O Banco Central do Brasil sob a ótica de seus observadores

The Central Bank of Brazil through the lens of its watchers

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Resumo: Este artigo estima funções de reação utilizando dados de expectativas do Sistema Gerenciador de Séries Temporais (SGS) do Banco Central. Infere-se então a percepção dos economistas do mercado financeiro sobre a função de reação do Banco Central ao longo do tempo, e em diferentes presidências. Os resultados mostram que esses economistas percebem o Banco Central satisfazendo o princípio de Taylor para a taxa de juros esperada para um ano à frente, assim como reagindo positivamente ao crescimento econômico.

Palavras-chave: Função de reação; Percepção do mercado; Taxas de juros.

Abstract: *This paper estimates reaction functions using survey data for Brazil. It then infers financial market economists` perceptions about the reaction function of the Central Bank of Brazil over time and across different governors. The results show that central bank watchers perceive the Central Bank as satisfying the Taylor principle for the 1-year ahead expected interest rate, and also responding positively to economic growth*.

Keywords: *Reaction function; Market perceptions; Interest rates.*

Classificação JEL: E43; E52; E58.

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1. Introduction

Financial market economists closely watch the actions and words of central banks, in order to forecast macroeconomic variables, such as inflation, GDP growth and most importantly, the future path of interest rates.

Expectations play a key role in the conduction of monetary policy, as they are an essential part in the transmission mechanisms in many models. Expectations about short-term interest rates are transmitted to the yield curve, and affect the behavior of economic agents, through decisions of consumption and investment. Central Banks usually use their communication tools (statements, minutes, speeches) to manage expectations about the evolution of interest rates in the near future.

On the other hand, short-term expectations feedback in forecasts of macroeconomic variables, for instance, which help form expectations. Due to this interplay, there is a large interest in what financial market participants and central bank watchers expect the central bank to do.

As emphasized by Bauer et al. (2023), perceptions of monetary policy play a crucial role in policy effectiveness, which depends not only on the actual framework used by policymakers but also on public perceptions of that framework. According to Bauer et al. (2024), the perceived reaction function shapes key asset prices that transmit monetary policy to the real economy, and matters for the inflation-unemployment tradeoff faced by a central bank.

This paper estimates implied interest rate reaction function using SGS survey data. The goal is to obtain the perceived reaction function of the Central Bank watchers, and more specifically to understand how the sensitivity of interest rates to inflation and output growth forecasts has changed over different governors since 2002.

The idea is to use reaction functions to link the evolution of forecasts of inflation and GDP growth and forecasts of short-term interest rates (Hamilton et al., 2011). This is different from papers that use forecasts for inflation and output and their volatilities to try to capture real-time features of monetary policy, as in nowcast Taylor rules (Branch et al., 2014).

The content of this paper is closely related to Gorter et al. (2008), Mitchell and Pearce (2010), Hamilton et al. (2011), Bundick (2015), Carlstrom and Jacobson (2015), Kim and Pruitt (2017) and Bauer et al. (2023), who all estimate reaction functions using survey data obtained from forecasters.

A related work is Buraschi et al. (2012) who estimate Taylor rules with survey expectations for the federal funds rate, inflation and GDP. They are not only interested in the underlying consistency of these variables through economic concepts such as the Taylor rule, but derive a measure of monetary policy path shocks with the estimated residuals of the rule, i.e., exogenous variations in the path of monetary policy, which they find to be mainly countercyclical. They further associate these shocks to forward guidance and find that they are strongly related to measures of bond risk premium.

Moreover, Morris (2017) estimate reaction functions from 2012 to 2016 using data from the Survey of Economic Projections (SEP), which he associates to forward guidance. He finds strong responses to inflation and economic activity and also statistically significant responses to financial risk, represented by the 10-year 2-year Treasury spread.

Although the focus of the paper is mainly empirical, it can be associated with models in which forecasters update their beliefs about the monetary policy coefficient in a Bayesian way. Forecasters do not know the true monetary policy rule but update the perceived weights of the responses of interest rates to inflation and output from policy decisions gradually over time (Bauer et al, 2023).

The rest of this paper is organized as follows. Section 2 reviews the literature. Section 3 discusses the speed limit Taylor rule used in the paper. Section 4 presents the data. Section 5 shows the results and section 6 concludes.

2. Literature review

Gorter et al. (2008) estimates Taylor rules for the European Central Bank (ECB), from 1997 to 2006, including forecasts for inflation and output growth, and compare the results with conventional specifications, that only include realized outcomes for inflation and the output gap. They find that the interest-setting behavior of the ECB can be better characterized with the inclusion of the forecasts in the model. The coefficients that measure the reactions to inflation and output are larger than the ones estimated without expected data. They argue that the results reflect the forward-looking behavior of the ECB.

Mitchell and Pearce (2010) assess whether forecasts made by professional economists surveyed by the Wall Street Journal are consistent with Okun's Law and the Taylor rule. The whole sample period covers the years from 1986 to 2007. They find that the coefficient that associates GDP growth to the change in unemployment rate is lower than what is usually displayed for the Okun Law. In turn, they find that forecasts do not conform with what would be dictated by a Taylor rule, with stronger (weaker) reactions of short-term interest rates to deviations of unemployment (inflation) from their long-run values.

Hamilton et al. (2011) estimate market perceived Taylor rules, using data from 1994 to 2007. They find that financial market economists perceived a gradual response of interest rates to inflation and economic activity. The second finding is that the perceived rule changed over time. During the 1990s the estimated rule shows a faster response to inflation and a robust response to output, while after the 2000s the perceived rule shows a lower response to output and a more gradual response to inflation. Even tough the market expected the FED to respond more gradually to inflation after 2000, it ultimately expected it to respond strongly to inflation relative to the period before 2000, as showed in the magnitude of the long-run estimated coefficients.

Bundick (2015) compares the reaction function perceived by forecasters before the Zero Lower Bound (ZLB) period (1984-2008) and after the Zero Lower Bound periods (after 2008). Although the coefficient associated with the degree of interest rate smoothing is very close across periods (0.93 against 0.91), he finds that in the estimated rule the coefficient related to the deviation from inflation from its target is lower after 2009 (2.88 before and 1.59 later), higher sensitivity to unemployment variations (-5.40 before against -6.84 later) and lower estimated coefficient of the output growth (point estimate of 3.09 in comparison to 0.31 after the ZLB). The main conclusion is that the implicit monetary rule perceived by forecasters remained relatively unchanged after the ZLB, meaning that forecasters expected that the FOMC would react in the same way to developments in the economy after 2009.

Carlstrom and Jacobson (2015) estimate implied Taylor rules based on forecasts from 14 forecasters from the Federal Reserve Bank of Philadelphia s Survey of Professional Forecasters (SPF) from 1995 to 2008. They find that interest rate forecasts differ both based on different forecasts of inflation and output growth and also due to different Taylor rule coefficients.

Ball et al. (2015) estimate Okun rules using data from Consensus Economics spanning from 1989 to 2012 for the G7 countries plus Australia and New Zealand. They find that the Okun coefficient is negative - consistent with theory - and statistically significant in all countries in their sample, meaning that professional forecasters believe in Okun s Law. Namely, there is a negative relationship between changes in GDP growth and changes in unemployment in the data.

Kim and Pruitt (2017) investigate whether the Federal Reserve policy has changed since the Global Financial Crisis. To avoid the censoring introduced by the Zero Lower Bound (ZLB) in U.S. nominal short rates, they estimate monetary policy rules using survey data of the CPI, the FED funds rate and the unemployment rate. They find that the response to inflation has become weaker than before the ZLB, and the reaction to real activity has increased after the Global Financial Crisis.

Bauer et al. (2023) estimate perceived monetary policy rules using individual macroeconomic forecasts from the Blue Chip Financial Forecasts, using data from 1985 to 2021. They find that the perceived coefficient of the response of interest rates to the output gap is positively related to the slope of the yield curve and financial conditions.

In a follow-up paper, Bauer et al. (2024) find that the perceived response of monetary policy to inflation increased significantly after March 2022, when the Fed began raising interest rates.

More recently, Healy and Jia (2024) investigate the financial markets´ perception of the FOMC´s data-dependent approach to monetary policy. They estimate models relating daily changes in expected Federal Funds Rate (FFR) and 2-year U.S. Treasury yield on surprise components of economic indicators such as core CPI inflation, nonfarm payrolls, unemployment rate and retail sales. They find stronger effects of surprises on the 2-year yield, and a larger coefficient on inflation after the pandemic period, which they associate with markets understanding the data-dependent monetary policy strategy.

Cucinello (2024) estimates the perceived monetary policy rule by financial markets in the euro area, finding a high perceived responsiveness coefficient of monetary policy to inflation between 2011 and 2012 and in 2022, following the surge in inflation after the Covid-19 outbreak. Overall, the perceived responsiveness tends to be high during tightening cycles, when ECB policy is perceived to be data-dependent.

Regarding the literature about Brazil, Divino and Haraguchi (2024) estimate observed, expected and forward-looking interest rate rules. The estimated policy rules respond to inflation deviations and the output gap. They find that professional forecasters do not believe in aggressiveness to fight inflation in the long run, and evidence of information rigidity in the short run. The main conclusion is that there is a misalignment between the Central Bank practice and the private agents' perception of monetary policy in the long but not in the short run, suggesting unanchored long-term inflation expectations.

In the Brazilian case, since the Central Bank started collecting survey data for unemployment only recently (in 2021), this paper will not investigate if forecasters implicitly believe in Okun´s Law, as in Mitchell and Pearce (2010) and Ball et al. (2015). Hence this paper is focused on whether forecasters believe in an underlying reaction function by the Central Bank of Brazil, and how it evolved over time.

3. Reaction functions

Taylor rules were estimated with expectations from the SGS database, with the same specification as Bundick (2015).

$$\mathrm{i}_t = \gamma_1 \mathrm{i}_{t-1} + \gamma_2 \mathrm{i}_{t-2} + (1-\gamma_1-\gamma_2)\left[\mathrm{i}^* + \varphi_\pi\left(\pi_t - \pi^*\right) + \varphi_{\Delta y}\left(\Delta \mathrm{y}_t - \Delta \mathrm{y}^*\right)\right] + \varepsilon_t. \qquad (1)$$

To be more precise, Bundick (2015) also includes a term related to the rection of the central bank to unemployment. Since the SGS database collect unemployment data only since 2021, equation 2 does not consider this term, which is equivalent to say that $\varphi_u=0$.

Unlike in the conventional Taylor rule (Taylor, 1993), there is no output gap in the model. Instead, the central bank responds to the difference between output and potential output growth ($\varphi_{\Delta y}$). This specification can be thought as a speed-limit rule (Walsh, 2003; Stracca, 2006). It is suitable for this research because there is no information about expectations of the output gap in the SGS database.

Overall, the rule says that the central bank sets interest rates partially in response to lagged policy rates (i_{t-1}) with interest-smoothing coefficients of first γ_1 and second order γ_2, and partially in response to deviations of inflation from the inflation target (π_t-π^*) and deviations of output growth from potential output growth (Δy_t - Δy^*).

The Taylor rules were estimated using Non-Linear Ordinary Least Squares. Carvalho et al. (2018) show that, although there is endogeneity in estimating Taylor rules by OLS, the resulting bias is proportional to the fraction of the variance of the endogenous regressors explained by monetary policy shocks. Since these are small in standard DSGE models, their bias is small, resulting in a good performance of single-equation OLS estimation of Taylor rules[2].

4. Data

In order to estimate the reaction functions, I use data collected from the SGS database of the Central Bank of Brazil. Expectations for the Selic policy rate, inflation and output growth are available on a daily basis, for subsequent years. I built constant maturity Selic interest rate, GDP growth and inflation expectations with the following equation:

$$\exp_{tj} = \frac{(12-j)}{12}\exp_t + \frac{(j)}{12}\exp_{t+1}, \quad (2)$$

where *j* refers to the month for which the expectations were collected and *t = 1, 2, 3* refers to the year ahead considered, and *exp* denotes expectations for the Selic interest rate, inflation or GDP growth. The next step was to transform the resulting series to the monthly frequency, by taking monthly averages of the daily series.

For the potential output growth (Δy^*), the data comes from two sources.

The first one is the 3-year ahead output growth expectations, labeled as $\varphi_{\Delta y \ e3y}$ in Table 1. The underlying assumption is that forecasters' long-run output growth expectations is a proxy of the potential growth of the economy. This assumption has precedence in the study of Kim and Pruitt (2017) and Cuciniello (2024). The first authors assume that the long-horizon forecasts from the Blue Chip survey represent the market´s estimate of the Federal Reserve´s inflation target, NAIRU and equilibrium real rate, while the second author uses the 5-years, 5-year ahead growth expectations as a proxy for potential output growth.

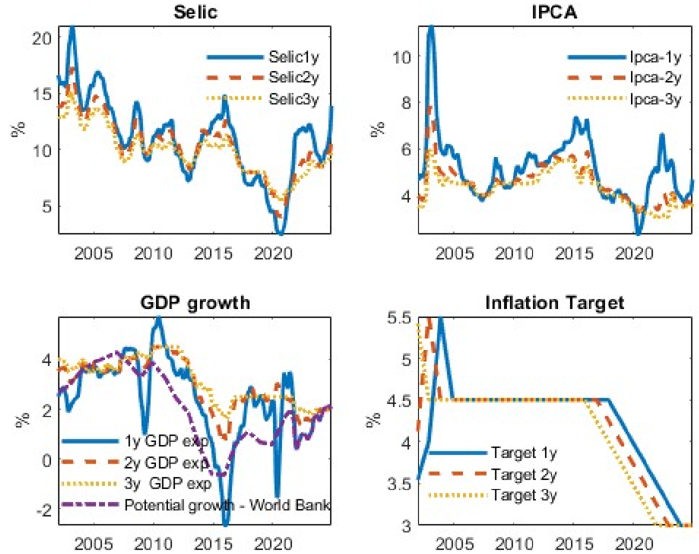
The second source is cross-country database of potential growth from the World Bank (Kilic, 2023), labeled as $\varphi_{\Delta y \ wb}$. I use the median of the measures, and interpolate the data in the same way as in equation 2, in order to obtain constant 1 and 2-year ahead potential growth variables. Due to data limitations, from 2021 onwards the figures equal those from 3-year ahead expectations from the SGS database.

The series used in the estimations are depicted in Figure 1. The sample period runs from January 2002 to December 2024, encompassing 23 years and 276 monthly observations.

Unit root tests for the series are presented in the Appendix. The Phillips-Perron and DF-GLS tests reject unit roots only for the 1- and 2-year ahead IPCA rate. But for the variables that actually enter the Taylor rule in equation 1 – the difference between inflation expectations and the target and the difference between GDP growth expectations and the potential rate – the tests reject the unit root. Although there is evidence of nonstationarity of the Selic rate, this should be less of a concern because it is a variable controlled by policy. So all in all the variables that enter the Taylor rule are stationary.

[2] They also show that using Generalized Methods of Moments (GMM) to estimate Taylor rules, using lagged endogenous variables as instruments, is complicated when the monetary shocks are persistent, because in this case the instruments and monetary shocks will be correlated, resulting in weak instruments. The bottom line is that the bias in using OLS is small, and that, while both methods lead to similar results, estimates by OLS imply model dynamics with higher precision than by single-equation GMM estimates (p.15).

Figure 1 - Data.



Data source: SGS, Central Bank of Brazil, World Bank. Source: Own Elaboration.

5. Results

5.1. Taylor rules with observed long-run equilibrium interest rate

This section presents the results of the estimation of Taylor rules following equation (1), for 1 and 2-years ahead. The logic bears similarities with a term structure of policy rules, as in Smith and Taylor (2009). In the estimations depicted in Table 1, it is assumed that the equilibrium nominal interest i^* is the 3-year expected interest rate. Kim and Pruitt (2017) also assume that the long-run forecast of each variable as the "stars" values for the Federal Reserve inflation target, NAIRU and real rate.

The results show that interest rate expectations have a high degree of smoothing, with both γ_1 and γ_2 being statistically significant at the 1% level, showing that interest rate expectations rely heavily on past values. The smoothing coefficient are given by $\gamma_1+\gamma_2$, resulting in 0.94 for the 1-year horizon, given by specifications (1) and (2) respectively, and 0.86 and 0.89 for the 2-year ahead horizon, specifications (3) and (4). Relatedly, Coibon and Gorodnichenko (2012) favor specifications that allow for a second order interest rate smoothing, with interest rates entering the rules with two lags, arguing that this substantially increases the explanatory power of the models.

Regarding the responsiveness to inflation, the estimated models show that for the 1-year ahead expectations the Taylor principle[3] is satisfied, with a reaction of interest rates above unity: φ_π=1.37 in column 1 and φ_π=1.09 in column 2. On the other hand, in the estimated models for the 2-years ahead expected rate as the dependent variable the Taylor principle is not met, with the φ_π coefficient below unity.

There is also a positive and statistically significant response to output growth in the models for the 1-year ahead rate: $\varphi_{\Delta y}$=0.60 in column 1. This means that interest rate expectations tend to increase when the economy is expected to growth above its potential. In turn, this dynamic does not happen for the 2-years ahead interest rate expectations, with negative figures for the $\varphi_{\Delta y}$ coefficient in specification (3). One possible interpretation is that over this horizon there is greater uncertainty about the course of the economy and how the monetary authority would react. Another possibility is the incidence of supply shocks, leading to a negative estimated response of interest rates to the difference in output growth and potential output growth.

[3] The Taylor principle refers to the requirement that the central bank should adjust nominal interest rates more than one for one in response to any change in inflation to ensure a determinate price level. Mathematically, φ_π>1 in equation 1.

Table 1 - Estimation of the Taylor Rule.

	1-year ahead		2-years ahead	
	(1)	(2)	(3)	(4)
γ_1	1.56***	1.60***	1.47***	1.49***
	(0.055)	(0.052)	(0.055)	(0.055)
γ_2	-0.62***	-0.66***	-0.61***	-0.60***
	(0.050)	(0.047)	(0.047)	(0.048)
φ_{π}	1.37***	1.09***	0.36*	0.66***
	(0.25)	(0.20)	(0.20)	(0.21)
$\varphi_{\Delta y\ e3y}$	0.60*		-0.92**	
	(0.32)		(0.39)	
$\varphi_{\Delta y\ wb}$		0.055		-(0.011)
		(0.31)		(0.093)
Observations	273	273	273	273
R-squared	0.999	0.999	0.999	0.999

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Own Elaboration.

5.2. Taylor rules with unknown long-run equilibrium rate

Table 2 presents the results of the estimation of Taylor rules that, rather than assuming that the long-run equilibrium interest rate follows a 3-year ahead interest rate as in Table 1, estimates the long-run equilibrium rate i*. Overall this rate is estimated to be around 9 and 10% p.a. over the sample period. Again the models show a high degree of interest rate smoothing, which is given by $\gamma_1+\gamma_2$, corresponding to 0.98 for the 1-year ahead rate (specifications 1 and 2) and 0.99 for the 2-year ahead expectation (specifications 3 and 4).

While for the 2-years ahead rate the results are statistically insignificant, for the 1-year ahead expected rate there is a high and statistically significant response to inflation and output growth. The coefficient that measures the response to inflation satisfies the Taylor principle, being estimated at φ_{π}=2.47 in column 1 and φ_{π}=1.86 in column 2. The coefficient associated with the response to output growth is positive and statistically significant in the first specification: $\varphi_{\Delta y}$=2.16 in column 1.

All in all, the results for the 1-year ahead expected rate mean that forecasters believe that interest rates would be hiked if inflation increases above its target and output grows above its potential. Considering the average inflation target of 4.5% p.a. over the sample period, the estimated nominal equilibrium interest rate is consistent with an equilibrium real rate between 5 and 5.5% p.a. through the lens of central bank watchers.

5.3. Taylor rules under different chairman´s.

This section presents the results of the estimation of Taylor rules under different chairman´s. The equilibrium nominal rate was estimated in the models, instead of assuming that they are equal to the 3-year ahead expected interest rate. Given that models for the 1-year ahead expected interest rate gave coherent results in Tables 1 and 2, this section only relies on this horizon for expectations.

Table 2 - Estimation of the Taylor Rule.

	1-year ahead		2-years ahead	
	(1)	(2)	(3)	(4)
i^*	10.4***	9.31***	10.2***	10.4***
	(1.09)	(1.36)	(1.60)	(1.45)
γ_1	1.61***	1.65***	1.63***	1.63***
	(0.054)	(0.051)	(0.051)	(0.051)
γ_2	-0.63***	-0.67***	-0.64***	-0.64***
	(0.051)	(0.050)	(0.050)	(0.050)
φ_π	2.47***	1.86**	1.56	1.14
	(0.70)	(0.80)	(2.65)	(1.99)
$\varphi_{\Delta y\ e3y}$	2.16**		2.80	
	(0.97)		(5.66)	
$\varphi_{\Delta y\ wb}$		0.43		-0.58
		(1.16)		(0.93)
Observations	273	273	273	273
R-squared	0.992	0.992	0.992	0.992

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Own Elaboration.

Column 1 shows the Taylor rule estimated for 2003-2010, when Henrique Meirelles was the governor of the Central Bank of Brazil. The equilibrium nominal rate is estimated at i*=12.5. The degree of interest rate smoothing is $\gamma_1+\gamma_2$=1.56-0.62=0.94. Professional forecasters perceived that interest rates under Meirelles would react to inflation (φ_π=1.10) and output growth ($\varphi_{\Delta y}$=1.65). Both coefficients are positive and statistically significant, meaning that central bank watchers expected that the Selic rate would increase if inflation expectations were above the target or GDP growth would increase above its potential rate. The coefficient associated with the response to inflation is higher than one, satisfying the Taylor principle.

Under Tombini, the results of column 2 show that professional forecasters viewed the economy operating with a lower equilibrium nominal rate than under Meirelles (i*=5.89). This might reflect the spillovers of unconventional monetary policies in advanced economies, through a lower foreign real rate. The coefficient of interest rate smoothing is estimated at $\gamma_1+\gamma_2$=1.26-0.35=0.91, lower than under Meirelles. Contrary to anecdotal evidence, the coefficient that gives the response of interest rates to inflation is estimated at φ_π=3.49, higher than in the previous chairmanship. This might be due to the fact that, after unexpectedly cutting rates in 2011, the Central Bank had to practice a tight monetary policy afterwards, particularly in the context of the 2014-2016 recession. The response of interest rates to output growth is estimated at $\varphi_{\Delta y}$=0.30, but it is not statistically significant. The model was estimated for the period 2011-2016, encompassing 66 observations.

The perceived reaction function for the Goldfjan chairmanship shows a higher equilibrium nominal interest rate, with i*=7.71. The degree of interest rate smoothing is estimated to have been $\gamma_1+\gamma_2$=1.36-0.56=0.80, lower than in the two previous chairmanships. This means that professional forecasters perceived interest rate setting under the presidency of Ilan Goldfjan to be more inclined to respond to economic

Table 3 - Estimation of the Taylor Rule.

	Meirelles (1)	Tombini (2)	Goldfjan (3)	RCN (4)
i^*	12.5***	5.89***	7.71***	9.09***
	(0.60)	(1.96)	(0.27)	(3.72)
γ_1	1.56***	1.26***	1.36***	1.72***
	(0.087)	(0.12)	(0.17)	(0.11)
γ_2	-0.62***	-0.35***	-0.56***	-0.75***
	(0.079)	(0.12)	(0.14)	(0.10)
φ_π	1.10***	3.49*	1.45***	2.67***
	(0.40)	(1.82)	(0.43)	(1.20)
$\varphi_{\Delta y}$	1.65**	0.30	-0.73**	2.39
	(0.77)	(0.86)	(0.34)	(3.09)
Observations	96	66	32	70
R-squared	0.991	0.968	0.993	0.992

developments in inflation and output. The coefficient that associates the respond of interest rates to inflation is estimated at φ_π=1.45. In turn, the coefficient that relates interest rates to output growth is $\varphi_{\Delta y}$=-0.73, likely reflecting the incidence of supply shocks during Goldfjan chairmanship, such as the truck driver´s strike in 2018 and financial markets turbulences stemming from Argentina and Turkey.

For the Campos Neto chairmanship, the equilibrium nominal rate is estimated to be i*=9.09 , lower than Meirelles, but higher than during Tombini and Goldfajn. The degree of interest-rate smoothing is given by $\gamma_1+\gamma_2$=1.72-0.75=0.97, the highest among all chairs. The was also a higher perceived response to inflation φ_π=2.67, although the coefficient that gives the response of Selic to the growth gap is not statistically significant.

6. Conclusion

This paper estimated reaction functions using survey data from professional forecasters. The goal was to understand how central bank watchers perceived monetary policy since 2002, and if the forecasts are consistent with economic rules.

The results show that professional forecasters for interest rates are consistent with the Taylor rule, particularly for the 1-year ahead horizon. Throughout the whole sample period, interest rate expectations are responsive to deviations of expected inflation from the inflation target - in accordance with the Taylor principle - as well as to deviations of expectations of output growth from its potential rate. The estimated coefficients are positive and statistically significant both in specifications that assume values for the equilibrium nominal rate (Table 1) and in specifications that estimate the equilibrium interest rate (Table 2).

In this latter case, it was found that the long-run policy interest rate that is consistent with the rule estimated for forecasters hovers around 9 and 10% p.a. over the whole sample. But this result hides substantial heterogeneity throughout different chairmans, as depicted in Table 3. Under Meirelles the equilibrium nominal rate is estimated to be

12.5% p.a.. During Tombini the equilibrium nominal rate fell to 5.89 % p.a., increasing to 7.7 % p.a. during Goldfjan and again to 9.09% p.a. during Campos Neto.

This paper was motivated by similar work by Gorter et al. (2008), Mitchell and Pearce (2010), Hamilton et al. (2011), Bundick (2015), Carlstrom and Jacobson (2015), Kim and Pruitt (2017), Bauer et al. (2023) and Cucinello (2024), and intended to contribute to the literature on perceived monetary rules for Brazil, taking advantage of more than 20 years of data of expectations made by central bank watchers.

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Appendix

Table 4 - Unit Root Tests.

Variable	Phillips-Perron P-value	Optimal Lag	DF-GLS Test Statistic	Result
Selic1y	0.2459	9	-1.701	Acept Null
Selic2y	0.3429	12	-1.765	Acept Null
Selic3y	0.4177	15	-2.084	Acept Null
Ipca1y	0.0472	9	-4.094	***
Ipca2y	0.0804	10	-2.758	*
Ipca3y	0.2401	12	-1.591	Acept Null
Growth1y	0.1252	15	-2.323	Acept Null
Growth2y	0.7011	14	-2.498	Acept Null
Growth3y	0.8365	12	-1.963	Acept Null
Ystar1y	0.7852	14	-1.655	Acept Null
difinf1y	0.0310	12	-3.108	**
difinf2y	0.0116	10	-2.919	**
difinf3y	0.0003	12	-2.605	*
difgrowth1y	0.0116	2	-3.697	***
difgrowth2y	0.0338	13	-2.624	*
difgpot1y	0.0101	15	-3.164	**

Notes: *,**,***: Reject H0 at the 10%, 5% and 1%, respectively; difinf1y refers to the difference between inflation expectations 1-year ahead and the inflation target ($E\pi_t$-π*) , difinf2y refers to the difference between inflation expectations 2-year ahead and the inflation target, difinf3y refers to the difference between inflation expectations 3-year ahead and the inflation target, difgrowth1y refers to the difference between expected GDP growth 1-year ahead and the 3-year expected growth rate (proxy for potential GDP growth): Δy_t-Δy_t^*, difgrowth2y refers to the difference between expected GDP growth 2-year ahead and the 3-year expected growth rate (proxy for potential GDP growth), difgpot1y refers to the to the difference between expected GDP growth 1-year ahead and the potential GDP growth rate from the World Bank database. Source: Own Elaboration.