# Do political commentaries command?
# The case of the Central Bank of Brazil

*Os comentários políticos comandam?*
*O caso do Banco Central do Brasil*

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RESUMO: Este documento investiga se a pressão política afeta a condução da política monetária no Brasil. Para o período entre janeiro de 2010 e agosto de 2020, estimamos uma regra de Taylor modificada para testar empiricamente se os apelos a taxas de juro mais baixas por parte dos presidentes induzem o Banco Central do Brasil (BCB) a baixar a taxa de política. Documentamos que é mais provável que o BCB defina a taxa de política de acordo com as preferências dos líderes políticos. Mostramos também que a resposta do BCB à pressão política permaneceu significativa, embora a pressão política tenha diminuído nos últimos anos.
PALAVRAS-CHAVE: Independência do banco central; pressão política; regra de Taylor; economia emergente.

ABSTRACT: This paper investigates whether political pressure affects the conduct of monetary policy in Brazil. For the period between January 2010 and August 2020, we estimate a modified Taylor rule to empirically test whether the calls for lower interest rates by presidents induce Central Bank of Brazil (BCB) to lower the policy rate. We document that BCB is more likely to set the policy rate in line with the preferences of political leaders. We also show that the response of BCB to political pressure remained significant even though political pressure diminished in recent years.
KEYWORDS: Central bank independence; political pressure; Taylor rule; emerging economy.
JEL Classification: E42; E43; E52; E58.

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## 1. INTRODUCTION

In the last few decades, numerous economies have passed laws giving their central banks (CBs) legitimate autonomy from their governments. There are two reasons behind this reform. First, a CB under government control may use monetary expansion to inflate away government debt. Second, incumbent parties may resort to monetary easing to raise the economic growth in the short-run prior to the elections in order to increase their re-election chances, which is a commonly referred issue in political business cycles. Therefore, to manipulate the monetary policy according to their interests, politicians would like to have some degree of oversight on the decisions of CBs as monetary policy instruments will not only influence the primary objectives of CBs but also the economy as a whole. In return, the control of government over the monetary policy may lead to deviations of the monetary policy from the optimal one. Hence, it is crucial to understand how influential the political pressure is on the conduct of monetary policy.

Many developed countries (e.g., Australia, Canada, the Great Britain, and Sweden) adopted inflation targeting (IT) in the 1990s. In return, they managed low and stable inflation rates without a great loss in their economic growths. After the success of this policy in advanced economies, IT regime attracted attention among developing countries. Keeping the inflation rate around a target became the fundamental objective of BCB in 1999, stressing the importance of the price stability. To communicate the IT regime with the public, National Monetary Council (CMN) establishes the annual inflation target of the National Consumer Price Index Extended (IPCA); and to achieve the primary goal of price stability, BCB uses the target for the Selic interest rate, set by Monetary Policy Committee (COPOM), as the main monetary policy tool. Although the choice on the monetary policy instruments relies on the changes in the macroeconomic indicators and disturbances, recent literature advocates for the interest rate over the monetary aggregates. In this regard, Taylor (1993) recommends a feedback rule that relates the interest rate to the deviations of output from its potential and inflation from its target. Since the papers studying the monetary policy of Brazil provide strong evidence showing that the policy rate of BCB follows a Taylor rule, especially after the adoption of IT, we use a Taylor rule to mimic how BCB sets its policy rate. We modify the rule by incorporating the political pressure to analyze the role of the calls for lower interest rates on the conduct of the monetary policy in Brazil. More specifically, by focusing on the period between January 2010 and August 2020, we empirically investigate whether the political pressure, measured by the calls for lower interest rates, induced BCB to lower the policy rate. Our analysis reveals that BCB gave in to the political pressure; and the reaction of BCB to political pressure remain significant even though the amount of calls for lower interest rates declined in recent years.

Many emerging market economies, in particular Latin America, have been fighting against volatile and persistently high inflation rates. Today, this is still an issue as they resume experiencing higher inflation rates than developed countries. Compared to other Latin American countries, Brazil is unique as it experienced

prolonged hyperinflation episodes, especially before 1994. Throughout these hyperinflationary periods, Brazil introduced stabilization plans. Despite these plans, Brazil was the latest among Latin American countries that managed to reduce the inflation rate from multi-digit numbers to single-digit ones, hinting us the uncovered dynamics behind this late achievement. It is also known that CBs of emerging economies tend to deviate more often from their inflation targets. As illustrated in Figure 1, the inflation rate in Brazil was not within the target band throughout most of 2011 together with the period 2015-2017; has been mostly closer to the upper limit of the target rate than the lower one; and coincided with the target rate especially after 2018. Higher inflation rates combined with the discrepancy between the realized and the target inflation rates suggest the possibility for non-economic factors for influencing the monetary policy. Among these non-economic factors, political pressure can be thought as the most prominent one as it would lead to a deviation from the optimal monetary policy, thereby damaging the credibility of a CB and violating its independence.

Figure 1: Inflation realized vs inflation target
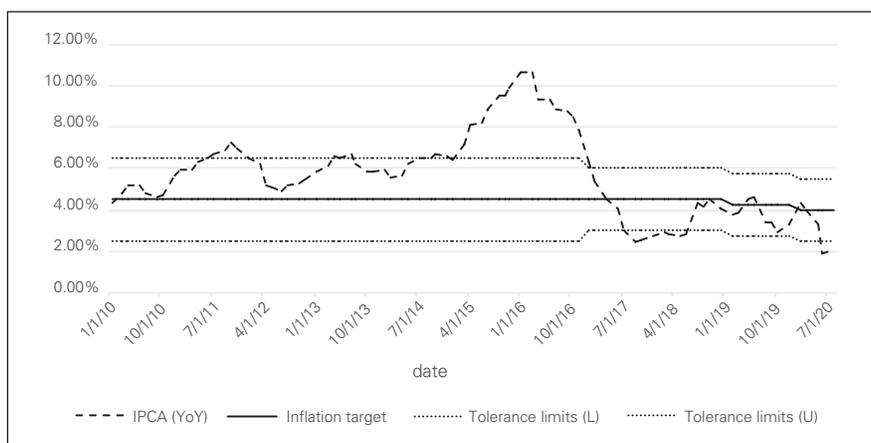


Source: BCB, IBGE.

Central bank independence (CBI) and associated reforms are important as they protect monetary authorities from political pressure and reduce inflationary bias. Inflationary bias occurs as a consequence of time inconsistency (Kydland and Prescott (1977) and Barro and Gordon (1983)) problem where a current plan is announced as the optimal strategy for a certain future period; yet when that period comes, it becomes suboptimal and is deviated from. The inconsistency in the policy over time will be anticipated by agents through time according to the rational expectations as the previous actions of the policy authority signal a discretion to change its announced plan frequently. Consequently, higher inflation rate and lower credibility of the CB will be experienced. Instead, a credible CB commits to the announced inflation rate to build reputation on the condition that there is no

underlying pressure from the government. Hence, in line with the findings of Mishkin (2007) and Binder (2021), who state political pressure is associated with high, persistent, and weakly-anchored inflation, these large deviations from the target rate, proximity towards the upper target and high inflation rates for long periods can be considered as indicators for political pressure as a non-economic factor for affecting the monetary policy in Brazil.

The BCB was established in 1964; and governors were chosen among appointed members of the CMN from 1965 to 1974, where Minister of Finance was assigned as the President of CMN (BCB (1995)). However, in 1974, governors began to be appointed by the President. Then, Board of Governors, as a model for governance, was introduced in 1992. In 1996, COPOM was established to provide structure to the decision-making in monetary policy and to communicate these policies with the public. In 1999, a flexible exchange-rate regime was adopted which enabled the introduction of the IT regime. In the same year, the adoption of IT, which is established by CMN, allowed BCB to take the full responsibility for achieving this target. Although Geithner (2005) and Knight (2005) praised the attempts to bring down the inflation rate and these institutional reforms at the 40th-anniversary celebrations of BCB, they still stressed the importance of one issue in common: independence of BCB. More specifically, they insisted that the effective monetary policy depends on the degree of accountability and transparency of the communications; and on the institutional arrangements in terms of freedom in the design and the choice of the mandates and objectives; in the choice of the regimes, instruments and the structure of the decision making. Considering that BCB gained its legal independence in 2021, these anecdotal evidences imply that it is possible for BCB to become more independent since February 2021; yet prior to this date, BCB presents a fitting example to study the effects of political pressure on monetary policy.

The relationship between CBs and politicians is tricky especially in terms of governance structure and mandates as CBs do not function in a political vacuum. In order to measure how shielded CBs are from the interference of governments, researchers (e.g., Rogoff (1985), Grilli et al. (1991), Debelle and Fischer (1994), Blinder (1998), and Walsh (2003)) have been studying the independence of CB. Cukierman et al. (1992) constructed a legal CBI for 72 countries considering the term of office, objectives, policy formulation and limitation on lending to the government. According to the calculations over 1980-1989, BCB was the least independent CB in Latin America. More specifically, the index for BCB was 0.21 whereas those of, for instance, Venezuela and Costa Rica were 0.43 and 0.47, respectively. Crowe and Meade (2008) construct transparency index (TI) and independence index by enhancing the work of the previous literature. Transparency is a critical factor in CBI as an independent CB does not mean a freedom from accountability; and can explain its actions and decisions as long as they are not imposed by political figures. Dincer and Eichengreen (2008) extend the TI considering five transparency categories for more than 100 countries. According to the latest update on this dataset, there is a rising trend towards greater transparency in

Latin America. Yet, BCB's TI average over 1998-2019 is lower, for instance, compared to Chile and Peru. According to CBI of Garriga (2016), the average value of the index between 2000-2012 for Brazil is lower compared to, for instance, Argentina, Bolivia and El Salvador with minimum of 2.5-fold.

Since there is a difference between legal status of CB and its actual independence, researchers also develop a measure for actual independence, such as turnover rates (TOR) of CB governors. According to Cukierman et al. (1992), more rapid turnover of the governors suggests a lower degree of independence for CB. The TOR in Brazil over 1950-1989 was 0.68, which is larger compared to industrial economies' average of 0.2. In Table 1, governors of BCB and their terms of office (ToO) are provided since the establishment of BCB. Including appointed and interim governors, BCB have been experiencing a change of governor once in every 23.2 months on average. Considering that the term of office is set to 4 years in 2016, when interim governors and those who are appointed later than 2016 are excluded, that change becomes slightly less frequent on average; more specifically, once per 26 months. On the other hand, these office changes occur once in 6 years on average in European Central Bank (ECB) since 1998; and governors of Bank of Guatemala changed on average once in 33.8 months since 1946. These examples indicate that frequency of the changes in governors (CBI) in BCB is larger (lower) compared to its counterparts from both developed countries and other Latin American countries.

Table 1: Duration and Governors

| ToO | Governor | ToO | Governor | ToO | Governor |
|---|---|---|---|---|---|
| 4-65 to 3-67 | Nogueira | 8-85 to 2-87 | Bracher | 9-93 to 12-94 | Malan |
| 3-67 to 2-68 | Leme | 2-87 to 4-87 | Gros | 12-94 to 1-95 | Franco* |
| 2-68 to 2-68 | Burger* | 4-87 to 5-87 | Faria* | 1-95 to 6-95 | Arida |
| 2-68 to 3-74 | Galvêas | 5-87 to 3-88 | Oliveira | 6-95 to 8-97 | Loyola |
| 3-74 to 3-79 | Lira | 3-88 to 6-89 | Camões | 8-97 to 3-99 | Franco |
| 3-79 to 8-79 | Brandão | 10-89 to 3-90 | Bucci* | 3-99 to 1-03 | Neto |
| 8-79 to 1-80 | Galvêas | 3-90 to 5-91 | Eris | 1-03 to 01-11 | Meirelles |
| 1-80 to 9-83 | Langoni | 5-91 to 11-92 | Gros | 01-11 to 06-16 | Tombini |
| 9-83 to 3-85 | Pastore | 11-92 to 3-93 | Loyola | 06-16 to 2-19 | Goldfajn |
| 3-85 to 8-85 | Lemgruber | 3-93 to 9-93 | Ferreira | 2-19 to present | Neto |

Source: BCB.
* interim

Measuring the political pressure directly is not easy as it is not observable. Instead, the literature uses several indicators as a representation of pressure, such as TI, CBI, TOR and political business cycles (e.g., Nordhaus (1975), Rogoff and

Sibert (1988) and Berger et al. (2001)). Nevertheless, these proxies suffer from certain drawbacks. There is a wedge between de facto and de jure CBI (Blinder (2012)) as indices developed basing on the perception of the survey respondents might be biased due to ill-preparation, office changes may be the result of incompetency (Dreher et al. (2008)) and natural causes; or governments that are popular may not need to intervene the monetary policy before elections. Since the procedure offered by Havrilesky (1993) solves these problems, we use a unique dataset that Cakmakli et al. (2021) created to quantify the political pressure. We aggregate these political commentaries in the inter-meeting period to construct the political pressure variable. According to our measure, there were 85 commentaries that call for lower interest rate between January 2010 and August 2020; and the amount of the political pressure declined over time.

Several papers in the literature study the relationship between political pressure and CBs. Cover and VanHoose (2000) evaluate how political pressure influence the choice of the monetary policy instrument. Their model introduces political pressure to the loss function of CB as shocks and suggest that CBs tend to use interest rate over reserves as a monetary policy tool if credibility gains from using it is greater when facing a political pressure. Gonçalvez and Fenolio (2007) investigate the existence of electoral cycles in monetary policy of Brazil after the adoption of IT regime. By augmenting an electoral dummy to a Taylor rule, they conclude that Selic rate was not influenced by elections. Based on a New Keynesian framework, Debortoli and Nunes (2008) explore the macroeconomic consequences of objective changes of a CB induced by external pressure. They construct a quadratic loss function for conservative and liberal CBs where switching policies of one type to the other is considered as the representation of external pressure. According to their findings, if liberal objectives will be adopted by a CB in the future, optimal response of a CB is to increase inflation while more conservative objectives anchor the inflation. Kuper and Veurink (2014) study the political pressure on US Federal Reserve (Fed) during Alan Greenspan's office. They get time-varying response parameters for the output and inflation gaps on a Taylor rule where political pressure presents itself as an indicator of partisan theory or political business cycle in these parameters. They demonstrate that Fed under Greenspan did not follow a political business cycle. In this line of research, many papers concentrate on the theoretical models with loss functions, optimal response of CB under commitment or discretion, evidence on partisan policies and an analysis on CB of developed countries, leaving a scope for an empirical analysis on the likelihood of the effects of political pressure on a CB from a developing country.

There are papers employing narrative approach in studying political pressure. Maier et al. (2002) examine Bundesbank's response to political pressure coming from both government and interest groups. By employing Granger causality tests, they find that while Bundesbank does not respond to political pressure, its policies are compatible with the will of the banking sector. Maier and Bezoen (2004) develop an indicator for political pressure arising from government or interest groups and for public support to analyze the external pressure on ECB. The estimates of

the Taylor rule imply that ECB faces pressure from organizations like IMF or politicians. Gersl (2006) aims to understand whether political pressure is exerted on Czech National Bank (CNB). The regression analysis based on a Taylor rule shows that CNB did not give in to the political pressure although the pressure for loose monetary policy in the period 1997-2005 was high. Ehrmann and Fratzscher (2010) use Taylor rules for ECB and politicians to analyze the political pressure on ECB. While the former rule represents the actual, the latter rule indicates the preference of the politicians for the interest rate; and the positive difference between the two rules demonstrates the political pressure. Their results indicate that politicians have preference for lower interest rate than ECB; and care more about the inflation than the output compared to ECB. Demiralp and Demiralp (2019) investigate the control of government on independent institutions focusing on Central Bank of Turkey (CBRT) over 2006-2016. They show that CBRT significantly responds to the calls of the President for a cut in interest rates. Bianchi et al. (2021) investigate the impacts of Trump's tweets on Fed. Using high-frequency data, they conclude that pressure stemming from Trump's commentaries about the ease monetary policy on Twitter manipulates market expectations. Binder (2021) regresses inflation on lagged inflation, pressure, unemployment, and industrial production (IP) growth rate; and finds that political pressure, arising from generally left-wing or less popular governments, leads to higher and persistent inflation.

Our contribution to the literature is twofold. First, to the best of our knowledge, this is the first study that investigates the impact of the political pressure on the decisions of BCB. The novelty of this study is that it shows BCB is more likely to adopt a loose monetary policy if the politicians call for lower interest rates; and to respond to inflation and output gaps by a tighter monetary policy with diminished weights on both when political pressure is controlled for. In other words, **BCB gives in to the political pressure in terms of both a policy stance by shifting it and the likelihood of the response by reducing the reactions to economic indicators. Moreover, several robustness checks, namely the introduction of exchange rate, international financial conditions, foreign monetary policy stance, inflation expectations and unemployment rate into the Taylor** rule, support our baseline conclusions. **Second, we study how the monetary policy framework in Brazil evolved over time. Time-varying estimation of the monetary policy rule enables us to see the variation in the sensitivity of BCB to the economic and political indicators. We demonstrate that the reaction of BCB to inflation gap has been positive but insignificant before 2017 while the one for output gap remained positive and significant. More importantly, our investigation reveals that BCB continued to set the Selic rate in line with the preferences of political leaders even though the amount of calls for lower interest rate decreased; and the reaction of BCB to political pressure became more pronounced between January 2013 and August 2020.**

The remainder of this paper is organized as follows. Section 2 explains the data collection and methodology. Section 3 describes the findings of the regression analysis. Section 4 checks the robustness. Section 5 concludes.

## 2. DATA AND THE MODEL

Taylor (1993) recommends a feedback rule as a model for conducting monetary policy that relates the interest rate to the deviations of inflation from its target and output from its potential. The original rule has the following form

$$r_t = r + \beta_\pi \left( \pi_t - \pi_t^* \right) + \beta_y \left( y_t - y_t^* \right) \qquad (1)$$

where $r_t$ is the policy rate and $r$ is the equilibrium interest rate, which a CB sets when the inflation rate $(\pi_t)$ is equal to the inflation target $(\pi_t^*)$ and the current level of output $(y_t)$ is equal the potential output $(y_t^*)$ at time $t$. The coefficients $\beta_\pi$ and $\beta_y$ represent the weights that a CB attaches to the inflation gap, $(\pi_t - \pi_t^*)$, and the output gap, $(y_t - y_t^*)$, respectively.

Even though Taylor suggests the original rule for the Fed, which has a dual mandate, it is also convenient for an IT framework as there are no restrictions on the coefficients. For instance, if a CB focuses only on the inflation dynamics, the weight of the inflation gap gets higher and the weight of the output gap vanishes. Since the previous literature, such as Favero and Giavazzi (2002), Gonçalvez and Fenolio (2007) and Modenesi (2011), provides strong evidence showing that the interest rate of BCB follows a Taylor rule, especially after the adoption of IT, we use a Taylor rule to mimic how BCB sets its policy rate.

In this paper, our aim is to study the role of political pressure on the decisions of BCB. For this purpose, we augment the original Taylor rule with the political pressure. Specifically, we focus on the changes in the Selic rate, as BCB uses the target for the Selic interest rate as the main monetary policy tool to achieve the price stability, to empirically test how BCB responds to economic conditions and political pressure. Since BCB changes the Selic rate by multiples of 25 basis points (bp), the policy rate has a discrete nature. Due to the discrete nature of the policy rate, estimating the model (2) with ordinary least squares technique may yield biased and inconsistent estimates. To avoid this issue, we define the policy rate to denote the direction of the change in the monetary policy stance. Specifically, we design the dependent variable as a ternary variable which takes the value of 1, 0, and – 1 if BCB increases, does not change, and decreases the Selic rate, respectively. Therefore, we model the changes in the policy rate by using an ordered probit model. The estimates of the model represent the change in the likelihood of the change in the direction of the policy rate in response to the corresponding variables. Moreover, positive coefficients hint higher likelihood of tightening whereas negative coefficients indicate increasing chance of loosening.

Then, our underlying model has the following form:

$$r_t^* = r + \beta_\pi \left( \pi_t - \pi_t^* \right) + \beta_y \left( y_t - y_t^* \right) + \beta_{PR} Pressure_t + \varepsilon_t \qquad (2)$$

$r_t^*$ is the latent continuous variable representing the changes in the interest rate on monetary policy meeting held at time $t$. We define $r_t^*$ such that

$$r_t = \begin{cases} 1, & r_t^* \geq \tau_2 \\ 0, & \tau_1 < r_t^* < \tau_2 \\ -1, & r_t^* \leq \tau_1 \end{cases}$$

and $r_t$ describes the direction of interest rate change at the policy meeting held at time $t$. The Selic rate increases (decreases) if $r_t^*$ is greater (lower) than upper (lower) bound $\tau_1$ ($\tau_2$). Otherwise, the Selic rate does not change.

We assume the residuals ($\varepsilon_t$) are independently and identically distributed and follow the standard normal distribution. Consequently, the probabilities of the dependent variable conditional on the available information set are

$$\Pr[r_t = -1|z_t] = \Phi\left(\tau_1 - z_t'\beta\right)$$

$$\Pr[r_t = 0|z_t] = \Phi\left(\tau_2 - z_t'\beta\right) - \Phi\left(\tau_1 - z_t'\beta\right)$$

$$\Pr[r_t = 1|z_t] = 1 - \Phi\left(\tau_2 - z_t'\beta\right)$$

where $\Phi(.)$ is the cumulative density function of the standard normal distribution, $z_t'$ is the vector of explanatory variables available at time $t$, and $\beta$ is the vector of coefficients estimated simultaneously with the bounds $\tau_1$ and $\tau_2$, where $\tau_1 < \tau_2$. Since the dependent variable is a categorical variable, we estimate the parameters of the model by using the maximum likelihood technique in Stata 13 using 'oprobit' command.

In the model, as BCB defines the inflation target in annual term, we use year-on-year IPCA inflation rate and take the difference between the year-on-year IPCA inflation rate and the inflation target in the corresponding year as the inflation gap. We use the seasonally adjusted IP level to calculate the output gap[1]. Specifically, we apply Hodrick-Prescott (HP)[2] filter to the series and obtain its trend and cyclical components, setting λ =14,400. Then, we take the ratio of the cyclical part to the trend level as the output gap. To avoid the reverse causality problem, we use the most currently available inflation rate and IP level figures to measure the inflation gap and the output gap, respectively. The monthly data between January 2010 and August 2020 for inflation and output (i.e., IP) are gathered from IBGE whereas those for exchange rate, VIX, foreign money stance (US 10-year bond yield), and unemployment rate that are used for robustness checks are obtained from Bloomberg; and inflation expectations are collected from BCB.

Measuring political pressure directly is not easy as it is not observable. The indicator under consideration to represent pressure should signal the strength and

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[1] As an alternative measure for output, we used IBC-Br and the estimation results, which are available upon request, remained the same.

[2] To calculate the output gap, we also used Hamilton filtered IP, HP filtered IBC-Br and Hamilton filtered IBC-Br; and the estimation results, which are available upon request, did not differ.

the direction of the pressure; be continuous, real-time, and consistent (Romer and Romer (2017)). Since the procedure offered by Havrilesky (1993), which is commonly referred to as narrative approach, satisfies these requirements, we use a unique dataset that Cakmakli et al. (2021) created to quantify the political pressure. For the period between January 2010 and August 2020[3], they searched for the archive of Bloomberg terminal to seek the news that contain the names of the political leaders and the keyword "interest rate". They coded the commentaries that called for the lower interest rate on day $\tau$, $PC_\tau$, such that

$$PC_\tau = \begin{cases} 1, & \textit{preference for lower rates} \\ 0, & \textit{otherwise} \end{cases}$$

$Pressure_t$, which is our main variable of interest, measures the political pressure on BCB. We construct the political pressure by aggregating the political commentaries that are released in the inter-meeting period. Figure 2 depicts the evolution of the political pressure. As our political pressure consists of the commentaries that call for lower rates, the political pressure increases if the politicians' call for lower rates mounts. In the sample period, there were 85 political commentaries, and the amount of the political pressure declined over time.

Figure 2: Amount of the political pressure
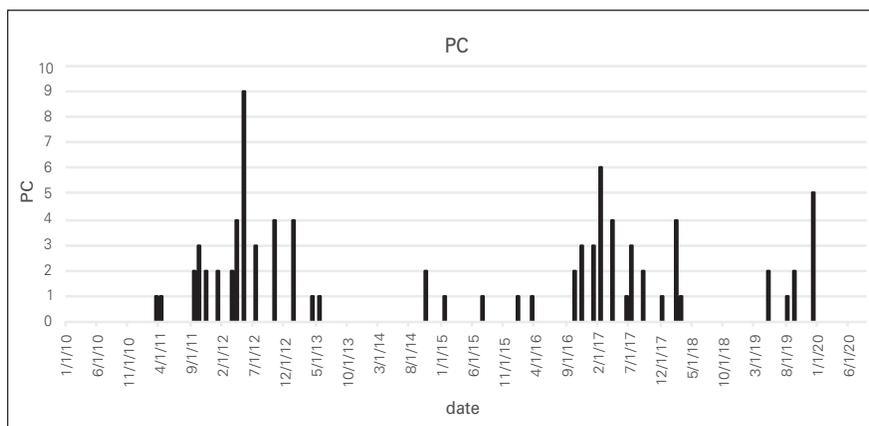


Source: Cakmakli et al. (2021), authors' calculation.

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[3] Data obtained from Cakmakli et al. (2021) covering 01.2010-08.2020 confine the period of the analysis. Following their procedure, we extended the political pressure variable till 1999. However, since the political pressure on BCB was not intense in pre-2010, we opted to conduct the analysis by using the sample after 2010. Results, which are available upon request, with quarterly and monthly frequency of extended data using alternative filtering methods still show 99 percent significance with same signs despite the low levels of pressure over 1999-2010.

In 2010, Luiz Inacio Lula da Silva was the president of Brazil acting in the last year of his term. In that period, there was no political comment that called for lower interest rates. However, when Dilma Rousseff took the office, political pressure intensified. She was the president between January 1, 2011, and August 31, 2016, and she gave 45 commentaries. Then, between August 31, 2016 and January 1, 2019, Michel Temer was the president. There were 30 commentaries that call for lower interest rate in that term. Next, Jair Bolsonaro became the president. There were 10 commentaries during his presidency.


## 3. RESULTS

This section presents the results of the empirical analysis. First, we test whether BCB responds to the political pressure by estimating the model (2) for 84 monetary policy meetings in the period between January 2010 and August 2020. That is, we investigate whether BCB is more likely to set the Selic rate in line with the preferences of the politicians. Then, by calculating their marginal effects, we examine whether the political pressure alter the likelihood of an increase or a decrease in the policy rate. Finally, we explore whether the responses of BCB to economic and political indicators vary over time.

In testing whether BCB gives in to the political pressure after controlling for the macroeconomic variables, we form the following priors. If BCB does not succumb to the political pressure, we expect the political pressure to have an insignificant effect (i.e., $\beta_{PR} = 0$) on BCB. However, it is worth noting that it is possible to have an insignificant estimate if both the politicians and BCB respond to the economic indicators in a similar way. In that case, we can infer that the political pressure does not have any impact on BCB. On the other hand, if BCB sets the policy rate in line with the preferences of the political leaders, we expect political pressure to have a negative impact (i.e., $\beta_{PR} < 0$). However, it is also possible that politicians call for higher interest rates. In that case, we expect the estimate of the political pressure to be positive if BCB follows those commentaries. Since we do not have any statement that calls for higher interest rate, we limit our focus on the preference of lower rates. Therefore, we expect $\beta_{PR} < 0$. That is, BCB decreases the Selic rate when politicians call for lower interest rates.

Table 2 reports the results of the model (2). Column I shows the estimates of the baseline Taylor rule, which contains the inflation gap and the output gap. The estimates reveal that BCB significantly responds to both the inflation and the output gaps. If the current inflation rate exceeds the inflation target or the Brazilian economy operates above its potential, BCB is more likely to raise the policy rate. Column II shows the results of the augmented form of the Taylor rule. The inclusion of political pressure to the model slightly reduces the weights that BCB assigns to economic indicators; yet all indicators are significant. According to the estimates of this specification, the positive inflation and output gaps increase the likelihood of BCB to adopt tighter monetary policy. However, the estimate of the

political pressure has a negative sign, which indicates BCB is more likely to cut the Selic rate if the politicians call for lower interest rates.

Table 2: Ordered probit result

|  | I | II |
| --- | --- | --- |
| Inflation gap | 0.50*** | 0.47*** |
|  | (0.08) | (0.08) |
| Output gap | 0.35*** | 0.33*** |
|  | (0.07) | (0.08) |
| Pressure |  | -0.55*** |
|  |  | (0.15) |
| Pseudo R² | 0.23 | 0.35 |
| Number of observations | 84 | 84 |

Robust standard errors are in parentheses.
*** indicates significance at 99 percent level of confidence.

Table 3 shows the marginal effects of the augmented model. The results reveal asymmetric response of BCB to the economic and the political indicators while setting the policy rate. In fact, in absolute terms, the impacts of the variables on the probability of a rate cut are higher than those of probability of rate hike. If the current inflation rate is 1 percentage point (pp) is higher than the inflation target, the probability of a rate cut decreases by 18 bp and the probability rate hike increases by 10 bp. The chances of rate cut decreases by 12 bp whereas the chance of a rate hike increases by 7 bp when the Brazilian economy operates 1 pp above its potential. Lastly, each additional call for lower interest rate increases the likelihood of a rate cut 21 bp and decreases the chances of a rate hike by 11 bp.

Table 3: The results of marginal effects

|  | Probability of a rate cut | Probability of a rate hike |
| --- | --- | --- |
|  | I | II |
| Inflation gap | -0.18*** | 0.10*** |
|  | (0.03) | (0.02) |
| Output gap | -0.12*** | 0.07*** |
|  | (0.03) | (0.02) |
| Pressure | 0.21*** | -0.11*** |
|  | (0.06) | (0.03) |

***/**/* indicates significance at 99/95/90 percent level of confidence.

Our next objective is to investigate whether the interest rate setting behavior of BCB changed over time. To study the possible time-varying relationship be-

tween the economic and the political variables and the Selic rate, we estimate the augmented Taylor rule using a recursive estimation technique. At each step of the method, we estimate the model (2) for different time window. The time window at each iteration starts with the meeting held on January 27, 2010 and terminates at the meeting held at time $T$ between January 2010 and August 2020. We chronologically extend the terminal point of the sample period ($T$) to include the date of the next meeting[4].

Figure 3 depicts the estimates in the recursive analysis. It shows how the response of BCB to the inflation and output gaps as well as the political pressure evolved between January 2013 and August 2020[5]. First, we document that the reaction of BCB to the inflation gap alternated. Even though it is an IT CB, BCB did not significantly respond to inflation gap until 2017 (left panel). Although BCB adjusted the Selic rate in accordance with the inflation rate (see Figure 4 in Appendix), due to the higher political pressure, BCB possibly could not set it at a level that economic fundamentals necessitate. When the outlook of Brazil is considered, Brazil was experiencing one of its worst recessions during 2014-2016 with a growth rate hardly positive in 2014; and the inflation rate was far from the target of 4.5 percent until 2017. Under these circumstances, BCB might have prioritized output gap in this period. BCB's aptitude for fiscal dominance (Pearson (2016)) and compliance with political pressure also suggest that BCB may have ostensibly adopted IT, yet not actually implemented it until 2017. Hence, the estimates before 2017 might be insignificant. On the other hand, it reacted significantly to the inflation rate after 2017. That is, BCB became more likely to raise the Selic rate if the current inflation rate is above the inflation target. Since 2017, the response of BCB to the inflation gap continued to increase. Second, the analysis shows that the reaction of BCB to the output gap remained positive and significant (right panel). That is, BCB tended to adopt tighter monetary policy if the economy operates above its potential. However, BCB put less weight on the output gap towards recent dates. Specifically, the estimate for the output gap until 2013 was about 0.77 and it became 0.33 as of August 2020. The varying degrees of response by CBs through time is not uncommon as the weights that CBs assign to gaps depend on the severity of the correction needed on them. Lastly, the analysis indicates that BCB is more likely to set the policy rate in line with the preferences of the political leaders. The impact of the political pressure on the direction of the policy remained stable around 0.5 (bottom panel). Although, at the very beginning of the analysis the estimates for the political pressure were insignificant, they became significant despite of de-

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[4] Specifically, at the first step, the time window covers the period between January 27,2010 and January 27,2010. The time window at the second step is between January 27, 2010 and March 18, 2010. At the next step, time frame extends to the period between January 27, 2010 and April 29, 2010 and so on. At the final step, the time frame covers the period between January 7, 2010 and August 6, 2020.

[5] We discarded the first 24 observations and start the time frame in 2013 because (i) for all of the estimations, number of observations is less than number of variables in the first 7 observations and (ii) the dismissal of the rest of the 17 observations is required for obtaining reliable and stable estimates.

clining amount of pressure. This counterintuitive finding can be explained by rising authoritarianism in recent years. In this vein, we calculate a metric for authoritarianism relying on the populism data in Cakmakli et al. (2021). They use the number of news that contain the names of each political leader and any of the "authoritarian", "populist" and "strong" keywords to classify a particular leader to be populist. To measure the degree of authoritarianism, we divide the amount of news to the number of days in the office and calculate the amount of news per day (see Table 5 in Appendix). The premise is that if a leader is more (less) authoritarian there is much (less) news per day on average. The calculations show that the degree of authoritarianism rises. Specifically, there were 0.54, 0.87, 0.63, and 1.09 news per day during the presidency of Luiz Inacio Lula da Silva, Dilma Rousseff, Michel Temer, and Jair Bolsonaro, respectively. This finding indicates even though the amount of political pressure diminishes, they remain significant as more authoritarian leaders call for lower interest rates.

Figure 3: Time-varying estimates
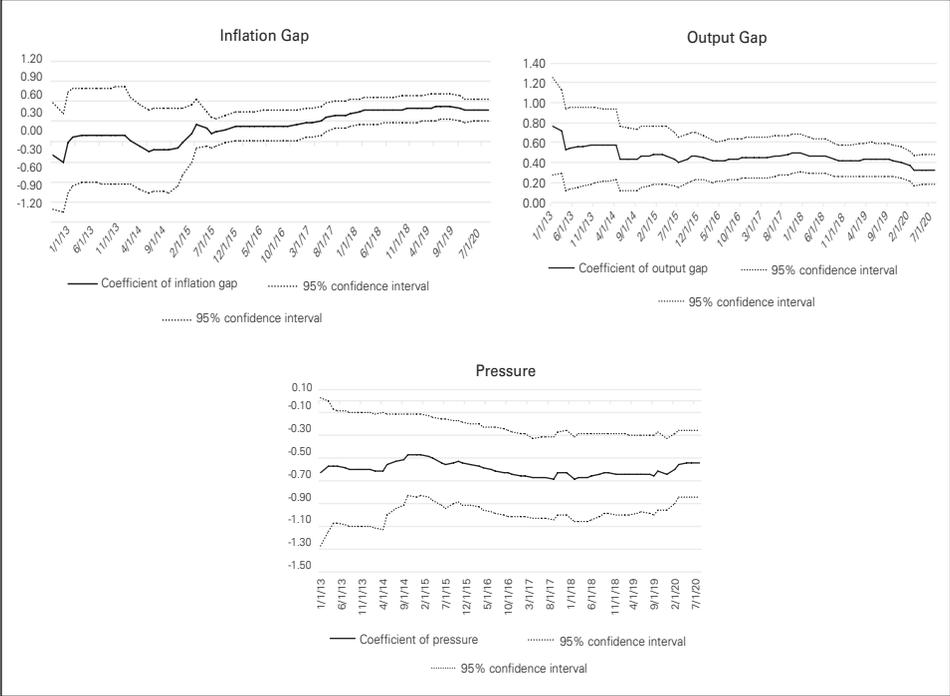


## 4. ROBUSTNESS CHECK

In this section, we test the robustness of the previous findings. We also extend the earlier analysis to check if there are any other determinants for influencing the policy rate decisions of BCB. Table 4 presents the results of the robustness checks.

In all the checks, even though there are slight differences, political pressure remained significant and BCB adopts loose monetary policy if politicians call for lower interest rates.

First, we analyze the role of the exchange rate. Following the previous literature, namely Muinhos (2004) and Ball (2000), and the suggestion by Mishkin (2000) stressing importance of introduction of the exchange rate for emerging economies adopting IT, we substitute exchange rate into the augmented Taylor rule. Since BCB has also the objective of fostering efficiency and the stability of the financial system, modifying the Taylor rule with the exchange rate can be interpreted as a measure for capturing both financial distress and cascaded effects led by the exchange rate.

Initially, we calculate the average exchange rate in the intermeeting period by using daily value of Brazilian Real vis-à-vis US Dollar. Then, we take the logarithmic difference of the average exchange rates between the last and the current meetings. Since the depreciation of Brazilian Real here means a decrease in the variable and hence it has a negative sign, the result indicates that BCB is more likely to tighten the monetary policy if the local currency depreciates (column I). BCB may increase the policy rate to restrict the inflationary effect on the sliding value of the Brazilian Real.

Second, we investigate the impact of the international financial conditions. If the risk appetite of international investor increases, they would channel their funds to the markets where there are higher return opportunities. On the other hand, foreign investors would drain their funds from other markets when their risk appetites decrease. Therefore, the behavior of the foreign investors can lead to fluctuations in the local markets. Hence, it is important for the CBs to monitor the external financing conditions.

To gauge the international financial conditions, we use VIX, which is the 30-day ahead implied volatility of S&P 500 option contracts. Higher (lower) values of VIX indicate decreasing (increasing) risk appetite. We used the logarithmic difference of the average value of daily VIX values among consecutive meetings. The estimate shows the swings in VIX do not alter the policy rate decisions of BCB (column II). However, the insignificant estimate does not imply that BCB rules out the international financial conditions. There may be an asymmetric reaction of BCB to increasing and decreasing risk appetites of the foreign investors, which we do not control for, and hence, the overall reaction is insignificant.

Since it is a small-open economy, Brazilian economy is sensitive to foreign interest rates. Hence, we investigate whether foreign monetary policy stance affects the decisions of BCB. Actions of the foreign CBs may affect the risk appetites of the foreign investors. If foreign interest rate rises (falls), investing in their domestic markets become more (less) risky for foreign investors, and they may leave (enter) other markets. Therefore, as we outlined in the previous check, foreign CBs can alter the behavior of the foreign investors, which may cause fluctuations in the domestic market. To control for the possible effect of foreign monetary policy on

the decisions of BCB, we extend the model to include the monetary policy stance in the US.

In our sample period, Fed used forward guidance and minor adjustments in federal funds rate (FFR) as its tools. Therefore, FFR may not be an appropriate indicator of the US monetary stance. Instead of FFR, we use the 10-year US government bond return as its returns are sensitive to the verbal communication of the Fed. We calculate the change in the average daily returns of the government bond to measure the tightness of the US monetary policy. The coefficient reveals that BCB tends to adopt a similar monetary policy stance to the Fed (column III). That is, BCB is more likely to increase the Selic rate if the US monetary policy tightens.

Next, we check whether there is a change in the way that BCB sets the policy rate if it uses an alternative inflation rate measure. Specifically, we modify the model (2) to include the inflation expectations instead of the actual inflation rate. The underlying reason of this control is the fact that an IT CB may ignore the short-run changes in the inflation rate if it anchors the inflation expectations. To gauge the inflation expectations, we utilize the daily survey that BCB conducts. We calculate the change in the average daily 12-month ahead inflation expectations of IPCA among consecutive meetings as the indicator of inflation expectations. Then, we define the inflation gap as the difference between the average of daily inflation expectations and the inflation target. The result shows that BCB tends to increase the policy rate if the inflation expectations rise (column IV). Also, it is evident that BCB assigns more weight on the inflation expectations than the actual inflation rate and inflation expectations explain higher portion of the decisions of the BCB. Furthermore, the pseudo R2 of this specification increases to 42% from 35% in the baseline model. Hence, this finding indicates the relevance of forward-looking behavior of BCB compared to backward-looking behavior of economic agents.

Lastly, we use another metric for the output gap as an alternative robustness check. We substitute the HP-filtered output gap in the baseline model with the unemployment rate. We assume that the natural rate of unemployment remains constant and use the unemployment rate as the output gap. For the unemployment rate series, we use the monthly unemployment rate between 2010 and August 2015, and 3-month average unemployment rate from September 2015 onwards[6]. The estimate indicates BCB is more likely to cut the policy rate if the unemployment rate rises (column V)[7].

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[6] The reason for this change in frequency of the data stems from the switch in the publication of unemployment data by the Brazilian Institute of Geography and Statistics (IBGE).

[7] We also investigate whether the political pressure on BCB led to major changes in the Selic rate. For this aim, we redefine the dependent variable considering the magnitude of the changes in the Selic rate. We increase the number of categories to 5 in line with the baseline model such that big hikes (cuts) are associated with 2 (-2), moderate hikes (cuts) with 1 (-1), and no change in the Selic rate with 0. For all the variables, estimates get smaller but remain significant with the same signs. Because of the character limit, we do not report those results.

Table 4: Results of the robustness check

| | I | II | III | IV | V |
|---|---|---|---|---|---|
| Inflation gap | 0.51*** | 0.47*** | 0.49*** | | 0.13*** |
| | (0.09) | (0.08) | (0.08) | | (0.05) |
| Output gap | 0.39*** | 0.32*** | 0.34*** | 0.30*** | |
| | (0.08) | (0.07) | (0.07) | (0.07) | |
| Pressure | -0.57*** | -0.55*** | -0.57*** | -0.61*** | -0.74*** |
| | (0.14) | (0.14) | (0.14) | (0.15) | (0.17) |
| Exchange rate | -7.32* | | | | |
| | (3.81) | | | | |
| VIX | | -0.03 | | | |
| | | (0.03) | | | |
| Foreign monetary policy | | | 1.13* | | |
| | | | (0.68) | | |
| Inflation expectations | | | | 1.15*** | |
| | | | | (0.18) | |
| Unemployment rate | | | | | -0.25*** |
| | | | | | (0.05) |
| Pseudo $R^2$ | 0.37 | 0.36 | 0.36 | 0.42 | 0.35 |
| Number of observations | 84 | 84 | 84 | 84 | 84 |

Robust standard errors are in parentheses. \*\*\*/\* indicates significance at 99/90 percent level of confidence.

## 5. CONCLUSION

High, persistent, and weakly-anchored nature of inflation dynamics together with high turnover rate of CB governors of Brazil suggest non-economic factors affecting the conduct of monetary policy. In this regard, we empirically test whether BCB responded to the political pressure after controlling for economic indicators. We use a unique dataset that contains the politicians' call for lower interest rates as a measure of the political pressure from presidents of Brazil. By employing ordered probit regression analysis over January 2010-August 2020, we show that BCB set the Selic rate in line with the preferences of the politicians. The results of the time-varying estimation indicate that the weight of the political pressure on the decision rule of BCB did not change even though the amount of pressure declined over time. This finding suggests that BCB could not have refused adopting loose monetary policy even though the economic fundamentals necessitate tighter stance

once it succumbed to the political pressure, i.e., set non-optimal monetary policy. Therefore, it might have lost credibility. Considering the adverse effects of declining CB credibility on the economy, which results in higher inflation rate and hence lower growth rate and deterioration in the income distribution, politicians either should not declare their preferences on the interest rates publicly or should consult to the CBs behind the closed doors.

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APPENDIX

Figure 4: Selic rate vs inflation rate
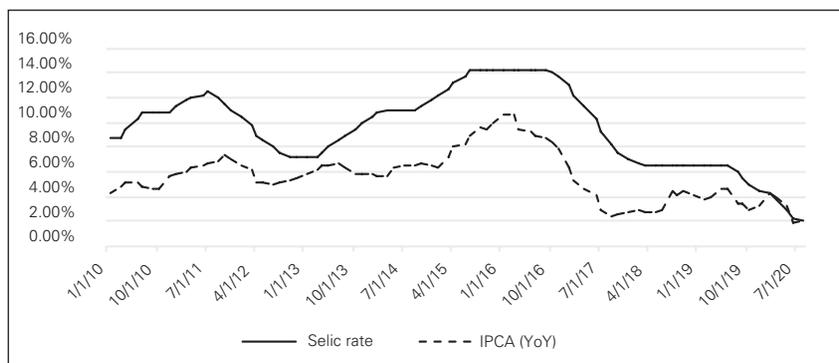
Table 5: Degree of authoritarianism

| President | ToO | Number of days in presidency | Number of news | Number of news per day |
|---|---|---|---|---|
| Luiz Inacio Lula da Silva | 1.01.2010-1.01.2011 | 365 | 197 | 0.54 |
| Dilma Rousseff | 1.01.2011-31.08.2016 | 2069 | 1791 | 0.87 |
| Michel Temer | 31.08.2016-31.12.2018 | 852 | 541 | 0.63 |
| Jair Bolsonaro | 1.01.2019-24.08.2020 | 601 | 656 | 1.09 |

Source: Cakmakli et al. (2021), authors' calculation.