the central bank fails in this attempt, conventions in the financial system would be disorganized, driving expectations towards a strong liquidity preference.

In view of these summarized ideas, according to Keynes, if the monetary authorities wish to expand the volume of capital, they should lower the interest rate to stimulate productive investments. This would, as a result, keep the interest rate at levels compatible with eliminating capital scarcity, a scarcity which would result in "euthanasia of the rentier," a class that is not remunerated for its "risk and exercise of skill and judgment," but for "exploiting the scarcity value of capital" (Keynes, 2007: 375-376).

To sum up, Minsky (2008) proposed that a permanent "Big Bank" must, on the one hand, regulate the activities of monetary and financial institutions and, on the other hand, at the first sign of loan defaults, act as lender of last resort.


## 3. The Brazilian countercyclical macroeconomic policies during the IFC and COVID-19 crisis

Since the 1990s, the current globalization process — that is, the increased international mobility of trade and, mainly, due to financial liberalization, capital — has seen the world economy face several economic crises, the most notable of which was the 2007-2008 international financial crisis (IFC) that resulted in the 2009 Great Recession (GR). More recently, however, the lockdown restrictions due to the COVID-19 pandemic initiated the largest economic recession in history, involving both the financial and the commodity markets.

The effects of these crises were not neutral in economic and social terms, mainly because the crises have substantially altered the dynamic process of the international economy and have represented a major turning point. Governments of both the G7 countries and the emerging countries have responded to the IFC and the GR, and COVID-19 with massive countercyclical fiscal and monetary policies.

Therefore, this section presents the countercyclical economic policies adopted in Brazil, specifically the fiscal and monetary policies, implemented by the BEAs in response to the IFC, and COVID-19 crisis.

### 3.1. The BEAs' response to the IFC

Between the last quarter of 2008 and the first quarter of 2009 the Brazilian economy was sharply affected by the IFC. More specifically, GDP shrank by 4.5 percent. In this context, the Government responded to the contagion effect of the systemic crisis with a broad variety of countercyclical macroeconomic measures, whose objective was to mitigate this effect both on the Brazilian financial system and on economic activity. Accordingly, the Central Bank of Brazil (CBB) and the Ministry of Finance spearheaded the IFC response which involved important fiscal, monetary, credit, finance and exchange rate measures.

Because the first effects of the IFC were felt in the Brazilian financial system, it was the CBB that had to respond first. Therefore, the CBB eased monetary policy by lowering the policy rate target – the base interest rate, called Selic, was lowered by 5 percentage points, from 13.75% in December 2008 to 8.75% in September 2009 – and by increasing liquidity in the interbank market.

Along with the measures of monetary policy by the CBB, the Brazilian government decided to use the three major federal public banks – Banco do Brasil (BB), Caixa Econômica Federal (CEF) and the National Bank for Economic and Social Development (BNDES) – to expand credit and to play a countercyclical role in a context of tightening credit conditions by private banks.

The countercyclical fiscal policy included the stimulus package adopted by the Ministry of Finance to mitigate the negative impact of the external crisis on economic activity and the labor market. The stimulus package, equivalent to 1.3 percent of Brazil's GDP in 2009, was based on government spending, tax cuts – mainly on industrial products – and subsidies, especially to the agricultural sector.

Moreover, the increase on social assistance, with the expansion of the program *Bolsa Família* – it was created in October 2003 and provides financial aid to poor Brazilian families –, the expansion of the *Programa de Aceleração do Crescimento* – that is, Growth Acceleration Program) that was launched in 2007 and consists of a set of investments, public and private, in the infrastructure sectors –, the start up of a program of government incentives and subsidies for housing construction called *Minha Casa, Minha Vida,*

targeted at low and middle-income households, and the extension of unemployment insurance benefits, all represented an expenditure measure.

As a result of these measures, at the end of 2009 the Brazilian GDP decreased only 0.2%, while Brazil's economic recovery was strong in 2010 – GDP increased 7.5%. In its turn, the unemployment rate trajectory was the following: it increased from 7.1% (2008) to 8.1% (2009), and in 2010 it dropped to 6.7%. Thus, the Brazilian economy showed remarkable resilience and became one of the less affected economies by the IFC.

### 3.2. The BEAs' response to the COVID-19 crisis

At the beginning of 2020, the world economy faced a serious health problem with the COVID-19 pandemic crisis. Unlike other crises, the COVID-19 pandemic represented a double adverse shock of both supply and demand, triggering an economic collapse in the world economy. On the supply side, due to the due to the partial lockdown measures that were adopted, since social distancing was advised by World Health Organization to be the most effective means of curbing the progress of the disease, firms could not offer their goods and services and workers (formal, informal and self-employed) were unable to work. On the demand side, the effects on the deferment of consumption and investment decisions were also amplified, in view of the uncertainty, either due to the fear of economic conditions or due to restrictions on the movement of people imposed by local authorities.

It was in this scenario that the world economy, which had not yet fully recovered from the IFC, and from the GR that followed, had a complete reversal of current expectations. According to data released by the International Monetary Fund (IMF, 2020), the GDP of the world economy is expected to fall by 4.9% in 2020, with a -8% decline predicted for developed countries and a -3% in developing and emerging countries. For the Brazilian economy, the estimated drop is much more acute: -9.1% (IMF, 2020).

The responses to the pandemic were swift in developed countries. As occurred during the IFC, in the current context of COVID-19, governments and central banks have implemented countercyclical policies to mitigate the recessive impact, with an emphasis on fiscal expansions via increases in public deficits and national public debts. This has been in addition to monetary policy, with which the central banks' base interest rate has been reduced.

With regard to Brazil, on the eve of the pandemic, the country was in obvious stagnation, a situation that the health crisis would worsen. In fact, after the two-year recession of 2015-2016 that led to an accumulated drop of 7% of GDP, in the years between 2017 and 2019, the average annual growth rate was only 1.2%. According to IBGE (2020a), in the beginning of 2020, this produced a general worsening in labor market indicators, along with the heightened social vulnerability of a significant portion of the population.

Unlike in the IFC, in which the BEAs quickly implemented countercyclical economic policies to mitigate the impact of the crisis on the Brazilian economy, the Minister of the Economy, Paulo Guedes, believed that the liberal reforms and the 'expansionary fiscal austerity' – that is, the idea that fiscal adjustment stimulates a sustainable economic growth in the long run – approach were the appropriate responses to tackle the COVID-19 crisis.

However, the National Congress and the Supreme Court of Justice forced the Bolsonaro government to change the course of economic policy in the short term. Thus, countercyclical fiscal and monetary policies were implemented in the beginning of March 2020.

Starting with actions in the area of fiscal policy, a first point to mention was the approval on May 7, 2020 of the Constitutional Amendment Project (PEC) of the "War Budget," which authorized the CBB to buy national treasury bonds (NTB) and private bonds to cope with pandemic spending. Such approval was necessary because, in addition to the prohibition by law of the CBB to directly finance NTB, the country has also found itself since 2016, under the legal imposition of the so-called "spending cap" that determines the real freeze of public spending on primary expenditures, including health and education, for a period of 20 years (until 2036).

After this action, the measures that were implemented in the scope of fiscal policy by the Brazilian government can be organized around five main axes: (i) social protection measures, (ii) employment protection measures, (iii) company relief measures, (iv) measures to directly combat the pandemic, and (v) sub-national entity assistance (states and municipalities).

In the area of social protection, the main measure was the approval of financial aid in the amount of R$ 600.00 (approximately USD 110.00), which is about half the minimum monthly salary in Brazil. The aid, which was paid for five months to around 66 million beneficiaries, covered the unemployed, the self-

employed, and those registered in social programs such as *Bolsa Família*. However, the poor management of the health crisis, which meant the prolongation of the pandemic and the differentiated impact in the Brazilian regions, led to the extension of this aid for another three months, but with the amount cut in half (R$ 300.00 or USD 55.00), extending until December 2020.

The employment protection measures, in turn, were intended to reduce the costs of maintaining jobs, preventing further layoffs. In this regard, employers were allowed to reduce hours or temporarily suspend employment contracts, having the government counterpart pay part of the monthly salaries. A program was also created to finance the payroll of small and medium-sized companies for a period of four months. The loans would be guaranteed by the National Treasury for 85% of the contracted amount, offering a 6-month grace period and a 36-month payment period, at an interest rate of 3.75% p.a.

Among the measures to assist companies, the deferment or temporary exemption from the payment of taxes are noteworthy. These included the suspension for three months of the installment of the *Simples Nacional* (the tax applicable to small and medium-sized companies) and of the Guarantee Fund for Length of Service (FGTS). There was also a temporary exemption from the Tax on Financial Operations (IOF), also for three months.

Regarding the measures to directly combat the pandemic, the federal government made transfers directly to the states responsible for confronting the pandemic, via the Unified Health System (SUS), in addition to strengthening the budget allocations of some ministries, such as the Ministries of Health, Defense and Science, Technology and Innovation. It also zeroed import tax rates and the Industrialized Products Tax (IPI) on some products for medical and hospital use.

Finally, on measures to assist sub-national entities, a project was approved in early June for the negotiation of loans, the suspension of debt payments by the states to the federal government (estimated at R$ 65 billion or USD 12 billion), and a transfer of R$ 60 billion (about USD 11billion) for actions to combat the pandemic. This was offset by the ban on readjusting civil servant salaries until 2021.

In short, the total amount of all fiscal measures implemented represented 7% of the Brazilian GDP.

Moving on to the field of monetary policy, the main actions taken by the BEAs aimed at providing liquidity to the National Financial System (SFN), allowing the resources to reach the firms and consumers, to avoid the "pooling of liquidity" typical in periods of uncertainty like the current one.

The first aspect to be mentioned is the significant cut in the base interest rate (Selic), which reached its lowest historical level. As mentioned, the stagnation in the pre-pandemic scenario allowed for a relatively long cycle of reductions in the Selic that, after remaining 15 months at 6.5% p.a., started a steady downward trend, reaching 4.5% p.a. in December 2019. When the pandemic started, the pace of decline intensified and, after nine consecutive falls, reached the historic mark of 2% p.a. at the beginning of August 2020. This scenario was made possible both by the deflationary context brought about by the crisis and by the low growth that had already come from previous years.

Finally, in addition to cuts in the Selic rate, according to information from the CBB (2020), monetary policy measures were categorized into two groups: measures for the release of liquidity and for the release of capital. Included in the first group is a reduction in the rate on mandatory deposits of term deposits – these went from 31% to 25% and then to 17% –, and the creation of the Term Deposit with Special Guarantees (DPGE), allowing financial institutions to capture deposits guaranteed by the Credit Guarantee Fund (FGC). In the field of capital provision, the reduction of the capital requirement for credit operations to small and medium-sized companies was allowed, in addition to the institution of a specific line of credit for financing the floating capital of micro, small and medium-sized companies.

The impact of these measures mitigated the Brazilian recession caused by the COVID-19 crisis: in 2020 the GDP dropped, as recently the CBB released, 4.1%. The unemployment rate, however, increased from 11.9% (2019) to 13.5% (2020).

### 3.3. A brief comparative analysis

Following this compilation of the main fiscal and monetary policy measures adopted in face of the IFC, and COVID-19 pandemic crisis in Brazil, the aim of this section is, based on the fiscal and monetary indicators of the Ipeadata (2020), to briefly compare the existing scenarios in each event, in the light of the measures adopted and the observed effects.

First, the IFC reached the Brazilian economy in a context in which, from 2004 to 2008, the economic growth was sustainable (the average GDP growth rate was 4.9% per year), mainly due to the huge increasing of the trade balance and the social programs implemented by the Lula da Silva's

administration to stimulate the domestic consumption. Moreover, the main fiscal and monetary indicators were comfortable: the inflation rate was moderate (the average inflation rate was 5.2% per year); the base interest rate was stable but very high; and the primary fiscal result was 3.4% of GDP, as well as the net domestic debt as a percentage of GDP was 38.8%, both, respectively, registering an increasing and declining performance.

Due to the IFC and the BEAs responses, the fiscal and monetary economic situation changed. In 2009 and 2010, the inflation increased lightly, mainly because the devaluation of the exchange rate and its pass-through mechanism to domestic prices, the base interest rate dropped almost 3 points, the average ratio primary fiscal surplus/GDP declined to 2.2%, and the net domestic debt increased a little bit (39.1% of GDP).

Graphs 1 and 2 below show the performance of selected macroeconomic indicators throughout the IFC and the GR (for which we analyzed the period 2007 to 2010). As can be seen in Graph 1, the IFC and the GR reached the Brazilian economy in a context in which the main indicators of the economy were doing well: the inflation and interest rates (Selic) were moderate and relatively stable; the R$/US$ exchange rate showed a slight downward trend, at a level close to R$2.00; the public deficit as a percentage of GDP showed a steady decline, registering a percentage close to zero in the last quarter of 2008, when the first effects of the crisis began to affect the country.

**Graph 1: Selected macroeconomic indicators — the IFC and the GR — Brazil (2007-2010)**
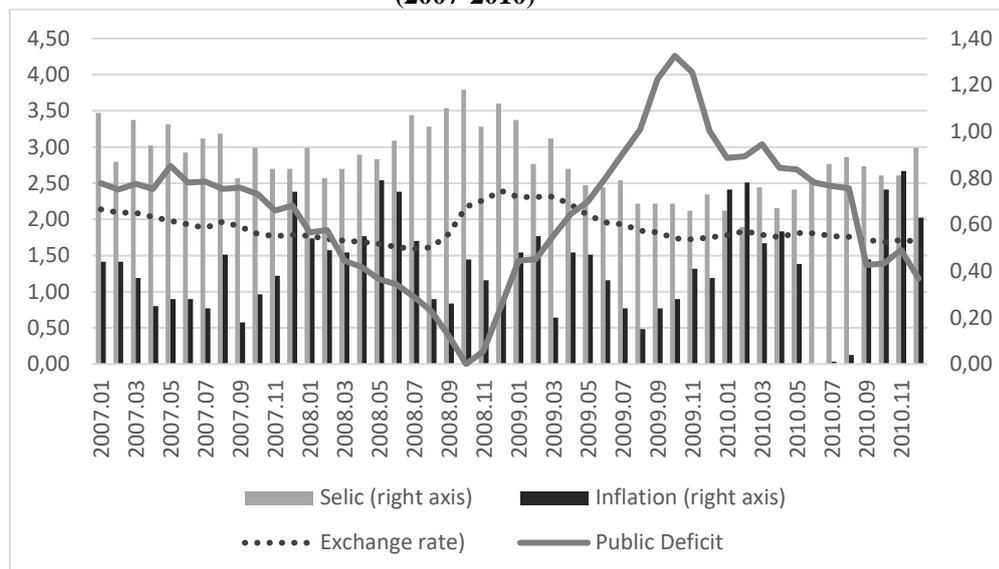


Source: Ipeadata (2020)

In view of this, the impact on the economy was felt in the last quarter of 2008, leading to a decline in GDP and in industrial production until the second quarter of 2009, with adverse effects on the rising unemployment rate (Graph 2).

**Graph 2: Selected macroeconomic indicators — the IFG and the GR — Brazil (2007-2010)**
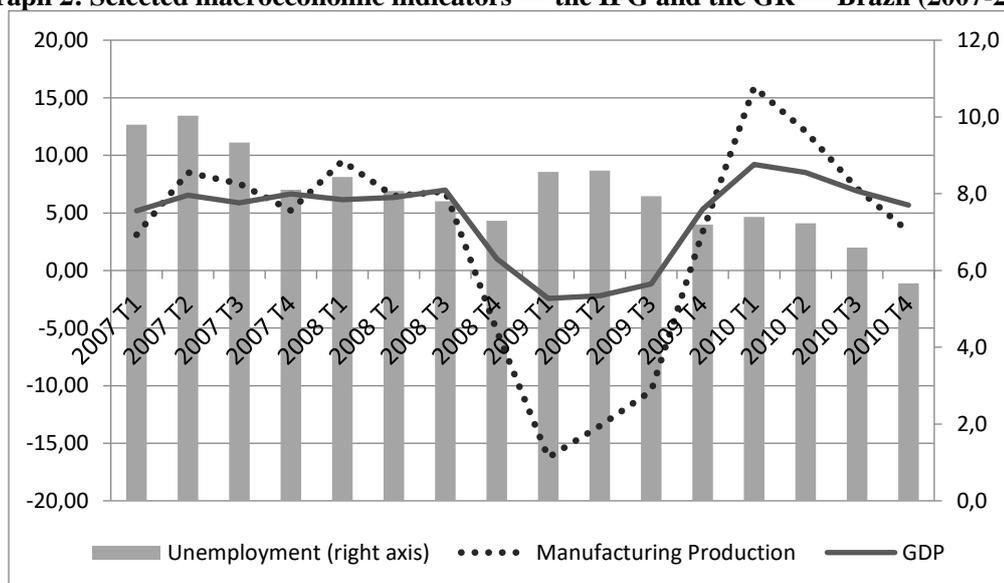


Source: Ipeadata (2020)

However, the performance of the economic authorities that focused on transfer payments and investment programs in infrastructure works, such as the construction of affordable housing, as already mentioned, allowed for the rapid recovery of employment and income to the levels seen prior to the crisis. The behavior of the exchange rate and inflation indicators, after a temporary increase, also stabilized, as did the public deficit, which after surpassing 4% of GDP in the last quarter of 2009, declined considerably reaching 1.3% of GDP at the end of 2010.

Graphs 3 and 4 show the behavior of the same indicators, but in the COVID-19 pandemic scenario. Unlike in the IFC context, the Brazilian economy was experiencing low growth, which favored low inflation rates and, thus, allowed the interest rate to fall, despite the higher, but stable, level of the exchange rate, which was close to R$4.00 (Graph 3).

**Graph 3: Selected macroeconomic indicators — the COVID-19 Crisis — Brazil (2019-2020)**
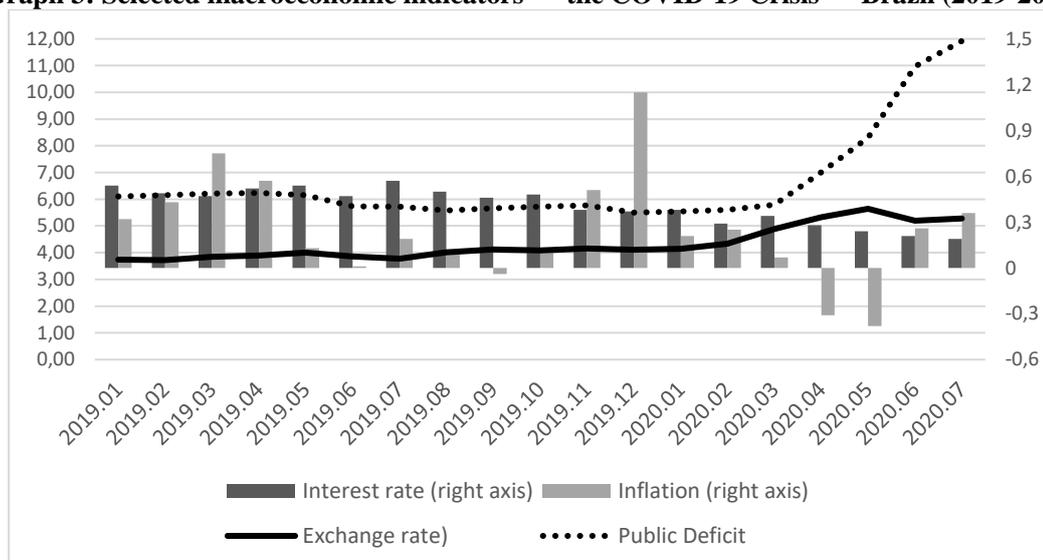


Source: Ipeadata (2020)

With the advance of the pandemic, however, GDP levels and industrial production, already in obvious stagnation (Graph 4), were severely impacted. Unemployment reached 13% of the workforce, while preliminary GDP data points to a drop of 11.4% in the second quarter of 2020. The shock led to an increase in the exchange rate, which had a sharp devaluation, as did the public deficit, which was already relatively high and more than doubled, reaching 11.9% of GDP.

**Graph 4: Selected macroeconomic indicators — the Covid-19 Crisis — Brazil (2019-2020)**
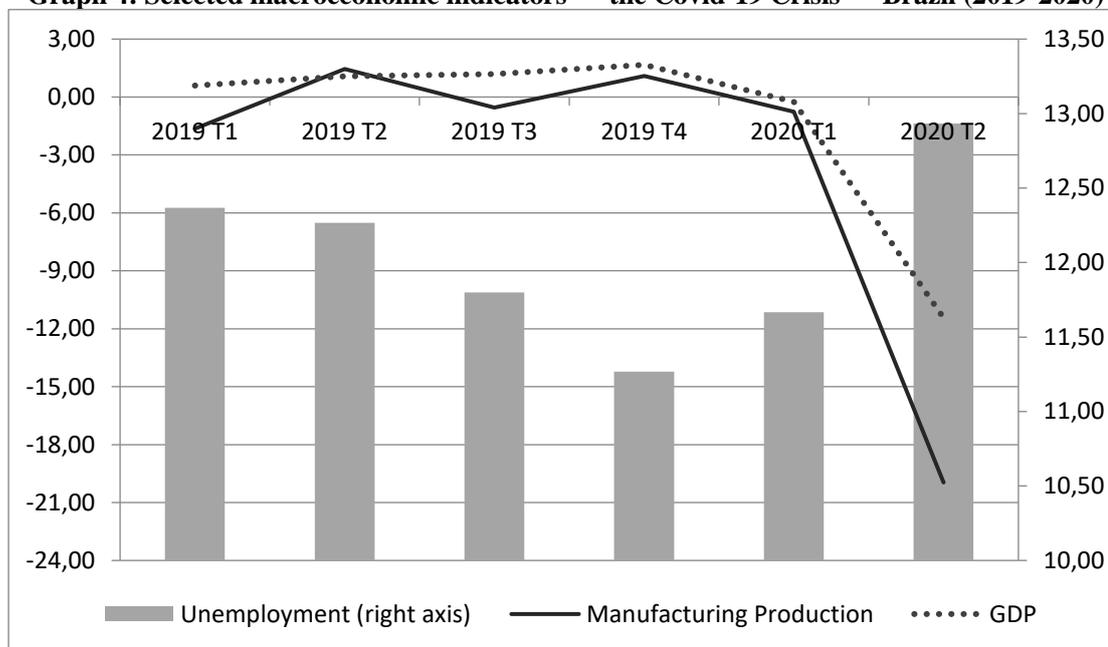


Source: Ipeadata (2020)

Finally, it should be mentioned that, although Brazil is still at the peak of the pandemic, the fact is that, compared to other countries, the observed effects of the crisis have been very severe. In light of this, what would be the possible explanations for such a recessive impact?

First of all, there is the economic agenda, in effect since 2015, which is based on the ideas of "expansionary fiscal adjustment." According to this agenda, the reduction in expenditures and the increase in taxes, privatizations of state-owned enterprises and other liberalizing measures create conditions for fiscal balance and the stabilization/fall of the public deficit/debt, positively affecting the confidence of agents and, therefore, investment and economic growth. It is worth noting on this point that, among other effects produced by this agenda, there is the strong grazing of the public health system, which has had numerous resource cuts, so essential in the current scenario.

A second aspect to be highlighted is the slowness and mismanagement of the Brazilian authorities in recognizing and dealing with the seriousness of the pandemic, then even after recognizing and taking acting, the insufficiency of resources (fiscal and monetary) that, as mentioned above, are below 4.0% of GDP. Finally, at a time when the preference for liquidity is high and monetary policy finds its limits as an inducer of expansion, essential agents for the resumption of growth, such as is the National Bank for Economic and Social Development (BNDES), are not fulfilling their purpose. For instance, there is a complete absence of resources being effectively transferred to companies, notably, in the provision of investment in capital goods and in economic and social infrastructure, hindering even more the ability to overcome what is presented as the greatest world crisis in recent history.

With these considerations in mind, the next section deals with the empirical part of the research, investigating the effects of monetary and fiscal policies and their effects in different contexts.

Unlike in the IFC context, when the COVID-19 reached Brazil, the Brazilian economy, from 2015 to 2019, was in a process of stagnation, after facing a huge recession in 2015-2016 (GDP dropped 7.1%). According to Arestis, Ferrari Filho, Resende and Terra (2019), this economic situation was associated with the following factors: (i) the orthodox economic policies, mainly fiscal policy, explicitly recessive, adopted by the governments of both Dilma Rousseff (from January 2015 to August 2016) and Michel Temer (from September 2016 to 2018), and Jair Bolsonaro (2019); (ii) a political and institutional crisis that, in April

17, led to Dilma Rousseff's suspension and finally, in August 31, the Senate removed President Rousseff from office, considering her guilty of breaking the Brazilian fiscal laws; (iii) huge fiscal deficit and high public debt; and (iv) a process of de-industrialisation and commodity-dominated exports (it is also called as 're-primarization'). As a result of this scenario, in 2019, if the inflation and interest rates were low – mainly due the stagnation process –, the fiscal results deteriorated: the relationship between primary fiscal deficit and GDP was 1.9%, and the net domestic debt reached 55.7% of GDP.

With the countercyclical fiscal and monetary policies implemented in 2020, the fiscal results deteriorated dramatically: the public deficit increased to almost 10% of GDP, and the net domestic debt reached 70% of GDP.

## 4. An empirical analysis of the effects of shocks on fiscal and monetary policy in times of normality and economic crises

The purpose of this section is to analyze the effects of shocks on macroeconomic policies, in particular, on fiscal and monetary policies on the economy. The impacts in times of low economic growth and high economic growth are analysed. The empirical exercise is inspired by articles that investigated the possibility of different results for economic policies when considering regime changes, in other words, the distinction between periods of economic crisis and stability.

The effects of the possible non-linearity of shocks on fiscal policy were investigated by Auerbach and Gorodnichenko (2017), Jordà and Taylor (2016) and Gorodnichenko (2014), while the non-linearity of shocks on monetary policy was investigated by Artis, Canova, Gali, Giavazzi, Portes, Reichlin, Uhlig and Weil, (2003) and Krolzig (2003), among others.

The empirical strategy of the research, therefore, consists of estimating a Markov-switching vector autoregressive (MS-VAR) model, which is generally used to capture the effects of monetary and fiscal shocks on the economy, considering the possibility of regime changes. According to Krolzig (1996; 1997; 1998), the MS-VAR models emerged from two sources: vector autoregressive models, emerged from Sims (1990) and widely used to analyze macroeconomic variables; and Markov-switching models that focus on regime changes in these variables. Krolzig (1997) created a simple notation that allows the identification of MS-VAR models according to the dependence or not of the parameters in face of the regimes.

The great innovation of using the MS-VAR model in this paper is that it dispenses with the need to analyze the series stationarity and verify the presence of structural breaks. This is because the model used may or may not converge to its own distribution given the characteristics of each series analyzed together. This allows to preserve the series in its natural state and to some extent endogenize structural breaks by modeling around these breaks, the regime changes to be observed in the model in question.

In this article, the MS-VAR is estimated with all parameters dependent on the regime, configures an MSIAH ($m$)-VAR ($p$) model. The estimation of this model is based on Expectation-Maximization (EM). In this regard, we chose to estimate a model in which both the intercept, the parameters and the variance varied. Without this flexibility, the model would become more restricted and difficult to estimate.

For a K set of time series variables, $y_t = (y_{1t},..., y_{kt})$, a VAR model captures the dynamic interactions between these variables (see, for instance, Enders, 2010). Its basic form with an order p (VAR (p)) can be represented as follows:

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + u_t,$$

where $A_i$s are matrices of coefficients ($K \times K$) and $u_t = (u_{1t},...,u_{kt})$ are the error terms, supposedly with zero mean and independent.

There are several advantages to using VAR models. First, the approach allows for the estimation of models with many parameters and does not impose restrictions on the shape of the impulse-response functions. Second, these models can be easily extended to estimate the effects of potential non-linearities of shocks, as is the case in this research. Third, the model is suitable for dealing with correlated error terms over time.

The coefficients of the VAR models are not directly interpreted, since the existence of multicollinearity makes them, in most cases, not statistically significant. Thus, in the present study, the analyzes are made from the impulse-response functions. These allow to capture the dynamic effect of an

exogenous shock on the model's variables in a given time horizon. In addition, through this method it is possible to ascertain the time in which the effects of a shock on a given variable are dissipated and the intensity of the responses as a result of the shocks.

The empirical analysis will be developed for the Brazilian economy, between 1996 and 2019, with quarterly data. The variables used in the econometric analysis are as follows: the effective Selic interest rate (annualized); P is the inflation measured by the consumer price index (IPCA); $y$ is the GDP (seasonally adjusted and deflated); and G is the deflated government expenditures. The description of the variables and their sources are available in the Appendix Table. The order of the estimated VAR begins with the shock variables on economic policy, interest rates and government expenditures, followed by the GDP and inflation variables.

The estimated model uses variables in level with two lags, which guarantees robustness and avoids the problem of over parameterization. Regarding the use of variables in level, instead of using the results of unit root tests, Sims (1990) emphasizes that the series should not be differentiated if the purpose of the estimation is to understand the interrelationships between the variables, given that the differentiation process leads to the loss of such relationships.

Given that the objective of this section is to estimate the impacts of shocks on fiscal and monetary policies on the economy in times of growth and recession, the model is divided into two regimes. Regime 1 refers to moments of economic growth, measured by rises in GDP, while regime 2 represents moments of economic crisis, measured by falls in GDP.

The data are used to estimate and analyze an unrestricted MS-VAR model, with intercept, variance and parameters varying according to the regime. Thus, an MS(2)-VAR(2) was estimated. The justification for the use of the MS-VAR model comes from the possible non-linearity in the parameters of the model, due to significant changes of these parameters between the regimes. The investigation of this hypothesis is performed by the LR Test, under the null hypothesis that the model is linear in its parameters, as shown in Table 1.

**Table 1. LR linearity test**

Null hypothesis of the test (H0): The model is linear

| Linearity LR-test Chi^2(16) | 165.91 | Prob. [0.0000]*** |
|---|---|---|

Source: Author's own elaboration based on research data.

As shown in Table 1, it is possible to reject the null hypothesis of linearity with a 99% confidence level in relation to the alternative hypothesis that the tested model is non-linear. This result corroborates the use of the MS-VAR methodology.

The convergence of the EM algorithm occurred after two interactions, with a probability of change of 0.0001. Figure 1, below, shows a good adjustment of the model in each estimated regime and indicates the occurrence of two regimes, demarcated by the GDP variable (Y).

**Figure 1. Adjustment of the model**
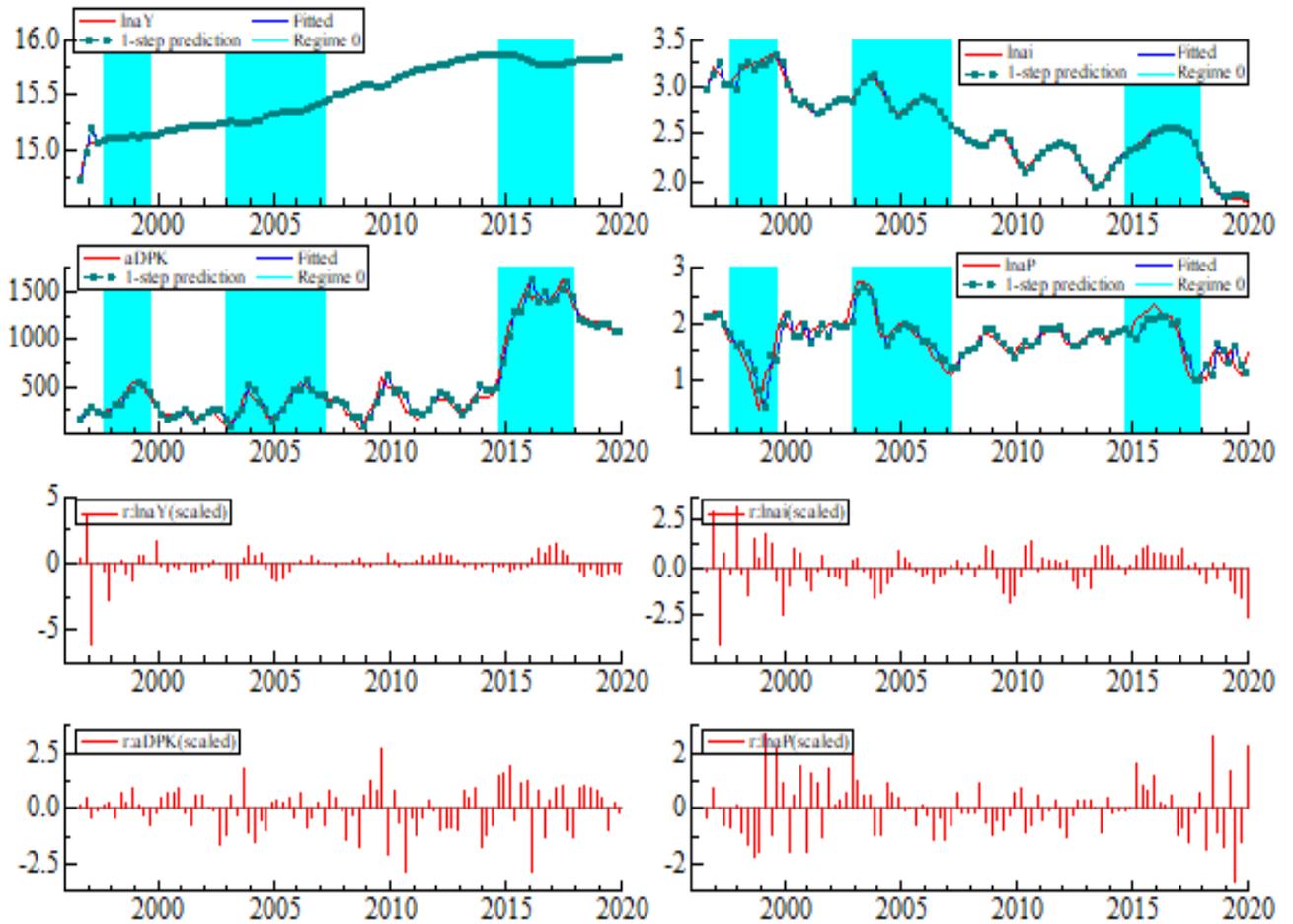


Source: Author's own elaboration based on research data.

The MS(2)-VAR(2) model, estimated for the period 1996 to 2019, showed the following transition matrix of the regimes:

$$\hat{T} = \begin{bmatrix} 0.88476 & 0.07021 \\ 0.11524 & 0.92978 \end{bmatrix}$$

It can be seen through this matrix that the estimated regimes are persistent, that is, once we are in a regime, the probability of staying in it is high: Once we are in the first regime, the probability of switching to the second regime is only 11%, while, to stay in it, the probability is 88%. The same occurs in the second regime, once in it, the probability of change is only 7%, while permanence is 93%.

In line with the estimated probabilities, the two regimes can be classified over time, resulting in Table 2 below:

**Table 2. Classification of estimated regimes**

| Regime 1 | Regime 2 |
|---|---|
| 09/1997 - 01/1999 (0.943) | 09/1996 - 06/1997 (0.908) |
| 12/2002 - 03/2007 (0.745) | 12/1999 - 09/2002 (0.858) |
| 09/2014 - 12/2012 (0.961) | 06/2007 - 06/2014 (0.884) |
| Total: 41 quarters | Total: 53 quarters |
| Representing 43.62% of the estimated period with an average duration of 13.67 quarters. | 56.38% of the estimated period with an average duration of 13.25 quarters. |

Source: Author's own elaboration from OxMetrics 7.2.
Note: Probabilities are between parentheses.

Regime 2 is more persistent, totaling 53 quarters of the analyzed period with an average duration of approximately 13.25 quarters. Regime 1 is less persistent, totaling 41 quarters of the analyzed period and having an average duration of 13.7 quarters.

In order to further analyze the relationships between endogenous variables within the MS-VAR model, impulse response functions are usually constructed. They summarize the effects of shocks on a model variable on itself and on the other hand included variables. Figure 2 summarizes the results of the model in Regime 1 and Figure 3 summarizes the results for Regime 2.

**Figure 2.- Impulse-response function for Regime 1**
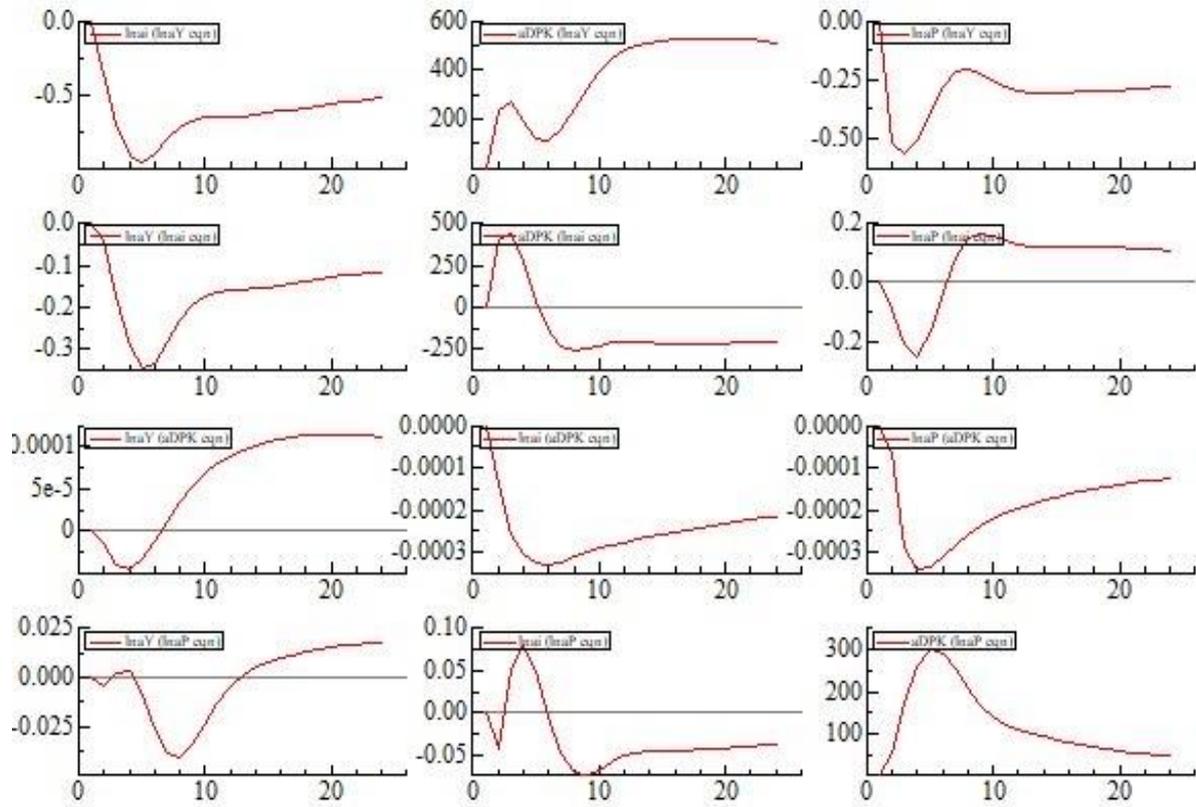


Source: Author's own elaboration based on research data.

**Figure 3. Impulse-response function for Regime 2**
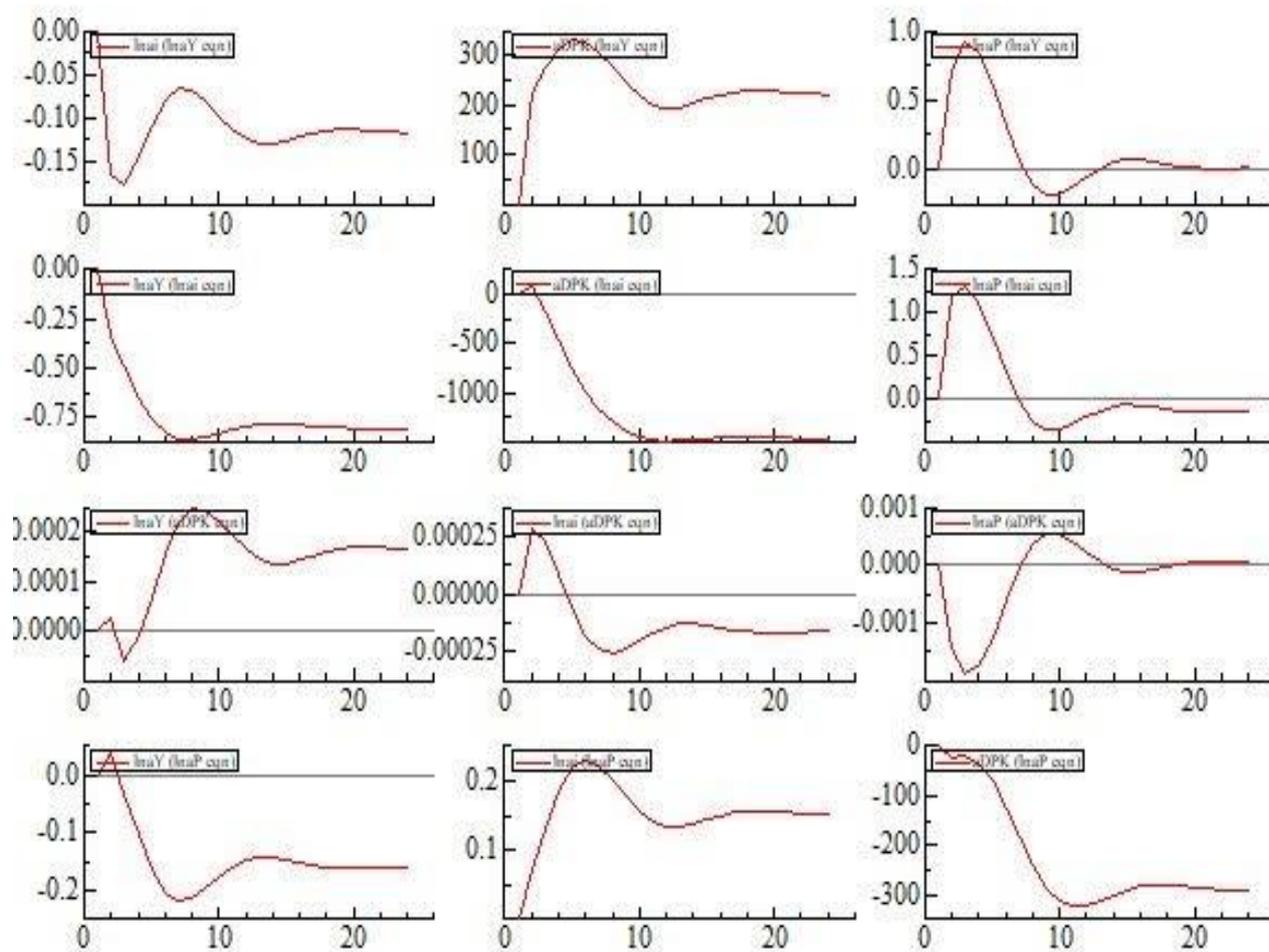


Source: Author's own elaboration based on research data.

Figures 2 and 3 bring interesting results for the purposes of this research. The first column of Figure 2 summarizes the effects of the following variables on GDP: interest rates, government expenditures and prices. Specifically, the second and third graphs from top to bottom synthesize, respectively, the effects of monetary and fiscal policy on GDP.

Regarding the effects of shocks on monetary policy, represented by changes in the interest rate, it is worth noting that, initially, the responses of the variables refer to a positive shock in the interest rate. Therefore, an increase in the interest rate in regime 1, that is, in the economy's growth regime (first column, second graph) implies a reduction in GDP that begins to dissipate from the sixth quarter onwards. In regime 2, an economic recession regime, an increase in the interest rate has a higher negative effect on GDP than in regime 2, an effect that does not dissipate quickly as occurred in regime 1.

As the effects of the shocks are symmetrical, we can conclude that the effects of an expansionary monetary policy, namely a reduction in the interest rate in the Brazilian economy, in times of economic growth has a lesser effect than in times of economic recession. Thus, it can be said that, during the analyzed period, the monetary stimulus has more important effects in times of recession than in times of economic growth in Brazil.

In this subject, Libanio (2010) analysed the procyclical and asymmetrical character of monetary policy under inflation targeting in Brazil, evaluating how monetary policy has responded to fluctuations in output, especially in the downturn of the cycle. Initially, the author emphasizes that, inflation targeting regimes, as is the case in Brazil, imply a strong emphasis on inflation stabilization, with low concerns for real effects on output and employment. The author´s results regarding the asymmetric behaviour of

monetary policy showed that monetary policy has been procyclical in good and bad times, but the estimated coefficients are higher and are only significant for bad times.

Regarding the effects of an expansionary fiscal policy on GDP, more specifically, of increases in government spending, the results of the impulse-response function in regime 1 (first column, third graph) show that the effects of an increase in government spending are lower in regime 1, when compared to regime 2. The important implication of this result is that the effects of fiscal policy on the Brazilian economy in the period studied tend to be greater in times of recession (regime 2) than in moments economic growth (regime 1).

Auerbach and Gorodnichenko (2017) also find that the effects of government spending shocks depend on a country's position in the business cycle. Expansionary fiscal policies adopted when the economy is weak stimulate output and reduce debt-to-GDP ratios as well as interest rates and CDS spreads on government debt. Differently, when the economy is strong the outcomes are more likely to have the conventional effects. According to the authors, their research is related to earlier studies, which find that government spending shocks generate expansions and the government spending multiplier is larger when economy is weak than when economy is strong, citing many studies such as: Blanchard and Perotti (2002), Ramey (2011), Auerbach and Gorodnichenko (2012, 2013) and Jorda and Taylor (2016).

The final conclusion that can be drawn from this empirical analysis is that fiscal and monetary stimuli are important for a weak economy, that is to say, one which is going through moments of economic recession. The effects of monetary and fiscal policies on GDP are also positive in an economy with an economic growth regime; however, they are not as intense as in a weak economy.

Analyzing these results in the light of the recent trajectory of the Brazilian economy, the conclusion reached is that the country gave up important tools to stimulate its growth when it opted for the austerity agenda as a permanent policy of the State. In addition, the weak performance of monetary and fiscal policies in face of the current pandemic may be one of the reasons for the extremely recessive impact observed here. It is worth mentioning that Brazil is probably among the countries that have lost the most in the context of the current pandemic — both in terms of lives taken by the disease and in terms of the opportunity to resume a long-forgotten development agenda.


## 5. Final remarks

The objective of this article was to analyze countercyclical economic policies, in particular, fiscal and monetary policies, implemented by the Brazilian Economic Authorities in response to the IFC, and the current COVID-19 crisis. The effectiveness of both policies was analyzed in different contexts, under the assumption that such measures are even more important in times of severe shocks.

To achieve its purpose, first it was outlined the Keynesian macroeconomic policies. Afterwards, it presented, analyzed and compared the policies implemented in Brazil in both crises, the IFC and COVID-19, highlighting the different scenarios existing at the time of each crisis and the emphasis of the policies adopted at each time, as well as their results. Finally, the empirical part of the article assessed the effects of shocks on fiscal (government spending) and monetary (the interest rate) policies on the Brazilian economy in the period between 1996 and 2019, using an MS-VAR model. This model considered the possibility of regime changes – of high and low growth – as a fact that could influence the nature of the relationship between the studied variables, namely, non-linearity.

An important observation to be made involves to the differences in scenarios at the time when the two crises reached Brazil. In the first (the IFC), the country was growing and there was relative stability (inflation, interest rates, and public debt), while on the eve of the pandemic, the context was one of obvious stagnation, with high unemployment and a high public deficit, a situation that the health crisis worsened. The actions of the BEAs were also different: in the first shock they acted quickly and effectively, focusing on transfer payments and investments in economic and social infrastructure. During the pandemic crisis, however, action was slow and inconsistent, in such a way that fundamental policies were no longer implemented. This contributed to the advance of the health crisis and the worsening of the economic scenario.

Finally, in the empirical part of the article, it was observed that the effects of fiscal and monetary policies, in the observed period, proved to be more pronounced in the recessive context than in a situation of greater economic growth. This is in line with the above and points to the importance of a central authority – 'Big Government' and 'Big Bank' – to act effectively to drive expectations in a scenario of

increased uncertainty. In addition, it provides substance for the necessary reevaluation of the austerity agenda, in effect since 2015, and its prolonged depressive effects.


## 6. References

Arestis, Philip; Ferrari Filho, Fernando; Resende, Marco Flávio; Terra, Fabio Henrique (2019). "Brazilian monetary and fiscal policies from 2011 to 2017: Conventions and crisis". *Challenge: The Magazine of Economic Affairs*, 62(3): 187-199.

Arestis, Philip ; Sawyer, Malcolm. (2013). "Policies for full employment and low inflation. In P. Arestis and M. Sawyer (eds.). *Economic and Monetary Union Macroeconomic Policies: Current Practices and Alternatives*. Basingstoke: Palgrave Macmillan, 144-167.

Artis, Michael; Canova, Fábio; Gali, Jordi; Giavazzi, Francesco; Portes, Richard; Reichlin, Lucrezia; Uhlig, Harald; Weil, Philippe (2003). "Business cycle dating committee of the Centre for Economic Policy Research". CEPR, 22 September.

Auerbach, Alan; Yuriy Gorodnichenko (2017). "Fiscal stimulus and fiscal sustainability". NBER Working Paper No. 23789.

Auerbach, Alan; Gorodnichenko, Yuriy (2013). "Fiscal Multipliers in Recession and Expansion" in *Fiscal Policy after the Financial Crisis*, Alberto Alesina and Francesco Giavazzi, eds., University of Chicago Press.

Auerbach, Alan; Gorodnichenko, Yuriy (2012). "Measuring the Output Responses to Fiscal Policy," *American Economic Journal – Economic Policy* 4: 1–27.

Blanchard, Olivier; Perotti, Roberto (2002). "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output," *Quarterly Journal of Economics* 117(4): 1329-1368.

Central Bank of Brazil (CBB) (2020). *Acompanhamento de medidas de combate ao Covid 19*. Available at: https://www.bcb.gov.br/acessoinformacao/acompanhamento_covid19. Accessed in December 5.

Enders, Walter (2010). *Applied Econometric Time Series*. New York City: John Wiley.

Ferrari Filho, Fernando; Conceição, Octavio (2005). "The concept of uncertainty in Post Keynesian theory and in Institutional Economics". *Journal of Economic Issues*, 39 (3): 579-594.

Fucs, José (2020). *Governo só gastou 53,7% da verba liberada na pandemia*. Available at: https://economia.estadao.com.br/noticias/geral,governo-so-gastou-53-7-da-verba-liberada-na-pandemia,70003392701. Accessed in December 5.

Gorodnichenko, Yuriy (2014). "Discussion of government spending multipliers in good times and in bad imes: Evidence from U.S. historical data by Valerie Ramey and Sarah Zubairy". *NBER Economic Fluctuations and Growth Summer Meeting*, Cambridge, MA.

Instituto Nacional de Geografia e Estatística (IBGE). (2020a). *Pesquisa Nacional por Amostra de Domicílio Contínua (PNAD Contínua)*. Available at: https://www.ibge.gov.br/estatisticas/multidominio/condicoes-de-vida-desigualdade-e-pobreza/9171-pesquisa-nacional-por-amostra-de-domicilios-continua-mensal.html?edicao=27233&t=destaques. Accessed in December 2.

_____ (2020b). *Sistema de Contas Nacionais.* Available at https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9052-sistema-de-contas-nacionais-brasil.html?=&t=resultados. Accessed in December 8.

International Monetary Fund (IMF) (2020). *Data and Statistics*. Available at: http://www.imf.org. December 5.

IPEADATA (2020). *Séries Históricas*. Available at: http://www.ipeadata.gov.br. Accessed in December 5.

Jordà, Òscar; Taylor, Alan (2016). "The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy," *Economic Journal* 126(590): 219-255.

Keynes, John M. ([1936] 2007). *The General Theory of Employment, Interest and Money*. London: Palgrave Macmillan.

_____. (1971). *A Tract on Monetary Reform*. Londres: MacMillan (The Collected Writings of John Maynard Keynes, v. 4).

_____. (1972). *Essays in Persuasion (The Collected Writings of John Maynard Keynes, Volume IX)*. London: Macmillan.

Krolzig, Hans-Martin (1996). Statistical analysis of cointegrated VAR processes with Markovian regime shifts. *SFB 373 Discussion Paper*, n. 25, p. 1-37.

_____. (1997). *Markov-switching vector autoregressions*: Modelling, statistical inference, and application to business cycle analysis. Berlin: Springer.

_____. (1998). *Econometric modelling of Markov-switching vector autoregressions using MSVAR for Ox*. Mimeo.

_____ (2003). "Constructing turning point chronologies with Markov Switching Vector Autoregressive Models: The Euro-Zone business cycle". *Discussion Paper in Economics*, University of Oxford.

Libanio, Gilberto (2010). A note on inflation targeting and economic growth in Brazil. Revista de Economia Política, 30, 73-88.

Marcuzzo, Maria C. (2010). "Whose Welfare State? Beveridge versus Keynes." In R.E. Backhouse and T. Nishizawa (Eds.). *No Wealth but Life - Welfare Economics and the Welfare State in Britain, 1880-1945*. Cambridge: Cambridge University Press. Available at: http://dx.doi.org/10.1017/CBO9780511750649.010. Accessed in December 5.

Minsky, Hyman (2008). *Stabilizing an Unstable Economy*. New York: McGraw-Hill.

Sims, Christopher A. (1990). *Macroeconomics and reality. Modelling Economic Series*. Oxford: Clarendon.

**Appendix**

**Table A1. Description of variables used in estimations**

| Variables | Description | Source |
|---|---|---|
| P | Inflation – IPCA – (% ) | IBGE, System of Quarterly National Accounts (IBGE 2020b) |
| G | Government social spending on health, pensions, assistance and other transfers | IBGE, System of Quarterly National Accounts (IBGE 2020b) |
| Y | GDP – market prices – R$ (million), deflated by the IPCA. | IBGE, System of Quarterly National Accounts (SCN104_PIBPMG104) (IBGE 2020b) |
| i | Interest rate – Selic – set by Copom – (% p.a.) | Central Bank of Brazil, Financial and Capital Market (BM366_TJOVER3660 |

Source: Elaborated by the authors.