

Lack of fiscal transparency and economic growth expectations: An empirical investigation of the Brazilian case

Helder Ferreira de Mendonça

Fluminense Federal University
Department of Economics and
National Council for Scientific and
Technological Development (CNPq)
email: *helderfm@hotmail.com*
phone: +55(24)2484-4143
ORCID: 0000-0003-1465-1755
[corresponding author]

Vítor Ribeiro Laufer Calafate

Fluminense Federal University
Department of Economics

email: vitorcalafate@hotmail.com

Abstract

This paper provides empirical evidence of the effect of the fiscal opacity related to the government's budget deficit on expectations of economic growth. Based on the Brazilian data from 2004 to 2018 and using signal-to-noise ratios, we built fiscal opacity indicators that measure the level of ignorance of the agents regarding the government's budget deficit. The evidence from several regression models indicates that an increase in the lack of fiscal transparency undermines short-term expectations of economic growth (current year, twelve months ahead, and next calendar year). The findings suggest that the use of discretionary fiscal policy is not a useful tool for improving economic growth expectations.

Key words: lack of fiscal transparency; economic growth expectations; government's budget deficit.

Resumo

Este artigo apresenta evidências empíricas do efeito da opacidade fiscal relacionada ao déficit orçamentário do governo sobre as expectativas de crescimento econômico. Com base em dados da economia brasileira referente ao período 2004 a 2018 e usando razões de sinal-ruído, construímos indicadores de opacidade fiscal que medem o nível de ignorância dos agentes em relação ao déficit orçamentário do governo. A evidência obtida a partir de vários modelos de regressão indica que um aumento na falta de transparência fiscal prejudica as expectativas de curto prazo de crescimento econômico (ano corrente, doze meses à frente, e próximo ano-calendário). Os resultados sugerem que o uso de política fiscal discricionária não é uma ferramenta útil para melhorar as expectativas de crescimento econômico.

Palavras-chave: falta de transparência; expectativas de crescimento econômico; déficit orçamentário do governo.

Área ANPEC: Área 4 - Macroeconomia, Economia Monetária e Finanças

JEL classification: E61, H68.

1. Introduction

In recent decades, studies on transparency have become frequent in economics. Most of these studies assess the importance of central bank transparency for monetary policy.¹ Regarding the effect of transparency on fiscal policy performance, studies are scarce.² Nevertheless, institutions such as the International Monetary Fund (IMF) and the Organization for Economic Cooperation and Development (OECD) recommend practices aimed at the greater dissemination of budget data by national governments. There is a channel between the expectations regarding the budget deficit and the expectations of the private sector. In general, even in the short-term, reductions in budget deficits are associated with economic growth (Alesina, 2010). In order to reduce the uncertainty related to the government's budget deficit and, thus, to create positive expectations for economic growth, fiscal transparency is necessary, that is, that the budget and its forecasts reveal the government's objectives and intentions, as well as the evolution of public finances (IMF, 2019).

This study, through time series models, uses the signal-to-noise ratio referring to the government's budget deficit to investigate the effect of the lack of fiscal transparency on expectations of economic growth in Brazil.³ Initially, we analyzed whether short-term forecasts from the private sector can anticipate the government's budget deficit.⁴ When private-sector expectations regarding the deficit are unable to predict its outcome, there is a lack of fiscal transparency (fiscal opacity) due to the inability of credible projections of the evolution of public finances. The higher the opacity related to the deficit, the greater the uncertainty associated with fiscal risk and thereby undermines the investment decision by the private sector. Therefore, we conjecture that the deterioration in the deficit forecasting capacity by private agents has direct harmful implications for the formation of expectations concerning economic growth.

Our analysis uses monthly data for short-term forecasts of the government's budget deficit and economic growth for the current year, twelve months ahead, and next calendar year in Brazil from January 2004 to October 2018. The set of data corresponds to the period when the confidence crisis concerning the presidential election 2002 dissipated, and there was the consolidation of the disclosure of expectations of macroeconomic variables by the CBB.⁵ The use of the three-time horizons for expectations allows us to analyze whether the impact of an increase in fiscal opacity over growth expectations exceeds the current year (nowcast). We use deficit forecasts to calculate the signal-to-noise ratio, that is, whether the information that is available to market agents contributes to reducing the noise between the forecast and the result of the deficit. Given that we consider the signal-to-noise ratio as a measure of fiscal opacity, we regressed our outcome variables of interest directly from the opacity measure. Due to the

¹ For an overview of central bank transparency and its importance in monetary policy management, see, for example, Geraats (2002); and Dincer and Eichengreen (2014).

² Alt and Lassen (2006), and Arbatli and Escolano (2015), present evidence that fiscal transparency is associated with better fiscal results.

³ Fiscal transparency is the result of several principles (see IMF, 2019). Throughout this study, the lack of fiscal transparency refers to the difficulty for private agents to anticipate the execution of the government's budget.

⁴ Since the government's effort to seek fiscal balance occurs mainly through restraining spending and increasing revenues, the deficit measure we used in this study corresponds to the government's budget deficit (primary result).

⁵ In 2013, the CBB launched a new information governance policy that has become a benchmark for the public sector. As a result of this policy, in 2018, the CBB won the FinTech RegTech Central Banking Data Management Initiative Award.

possibility of asymmetry on expectations concerning the fact that the agents underestimate or overestimate the deficits, we use the periods when the forecasts overestimate the deficits as controls in the models.

The baseline results show that an increase in fiscal opacity leads to a reduction in expectations of economic growth. If there is total fiscal opacity (a situation in which private agents lose the ability to anticipate the government's budget deficit), growth expectations may drop by up to -1.11 p.p., -1.02 p.p., and -1.24 p.p. for the current year, twelve months ahead, and next calendar year, respectively.

Our results are robust to applications of different methods and control variables. Our opacity measures are potentially endogenous to expectations of economic growth because they take into account a fiscal forecast error. To deal with such concerns, we used the Generalized Moment Methods as a reference because it is an approach that is "more efficient than common method of moments estimators - such as ordinary least squares and two-stage least squares" (Wooldridge, 2001, p. 92).

In general, the literature that analyzes the expectations of macroeconomic variables has focused on the disagreement between the central bank and private sector expectations regarding inflation and economic growth (for example, Fujiwara, 2005; Capistran, and López-Moctezuma, 2014; and Pedersen, 2015). In practice, the justification for studies on inflation and growth is because several central banks provide their forecasts as well as expectations from professional forecasters regarding these variables. Besides, the Global Financial Crisis of 2008 gave new impetus to the analysis of the role of expectations on the government's budget deficit (Beetsma, Giuliadori, and Wiertz, 2009; Pina and Venes, 2011, and Merola and Pérez, 2013). However, although there is recognition of the importance of the search for fiscal stability to foster economic growth (IMF, 2019; and Alesina, 2010), there is a scarcity of studies that analyze the effect of the lack of fiscal transparency on growth expectations. In summary, the main contribution of this study is to analyze whether the lack of transparency, as measured by the ignorance of the private sector about the government's budget deficit, influences the expectations of economic growth in the private sector.

Our article stands out from the existing literature in at least two aspects. First, in a different way of the fiscal transparency measures provided by the International Monetary Fund (ROSCs) and International Budget Partnership (OBI) that have low frequency, we built a "time-varying" measure that allows analysis over time of the effect of fiscal opacity. Second, we assess whether the possible gain from a forecast error associated with government performance above expectations could offset the loss related to the fall in growth expectations due to an increase in fiscal opacity.

The remainder of this paper is organized as follows. Section 2 introduces our measures of fiscal opacity based on the signal-to-noise ratio, the behavior of the economic growth expectations over time, and shows a preliminary relationship between them. Section 3 presents the empirical strategy for analyzing the impact of fiscal opacity on economic growth expectations. Section 4 provides the results of the empirical models and their interpretations. The last section presents the conclusion.

2. Fiscal opacity and economic growth expectations: A first glance

A fundamental element for carrying out this study is the measurement of fiscal opacity. Fiscal transparency corresponds to the disclosure of information about the public accounts scenario, allowing private agents to be able to anticipate the government's position concerning its public finances accurately (Kopits and Craig, 1998). There are different measures of fiscal transparency. The most common are: the Reports on

Observation of Standards and Codes (ROSCs) and Open Budget Index (OBI). ROSC is an assessment published by the International Monetary Fund (IMF) to follow good practices related to fiscal transparency in different countries. Alternatively, the Open Budget Index (OBI) is an index published by the International Budget Partnership (IBP) since 2006, built from surveys aimed at questions about fiscal information. However, both ROSCs and OBI measures are available only for a specific time horizon and with a frequency greater than one year, and thus they are not useful in time-series analysis.

In order to circumvent the limitations of the standard fiscal transparency indices (for example, ROSCs and OBI) regarding the low frequency and unavailability for different time horizons, we built a measure based on the market's ignorance about the real budgetary situation. Hence, the use of the signal-to-noise ratio represents a methodology that is suitable for measuring the lack of fiscal transparency regarding the government's budget deficit as a time-varying index.

The intuition behind the use of the signal-to-noise ratio is the ability to identify which informational improvements make it possible to reduce the noise between the forecast of the government's budget deficit and actual. Such as in Kholodilin and Siliverstovs (2009), we obtained the signal-to-noise ratio from four central equations. The first procedure is to compute the errors between the predictions and the results. The magnitude of the deviations expresses the level of ignorance of the predictors about fiscal results. In equation (1), forecast errors ($FE_{t,h}$) are the difference between the realized government's budget deficit ($GBudget$ – government's budget) and the expectations of private agents regarding the deficit ($E(GBudget)$), that is:

$$(1) \quad FE_{t,h} = GBudget_t - E_t(GBudget_{t,h}),$$

where $GBudget > 0$ ($GBudget < 0$) represents the situation of a primary surplus (deficit), and h is the time horizon under consideration.

The result of equation (1) shows that errors can assume positive or negative values; that is, it depends on whether the expectations of private agents overestimate or underestimate the deficit. The idea of opacity is not associated with situations where predictions overestimate or underestimate results. The lack of transparency (opacity) refers to the situation in which the information that is available to the agents is insufficient for the projections regarding the government's budget deficit to be accurate. In other words, both positive and negative forecast errors indicate situations in which there is opacity. Therefore, it becomes appropriate to consider the use of the mean square error (MSE) in the analysis:

$$(2) \quad MSE_{t,h} = \frac{\sum_{n_t=1}^{n_t} (FE_{t,h}^2)}{n_t}, \quad \text{where } n_t \text{ is the number of observations in a month.}$$

The signal-to-noise ratio is the result of the ratio between the mean square errors (equation 2) and the variance of the government's budget deficit ($\sigma_{GBudget}^2$), that is:

$$(3) \quad \text{Signal-to-noise ratio}_{t,h} = \frac{MSE_{t,h}}{\sigma_{GBudget}^2}.$$

Therefore, values of the signal-to-noise ratio close to zero indicate situations in which the forecasts concerning the government's budget deficit are close to the realized deficit, which, in turn, indicates a low level of opacity. In contrast, the higher the signal-to-noise ratio, the greater the fiscal opacity.

When the signal-to-noise ratio equals zero, the predictor has enough information for a perfect forecast of the variable of interest ($MSE_{t,h}=0$). On the other hand, when the signal-to-noise ratio is greater or equal than one ($MSE_{t,h} \geq \sigma_{GBudget}^2$), the predictor is entirely unaware of the final value of the variable of interest (see Kholodilin and Siliverstovs, 2009). Hence, our measure of fiscal opacity ($FOPAC$) ranges from zero to one:

$$(4) \quad FOPAC_{t,h} = \left\{ \begin{array}{ll} 1 & \text{se } MSE_{t,h} \geq \sigma_{GBudget}^2 \\ \frac{MSE_{t,h}}{\sigma_{GBudget}^2} & \text{se } 0 < MSE_{t,h} < \sigma_{GBudget}^2 \\ 0 & \text{se } MSE_{t,h} = 0 \end{array} \right\}.$$

The government's budget deficit measure used in the *FOPAC* is available from the Time Series Management System of the Central Bank of Brazil (TSMS/CBB). It corresponds to the Public Sector Borrowing Requirement (PSBR) - primary result (% of GDP - code 5793). To facilitate the interpretation of the results, we multiply the PSBR by "-1" so that positive values correspond to surpluses while negative values represent deficits. The use of the PSBR (primary result) is because, since 2000, the Fiscal Responsibility Law establishes that the federal government needs to set annual targets for the primary result for the current year and the next two years. In brief, the primary result represents an essential informational content when analyzing fiscal forecasts in Brazil (de Mendonça and Silva, 2016). Furthermore, the expectations of the private sector about the PSBR (primary result) of a given year are obtained monthly by the average of the daily forecasts available in the TSMS/CBB.

In order to observe the effect of fiscal opacity in the short-term, we considered three-time horizons for measuring opacity: current year (T - nowcast), twelve months ahead ($T+12m$), and next calendar year ($T+1$). The $FOPAC_{t,T}$ and $FOPAC_{t,T+1}$ measures take into account fixed-event forecasts for the government's budget deficit ($E(GBudget)$). Therefore, expectations made at the beginning of the year are more susceptible to forecast errors when compared to those made at the end of the year. Thus, we made use of a third measure that considers instead of a fixed-event the case of a fixed-horizon for the government's budget deficit projections, that is, $FOPAC_{t,T+12m}$. In this case, the expectations of the private sector regarding the budget deficit for the next twelve months are a result of:

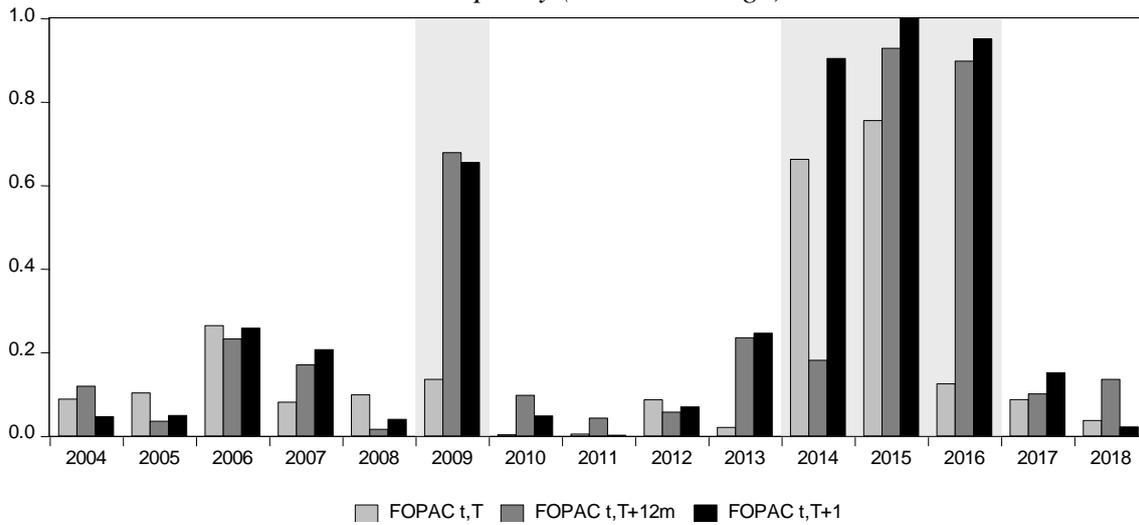
$$(5) \quad E(GBudget_{t,T+12m}) = \left(\frac{12-m+1}{12}\right) E(GBudget_{t,T+12m,t-12,T}) + \left(\frac{m-1}{12}\right) E(GBudget_{t-12,T+1}),$$

where m is an index that ranges from 1 to 12 and represents the months of the year (1 = January, 2 = February, ..., 12 = December).

In order to observe the behavior of fiscal opacity over time, figure 1 shows the evolution of the opacity measure for the current year based on horizons of the current year, twelve months ahead, and next calendar year. It is possible to identify three periods in which fiscal opacity was relatively low: 2004-2008, 2010-2013, and 2017-2018. On the other hand, there are two periods when fiscal opacity was quite high: 2009 and 2014-2017. The effect in 2009 is a result of the Global Financial Crisis of 2008. Regarding the 2014-2017 triennium, there was a severe political crisis that culminated with the impeachment of President of the Republic Dima Rousef and the economic crisis whose main highlight was the recession in the years 2015 and 2016.

While the effect of the international shock of 2008 caused an increase in the lack of fiscal transparency for two time-horizons (twelve months ahead and the next calendar year), the domestic shocks in 2014-2017 provoked an increase in the fiscal opacity regardless the horizon under consideration. In general, the two cases show that the opacity associated with the current year horizon is less than in the longer horizons. One possible interpretation is that the occurrence of shocks leads to a deterioration in the ability of private agents to anticipate the government's budget deficit due to the use of the countercyclical fiscal policy. Concerning the periods that are not marked by the incidence of shocks, the relative importance of the fiscal opacity for the current year horizon tends to increase.

Figure 1
Fiscal opacity (annual average)



Note: $FOPAC_{t,T}$, $FOPAC_{t,T+12m}$, $FOPAC_{t,T+1}$, and are measures of fiscal opacity ranging from 0 (total lack of opacity) to 1 (total existence of opacity) obtained from equation 4. The shaded areas identify the two periods in which fiscal opacity is high (2009 and 2014-2016).

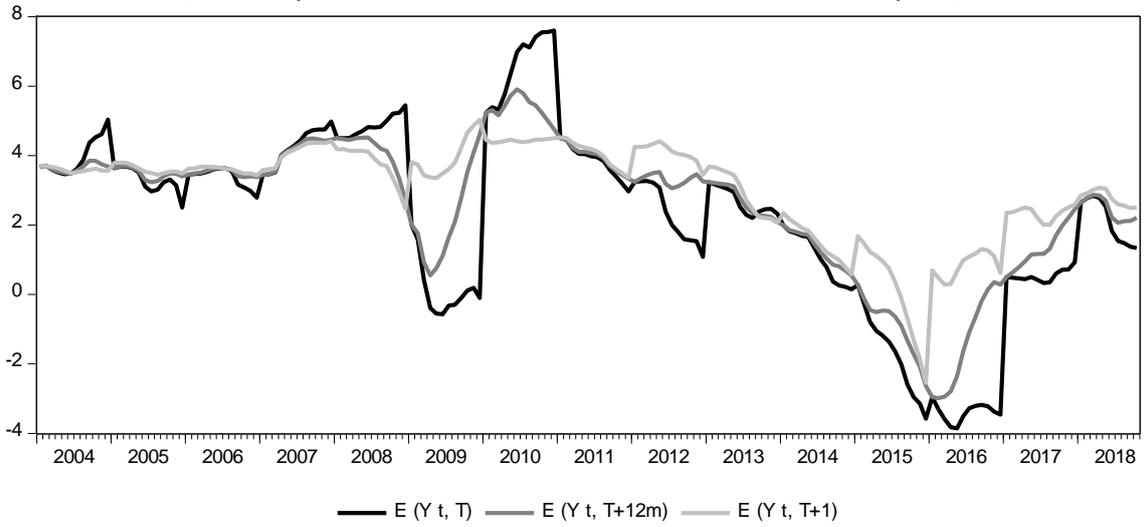
After introducing the measures of fiscal opacity, it is essential to present the expectations of economic growth. The CBB makes available through the Focus Report daily market expectations drawn from approximately 140 institutions (mostly banks, asset managers, dealers and brokers, as well as consulting and other non-financial companies). Growth expectations are “consensual”, that is, they are the average of the projections of all institutions participating in the survey. In this study, we are considering short-term growth expectations for horizons referring to the current year ($E(Y_{t,T})$ - *nowcast*), twelve months ahead ($E(Y_{t,T+12m})$), and next calendar year ($E(Y_{t,T+1})$).⁶

Figure 2 shows that while for the period before the Global Financial Crisis of 2008, the paths of the growth expectations were close to each other for the three horizons, the subsequent period shows a change in the behavior. Growth expectations for the current year tend to be below of growth expectations for 12 months ahead and next calendar year. Besides, the disagreement between expectations for the three-time horizons under consideration increases, especially after the political and economic crisis of 2014 in Brazil.

To observe whether there is a relationship between the measures of fiscal opacity and the expectations of economic growth, we analyzed the correlation between them. The correlation between fiscal opacity and growth expectations is negative for all cases, and the average is -0.54 (see figure 3). This observation suggests that an increase in fiscal opacity related to the government’s budget deficit is associated with a fall in expectations of economic growth.

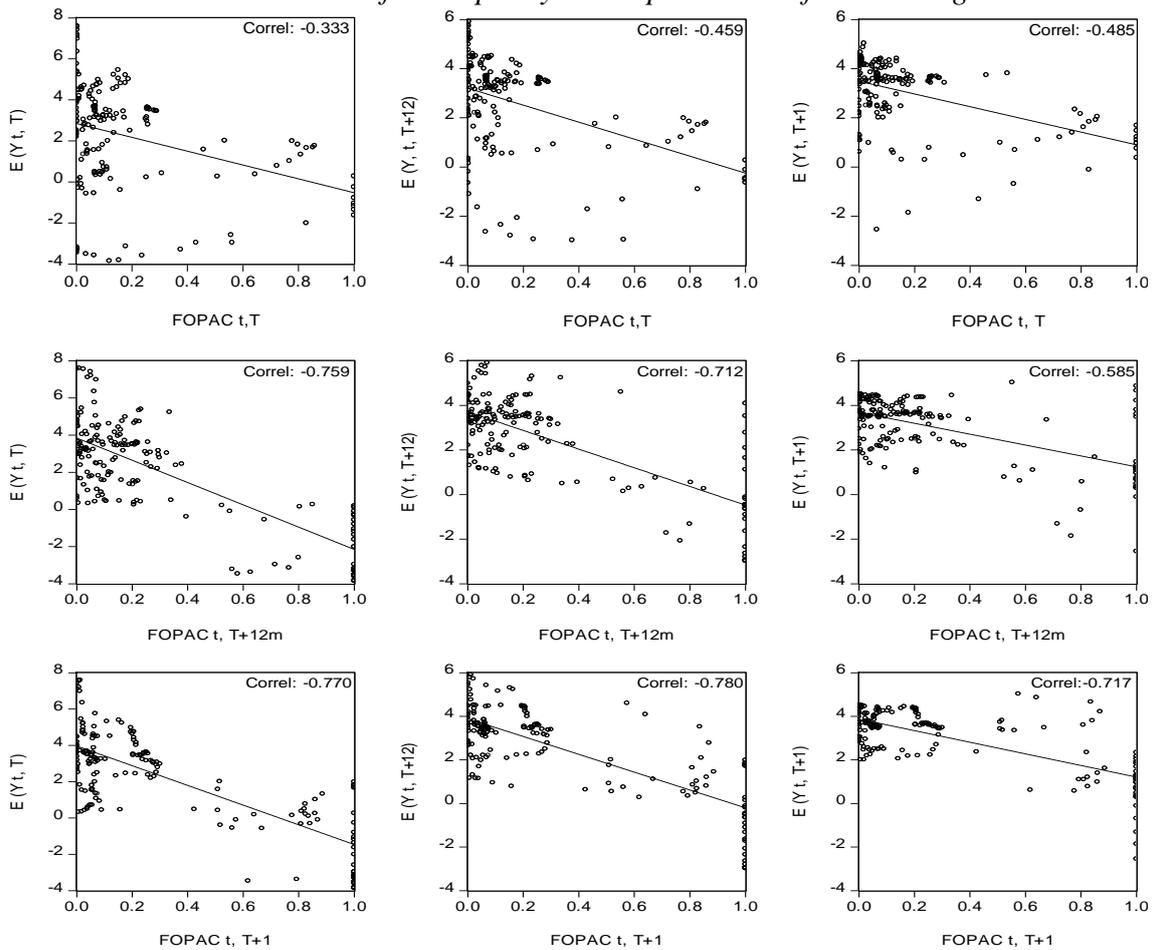
⁶ To achieve growth expectations twelve months ahead, we use the method proposed by Dovern, Fritsche, and Slacalek (2012), that is, $E[Y_{t,T+12m}] = \left(\frac{12-m+1}{12}\right) E[Y_{t,T}] + \left(\frac{m-1}{12}\right) E[Y_{t,T+1}]$.

Figure 2
Expectations of economic growth
(current year, twelve months ahead, and next calendar year)



Note: $E(Y_{t,T})$, $E(Y_{t,T+12m})$, $E(Y_{t,T+1})$ are expectations of economic growth for the current year (nowcast), twelve months ahead, and next calendar year, respectively.

Figure 3
Correlation between fiscal opacity and expectations of economic growth



Note: *FOPACs* are measures of fiscal opacity regarding the government's budget deficit. $E(Y)$ are expectations of economic growth for the current year (nowcast), twelve months ahead, and next calendar year, respectively.

3. Empirical strategy

To observe the impact of fiscal opacity on expectations of economic growth, in addition to the opacity measures, we include control variables in the baseline model (output gap, expectations concerning the federal government's primary result, exchange rate, central bank credibility, public dissatisfaction with government management, and the international crisis). Therefore, our general specification corresponds to:

$$(6) \quad E_t(Y_i) = f(FOPAC_i, GAP, E(GBudget_{t+12m}), \Delta E(Exchange_{t+12m}), E_t(\pi_{t+12m}) - Target(\pi_{t+12m}), DISGOV, GFCrisis),^7$$

where: $i = T, T+12m$, and $T+1$;

FOPAC - measures of fiscal opacity related to the government's budget deficit obtained from the signal-to-noise ratio according to equation (4);

GAP - output gap measured using as a proxy the industry's installed capacity. The data is available from IPEADATA, and it represents the portion of the operational production capacity of the local unit used under normal operating conditions in the reference month, expressed as a percentage. The percentage can vary from 0% to 100%. In general, an increase in installed capacity increases the demand for labor that needs to be balanced by an increase in labor supply, which therefore suggests an expectation of increased growth (see, for example, Greenwood, Hercowitz, and Huffman, 1988).

$E(GBudget_{t+12m})$ - corresponds to market expectations for the primary result of the consolidated public sector (% of GDP – Government Budget Result) for the next 12 months. This information is available on the TSMS/CBB. Expectations of "primary result" are an indicator of fiscal risk, which allows anticipating deteriorations in the public debt/GDP ratio. In short, an increase in deficit expectations would be associated with an increase in public debt. Because in Brazil the share of public bonds indexed to the monetary policy interest rate (SELIC) is high, the consequence would be an increase in the interest rate that could lead to a reduction in growth expectations (de Mendonça and Machado, 2013).

$\Delta E(Exchange_{t+12m})$ - variation in market expectations of the exchange rate (R\$/US\$ average – end-of-year) for the next 12 months extracted from TSMS/CBB. In general, assuming the Marshall-Lerner condition as valid, expectations of devaluations in the exchange rate are associated with the view that there will be an improvement in the current account balance and, thus, an increase in economic growth.

$E_t(\pi_{t+12m}) - Target(\pi_{t+12m})$ – the difference between market expectations for inflation in the next 12 months and the inflation target announced by the CBB, it corresponds to a measure of central bank credibility. This variable aligns with Blinder's definition of credibility (2000, p. 1422): "A central bank is credible if people believe it will do what it says". An increase in credibility can positively affect growth expectations due to the possible effect on reducing the cost of fighting inflation (de Mendonça and de Guimarães e Souza, 2012).

DISGOV – dissatisfaction with the federal government. This measure is the result of an opinion poll conducted by the Brazilian National Confederation of Industry on the popularity of the President of the Republic. The result of low government popularity may imply an increase in political uncertainty with adverse effects on productive economic decisions, such as investment and savings (Alesina et al., 1996). In short, the widespread rejection of the government indicates a political risk that negatively affects growth expectations.

GFCrisis – it is a dummy variable that captures the effect of the Global Financial Crisis

⁷ Table A.1 (appendix) provides descriptive statistics for all variables used in the different specifications.

of 2008 on the Brazilian economy. In line with de Mendonça and Tostes (2015), the variable takes the value “1” from October 2008 to June 2009, and “0” for the remaining months. The inclusion of this variable in the model is because the presence of global shocks harms the formation of growth expectations.

The period under analysis is from January 2004 to October 2018 (178 observations - monthly frequency).⁸ Therefore, the baseline model corresponds to:

$$(7) \quad E_t(Y_i)_t = \alpha_0 + \alpha_1 FOPAC_{i,t-1} + \alpha_2 X_{t-1} + \varepsilon_t,$$

where: $\varepsilon_t \sim N(0, \sigma^2)$; $i = T, T+12m$, and $T+1$; and X is a vector of control variables (GAP , $E(GBudget_{t+12m})$, $\Delta E(Exchange_{t+12m})$, $E_t(\pi_{t+12m}) - Target(\pi_{t+12m})$, $DISGOV$, $GFCrisis$).

We present empirical evidence from two approaches: Ordinary Least Squares (OLS) and Generalized Moments Method (GMM one-step), both using the Newey-West matrix for the correction of autocorrelation and heteroscedasticity in the data matrix. These methods represent a simple framework for observing the impact caused by the fiscal opacity on the expectations of economic growth through the observation of estimated parameters.

In equation (7), the α_1 coefficient measures the effect on expectations of economic growth due to an increase in the ignorance regarding the government’s budget deficit (fiscal opacity). We assume that a lack of fiscal transparency can reduce growth expectations and, therefore, we expect an $\alpha_1 < 0$ in the event of an increase in $FOPAC$.

In general, the use of the OLS method with macroeconomic time series is subject to the problem of heteroscedasticity. In addition, the use of expectational variables as regressors can create a possible risk of endogeneity in the regressions. Although we use regressors with one lag in the models, due to the monthly frequency can still have problems of endogeneity in the regressions. Thus, to deal with these problems, the GMM method is used. A condition for efficient estimation using GMM is that overidentification restrictions need to be respected (Woodridge, 2001). Therefore, all estimates present the J-statistic as a test for the overidentification of moment conditions. Furthermore, instrumental variables correspond to lagged regressors as usual.⁹

An important question to be analyzed is whether any situation that leads to the occurrence of fiscal opacity (cases in which the private sector overestimates or underestimates the budget deficit) is associated with a deterioration in expectations of economic growth. In particular, it is reasonable to consider that in a situation where deficit expectations are higher than what happened, that is, fiscal performance is better than expected ($FISCALPBE$), it has a positive impact on growth expectations. Besides, the level of uncertainty in the economy is also a factor that can directly affect growth expectations. When uncertainty is high, there is a tendency towards more conservative behavior by the entrepreneur and the result tends to be a decrease in growth expectations. Thus, we extended the analysis using GMM regressions based on two new specifications:

$$(8) \quad E_t(Y_i)_t = \beta_0 + \beta_1 FOPAC_{i,t-1} + \beta_2 X_{t-1} + \beta_3 FISCALPBE_{i,t} + \xi_t \quad \text{and}$$

$$(9) \quad E_t(Y_i)_t = \delta_0 + \delta_1 FOPAC_{i,t-1} + \delta_2 X_{t-1} + \delta_3 FISCALPBE_{i,t} + \delta_4 Uncertainty_{t-1} + \zeta_t,$$

⁸ We performed unit root tests, and the findings show that all series are $I(0)$. The results are available upon request to the authors.

⁹ In addition to the lagged regressors, we also used as instrumental variables in the models: the market expectations of public sector net debt for the next 12 months ($E(DEBT_{t+12m})$); the market expectations of the monetary policy interest rate (Selic) for the next 12 months ($E(SELIC_{t+12m})$); and the market expectations of inflation for the next 12 months ($E(INF_{t+12m})$). The maximum lags applied for each instrument was 12 (one year) to avoid bias in the results. Moreover, the number of instruments used for all models is less than 15% of the total observations). A list of instruments for each model is available upon request to the authors.

where: ξ_t and $\zeta_t \sim N(0, \sigma^2)$; $i = T, T+12m$, and $T+1$; X is a vector of control variables. *FISCALPBE* is a dummy variable that assumes a value equal to “1” for periods when the market makes projections for the government’s budget deficit are more pessimistic than the one realized, and it assumes a value “0” for other periods. *Uncertainty* is the Brazilian economy uncertainty index provided by the Brazilian Institute of Economics – Fundação Getúlio Vargas, which is available from information collected from the main newspapers in the country, from the Ibovespa Index, and the financial market expectations about macroeconomic variables.

4. Analysis of results

In general, the results indicate that an increase in fiscal opacity, measured by the signal-to-noise ratio referring to the government’s budget deficit, accompanies a decrease in expectations of economic growth for different short-term forecast horizons. The OLS and GMM regressions carried out based on equation 7, reveal that regardless of the model under consideration, the coefficients of fiscal opacity are negative and have statistical significance (see tables 1 and 2). Concerning the horizons considered in the measure of opacity, we observe that the model with the next calendar year ($FOPAC_{t,T+1}$) is the one with the most significant reduction impact on growth expectations. Another important fact is that fiscal opacity has its greatest negative impact when considering the growth expectations for the current year ($E(Y_{t,T}, nowcast)$). A possible explanation for this result is that the noise that makes up the opacity indicator tends to increase as the market’s inability to anticipate the budget deficit persists over time. In addition, the results suggest that the harmful effect of higher opacity tends to concentrate in the very short-term, which suggests that the market expects the government to take measures to prevent a worsening of fiscal deterioration.

Regarding the control variables in the model, we observe that the results are consistent with the theoretical perspective of their relationship with economic growth. The measure of the output gap reveals that an increase in economic activity affects growth expectations positively, especially for horizons up to 12 months ahead.¹⁰ The coefficients on *GAP* are positive for almost all specifications, and there is statistical significance in both OLS and GMM models for the time horizons of the current year and twelve months ahead. About the effect of expectations regarding the government’s budget result, the evidence suggests that a reduction in the expected fiscal risk positively affects growth expectations.¹¹ The coefficients for $E(GBudget)$ are positive and there is statistical significance in at least half of the models. The variation in the exchange rate expectations indicates that there is a difference in the effect on growth expectations of up to twelve months and the next calendar year. The results indicate that an expectation of currency devaluation has a positive and significant effect on growth expectations only in the very short-term. The coefficient on $\Delta E(Exchange)$ is positive and significant for the model that considers current year expectations for both economic growth and the measure of fiscal opacity.¹²

¹⁰ There is evidence that an increase in economic activity positively affects economic growth, see Dalgaard (2002).

¹¹ To observe the importance of reducing fiscal risk by, for example, avoiding explosive paths of public debt/GDP ratio for economic growth, see Reinhart and Rogoff (2010), and Eberhardt and Presbitero (2015).

¹² For empirical evidence of the effect of a currency devaluation on short-term economic growth, see Habib, Mileva, and Stracca (2017).

Table 1*Effect of fiscal opacity on expectations of economic growth (OLS) – baseline model*

Regressors:	$E(Y_{i,T})$			$E(Y_{i,T+12m})$			$E(Y_{i,T+1})$		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$FOPAC_{i,T,t-1}$	-1.465* (0.760)			-1.025* (0.527)			-0.894** (0.438)		
$FOPAC_{i,T+12m,t-1}$		-3.466*** (0.479)			-1.551*** (0.383)			-0.576* (0.347)	
$FOPAC_{i,T+1,t-1}$			-3.491*** (0.652)			-1.924*** (0.340)			-1.315*** (0.337)
GAP_{t-1}	0.357*** (0.114)	0.251** (0.102)	0.217** (0.095)	0.247*** (0.055)	0.204*** (0.044)	0.173*** (0.038)	0.018 (0.037)	0.009 (0.037)	-0.030 (0.038)
$E(GBudget_{i,t+12m})_{t-1}$	0.379** (0.168)	0.216* (0.127)	0.190 (0.120)	0.169** (0.079)	0.073 (0.072)	0.051 (0.062)	0.139** (0.056)	0.071 (0.059)	0.046 (0.048)
$\Delta E(Exchange_{i,t+12m})_{t-1}$	5.241* (2.779)	2.791 (1.817)	2.770 (1.683)	2.428 (1.611)	1.209 (1.106)	0.994 (1.046)	-0.637 (1.245)	-1.261 (1.080)	-1.682* (0.868)
$E(\pi_{t+12m})_{t-1} - Target(\pi_{t+12m})_{t-1}$	-0.882*** (0.226)	-0.572*** (0.148)	-0.345** (0.153)	-0.898*** (0.175)	-0.805*** (0.135)	-0.629*** (0.118)	-0.620*** (0.114)	-0.648*** (0.118)	-0.459*** (0.104)
$DISGOV_{t-1}$	-0.009 (0.016)	-0.018 (0.013)	-0.021* (0.012)	-0.021** (0.010)	-0.027*** (0.009)	-0.029*** (0.008)	-0.025*** (0.007)	-0.030*** (0.006)	-0.031*** (0.005)
$GFCrisis$	-1.274 (0.921)	-1.424* (0.801)	-1.145* (0.665)	-1.694*** (0.457)	-1.809*** (0.416)	-1.651*** (0.332)	-0.551*** (0.192)	-0.660*** (0.160)	-0.547*** (0.157)
<i>OBS</i>	176	176	176	176	176	176	176	176	176
<i>Adjusted R²</i>	0.664	0.783	0.788	0.828	0.865	0.892	0.807	0.804	0.860
<i>F-statistic</i>	50.298	91.248	93.942	121.071	160.588	207.408	105.505	103.308	155.007
<i>Prob F-statistic</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Regressions based on equation (7): $E_t(Y_i)_t = \alpha_0 + \alpha_1 FOPAC_{i,t-1} + \alpha_2 X_{i,t-1} + \varepsilon_i$. $FOPAC$ is a measure of fiscal opacity (see equation (4)). $E(Y_{i,T})$ is the expectations of economic growth – current year (nowcast), $E(Y_{i,T+12m})$ is the expectations of economic growth – twelve months ahead, and $E(Y_{i,T+1})$ is the expectations of economic growth – next calendar year. Constant is included in the models but not reported for convenience. Robust (Newey-West) standard errors are in parentheses.

Table 2*Effect of fiscal opacity on expectations of economic growth (GMM) - baseline model*

Regressors:	$E(Y_{i,T})$			$E(Y_{i,T+12m})$			$E(Y_{i,T+1})$		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$FOPAC_{i,T,t-1}$	-1.108* (0.664)			-0.836* (0.489)			-1.012** (0.388)		
$FOPAC_{i,T+12m,t-1}$		-3.368*** (0.378)			-1.302*** (0.284)			-0.526* (0.311)	
$FOPAC_{i,T+1,t-1}$			-3.648*** (0.449)			-1.860*** (0.297)			-1.302*** (0.289)
GAP_{t-1}	0.429*** (0.142)	0.414*** (0.112)	0.213** (0.100)	0.318*** (0.074)	0.307*** (0.065)	0.260*** (0.071)	0.073 (0.050)	0.053 (0.061)	0.009 (0.041)
$E(GBudget_{t+12m})_{t-1}$	0.282* (0.165)	0.159* (0.096)	0.249*** (0.094)	0.154* (0.083)	0.033 (0.065)	0.019 (0.061)	0.099* (0.055)	0.035 (0.054)	0.006 (0.034)
$\Delta E(Exchange_{t+12m})_{t-1}$	4.102* (2.394)	2.781 (1.756)	2.929 (2.378)	1.816 (1.199)	0.867 (0.980)	0.563 (1.323)	-0.665 (1.793)	-1.365 (1.431)	-0.504 (1.026)
$E(\pi_{t+12m})_{t-1} - Target(\pi_{t+12m})_{t-1}$	-0.961*** (0.210)	-0.452*** (0.123)	-0.345*** (0.124)	-0.895*** (0.169)	-0.820*** (0.116)	-0.617*** (0.113)	-0.580*** (0.085)	-0.640*** (0.099)	-0.437*** (0.091)
$DISGOV_{t-1}$	-0.008 (0.016)	-0.005 (0.011)	-0.018* (0.009)	-0.014* (0.007)	-0.022*** (0.008)	-0.024*** (0.007)	-0.023*** (0.006)	-0.031*** (0.006)	-0.033*** (0.004)
$GFCrisis$	-0.389 (1.717)	-1.647* (0.897)	-1.708** (0.743)	-1.253* (0.713)	-1.425** (0.554)	-1.002* (0.590)	-0.861* (0.482)	-0.978** (0.463)	-0.514* (0.273)
<i>OBS</i>	170	169	171	169	169	169	171	169	171
<i>Adjusted R²</i>	0.650	0.761	0.782	0.822	0.859	0.885	0.794	0.795	0.851
<i>Instrum. rank</i>	21	24	25	25	25	22	21	21	21
<i>J-statistic</i>	13.598	15.301	17.991	15.785	19.724	17.168	17.500	12.305	15.048
<i>Prob J-stat.</i>	0.403	0.502	0.389	0.539	0.289	0.247	0.177	0.503	0.304

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Regressions based on equation (7): $E_t(Y_i)_t = \alpha_0 + \alpha_1 FOPAC_{i,t-1} + \alpha_2 X_{t-1} + \varepsilon_t$. $FOPAC$ is a measure of fiscal opacity (see equation (4)). $E(Y_{i,T})$ is the expectations of economic growth – current year (nowcast), $E(Y_{i,T+12m})$ is the expectations of economic growth – twelve months ahead, and $E(Y_{i,T+1})$ is the expectations of economic growth – next calendar year. Constant is included in the models but not reported for convenience. Robust (Newey-West) standard errors are in parentheses. GMM – one-step estimation.

Besides the results mentioned above for the control variables in the model, we observe that the lack of credibility, the loss of popular support from the government, and the presence of international shocks, lead to a deterioration in expectations of economic growth. The decrease in the central bank's capacity to anchor inflation expectations to the target, that is, the situation in which there is a fall in credibility, is relevant to explain a reduction in growth expectations. The coefficients associated with the variable $E(\pi_{t+12m}) - Target(\pi_{t+12m})$ are negative and significant in all models. The lack of popularity and lack of government approval represents a difficulty for the business environment associated with a fall in growth expectations. The coefficients on *DISGOV* are negative in all specifications and have statistical significance for all models with horizons of, at least, twelve months ahead. Finally, we observe that international shocks, such as the global financial crisis, lead to a reduction in the expectations of economic growth. In general, the coefficients on *GFCrisis* are negative and significant.¹³

The result of regressions based on equation (8) shows that the inclusion of the variable that captures the asymmetry of the forecast error regarding the government's budget result is relevant to the formation of expectations for economic growth (see table 3). Since *FISCALPBE* corresponds to cases in which the market underestimates the "good performance" of the government's budget result, the models show that the positive difference between the observed and the expected result for the budget causes an increase in growth expectations. The estimated coefficients are positive and have statistical significance in most models.

It is important to note that although the impact of a positive forecast error in the government's budget deficit may imply an increase in expectations of economic growth, this does not mean that adopting the government's strategy of surprising the market is correct. The coefficients related to the opacity measurements are negative and significant in all models. In other words, there is a trade-off between the positive impact of agents being surprised by a good budget performance and the negative impact of increased fiscal opacity. The results show that the coefficients associated with *FOPAC* are higher (absolute value) than the coefficients related to *FISCALPBE*. Therefore, the negative effect associated with fiscal opacity outweighs the benefit of surprising the market with a performance above expectations.

The inclusion of the control variable in the models to consider the effect of economic uncertainty on economic growth expectations did not change the previous results substantially (see table 4). Regarding the variables of interest, we observe that the coefficients related to *FOPAC* remain negative and significant, while the coefficients related to *FISCALPBE* are positive. As expected, an increase in economic uncertainty leads to a deterioration in growth expectations. The coefficients related to *Uncertainty* are negative and significant in most models.

To observe the effect that an increase in fiscal opacity has on the expectations of economic growth, table 5 presents the result of shocks of different levels of opacity on the expectations of economic growth for the three-time horizons under consideration (current year - $E(Y_t, T)$, twelve months ahead - $E(Y_t, T+12m)$, and next calendar year - $E(Y_t, T+1)$). In general, the results are consistent with the perspective that an increase in fiscal opacity undermines expectations of economic growth.

¹³ For an analysis of the negative impact of the global financial crisis of 2008 on economic growth, see Chen, Mrkaic, and Nabar (2019).

Table 3

Effect of fiscal opacity on expectations of economic growth (GMM) – equation (8)

Regressors:	$E(Y_{i,T})$			$E(Y_{i,T+12m})$			$E(Y_{i,T+1})$		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$FOPAC_{i,T,t-1}$	-2.067* (1.133)			-1.744** (0.700)			-0.829** (0.344)		
$FOPAC_{i,T+12m,t-1}$		-2.237*** (0.496)			-0.989** (0.398)			-0.491* (0.295)	
$FOPAC_{i,T+1,t-1}$			-2.293*** (0.789)			-1.800*** (0.588)			-0.895*** (0.315)
GAP_{t-1}	0.259** (0.106)	0.262** (0.102)	0.210* (0.121)	0.301*** (0.084)	0.297*** (0.110)	0.315*** (0.106)	0.071 (0.055)	0.042 (0.058)	0.007 (0.045)
$E(GBudget_{i,t+12m})_{t-1}$	0.999*** (0.206)	0.359*** (0.112)	0.408*** (0.151)	0.560*** (0.087)	0.138 (0.118)	0.031 (0.120)	0.237*** (0.062)	0.003 (0.066)	0.046 (0.048)
$\Delta E(Exchange_{i,t+12m})_{t-1}$	4.503** (2.230)	3.679 (2.514)	4.101 (2.520)	2.720 (1.900)	0.962 (1.057)	0.409 (1.040)	-0.373 (0.918)	-0.936 (1.184)	-0.804 (0.848)
$E(\pi_{t+12m})_{t-1} - Target(\pi_{t+12m})_{t-1}$	-0.493** (0.247)	-0.668*** (0.152)	-0.360* (0.185)	-0.519*** (0.092)	-0.844*** (0.121)	-0.613*** (0.118)	-0.461*** (0.068)	-0.674*** (0.089)	-0.474*** (0.078)
$DISGOV_{t-1}$	0.019 (0.020)	-0.008 (0.009)	-0.021** (0.008)	-0.0001 (0.009)	-0.017** (0.008)	-0.016** (0.008)	-0.018*** (0.006)	-0.033*** (0.006)	-0.032*** (0.004)
$GFCrisis$	-0.568 (1.681)	-1.496* (0.835)	-1.668* (0.986)	-2.140*** (0.594)	-2.095** (0.954)	-1.915* (0.776)	-0.891** (0.427)	-0.794* (0.466)	-0.713* (0.397)
$FISCALPBE_{i,T}$	1.616** (0.783)			1.712** (0.343)			0.795** (0.211)		
$FISCALPBE_{i,T+12m}$		1.498** (0.744)			0.692 (0.817)			0.284 (0.360)	
$FISCALPBE_{i,T+1}$			1.820* (1.043)			0.310 (0.863)			0.622** (0.273)
<i>OBS</i>	168	169	169	168	169	169	169	169	169
<i>Adjusted R²</i>	0.675	0.786	0.766	0.821	0.865	0.866	0.797	0.821	0.855
<i>Instrum. Rank</i>	25	24	24	25	22	21	25	18	25
<i>J-statistic</i>	11.111	15.755	16.730	15.564	11.667	11.715	12.526	7.946	10.835
<i>Prob J-stat.</i>	0.803	0.399	0.335	0.484	0.555	0.468	0.707	0.540	0.819

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Regressions based on equation (8): $E_t(Y_{i,t}) = \beta_0 + \beta_1 FOPAC_{i,t-1} + \beta_2 X_{t-1} + \beta_3 FISCALPBE_{i,t} + \zeta_t$. $FOPAC$ is a measure of fiscal opacity (see equation (4)). $E(Y_{i,T})$ is the expectations of economic growth – current year (nowcast), $E(Y_{i,T+12m})$ is the expectations of economic growth – twelve months ahead, and $E(Y_{i,T+1})$ is the expectations of economic growth – next calendar year. Constant is included in the models but not reported for convenience. Robust (Newey-West) standard errors are in parentheses. GMM – one-step estimation.

Table 4

Effect of fiscal opacity on expectations of economic growth (GMM) – equation (9)

Regressors:	$E(Y_{i,T})$			$E(Y_{i,T+12m})$			$E(Y_{i,T+1})$		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$FOPAC_{i,T,t-1}$	-1.857* (1.101)			-1.713*** (0.640)			-0.915** (0.402)		
$FOPAC_{i,T+12m,t-1}$		-2.198*** (0.734)			-0.915* (0.549)			-0.458* (0.276)	
$FOPAC_{i,T+1,t-1}$			-1.977*** (0.739)			-1.574*** (0.508)			-0.795* (0.442)
GAP_{t-1}	0.009 (0.112)	0.358*** (0.122)	0.190* (0.113)	0.256*** (0.065)	0.256** (0.114)	0.210*** (0.068)	0.102* (0.058)	0.024 (0.050)	-0.148 (0.094)
$E(GBudget_{t,+12m})_{t-1}$	0.878*** (0.201)	0.368*** (0.105)	0.288* (0.146)	0.431*** (0.107)	0.149 (0.103)	0.042 (0.115)	0.162** (0.071)	0.015 (0.064)	0.014 (0.099)
$\Delta E(Exchange_{t,+12m})_{t-1}$	9.809*** (3.087)	2.203 (1.991)	4.328** (2.068)	3.816*** (1.216)	0.921 (1.002)	0.670 (0.770)	-1.148 (1.008)	-0.492 (1.173)	-0.208 (1.165)
$E(\pi_{t+12m})_{t-1} - Target(\pi_{t+12m})_{t-1}$	-0.606** (0.261)	-0.536*** (0.154)	-0.496*** (0.151)	-0.630*** (0.118)	-0.862*** (0.120)	-0.578*** (0.128)	-0.444*** (0.066)	-0.641*** (0.079)	-0.555*** (0.131)
$DISGOV_{t-1}$	-0.003 (0.019)	-0.002 (0.009)	-0.004 (0.011)	-0.003 (0.007)	-0.015* (0.008)	-0.018*** (0.006)	-0.013* (0.007)	-0.034*** (0.005)	-0.038*** (0.007)
$GFCrisis$	-3.071 (2.119)	-2.523** (0.982)	1.466 (1.077)	-0.636 (0.591)	-2.243** (1.116)	-0.318 (0.890)	-0.012 (0.690)	-0.838 (0.587)	-0.003 (0.735)
$FISCALPBE_{i,T}$	1.658* (0.863)			1.588** (0.422)			0.803** (0.201)		
$FISCALPBE_{i,T+12m}$		1.787** (0.557)			0.677 (0.740)			0.351 (0.299)	
$FISCALPBE_{i,T+1}$			1.844** (0.921)			0.873 (0.670)			0.710* (0.424)
$Uncertainty_{t-1}$	-0.033 (0.051)	-0.003 (0.036)	-0.078** (0.023)	-0.027** (0.013)	-0.008 (0.019)	-0.034** (0.017)	-0.026* (0.015)	-0.0001 (0.016)	-0.051*** (0.016)
<i>OBS</i>	166	169	170	168	169	169	169	169	169
<i>Adjusted R²</i>	0.650	0.75	0.772	0.854	0.86	0.880	0.771	0.823	0.784
<i>Instrum. Rank</i>	24	25	25	25	20	23	26	20	24
<i>J-statistic</i>	11.616	13.436	13.421	15.441	8.373	14.190	11.352	9.911	6.009
<i>Prob J-stat.</i>	0.637	0.399	0.335	0.420	0.592	0.360	0.787	0.448	0.966

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Regressions based on equation (9): $E_i(Y_i)_t = \delta_0 + \delta_1 FOPAC_{i,t-1} + \delta_2 X_{t-1} + \delta_3 FISCALPBE_{i,t} + \delta_4 Uncertainty_{t-1} + \zeta_t$. $FOPAC$ is a measure of fiscal opacity (see equation (4)). $E(Y_{i,T})$ is the expectations of economic growth – current year (nowcast), $E(Y_{i,T+12m})$ is the expectations of economic growth – twelve months ahead, and $E(Y_{i,T+1})$ is the expectations of economic growth – next calendar year. Constant is included in the models but not reported for convenience. Robust (Newey-West) standard errors are in parentheses. GMM – one-step estimation.

Table 5

Shocks of fiscal opacity on expectations of economic growth

<i>Shocks</i>	<i>E(Y_{t,T})</i>			<i>E(Y_{t,T+12m})</i>			<i>E(Y_{t,T+1})</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Opacity 25%:									
<i>FOPAC_{t,T,t-1}</i>	-0.047*	-0.088*	-0.079*	-0.035*	-0.074**	-0.073***	-0.043**	-0.035**	-0.039**
<i>FOPAC_{t,T+12m,t-1}</i>	-0.221***	-0.147***	-0.150***	-0.085***	-0.064**	-0.062*	-0.034*	-0.032*	-0.031*
<i>OPAC_{t,T+1,t-1}</i>	-0.285***	-0.179***	-0.154***	-0.145***	-0.140***	-0.123***	-0.110***	-0.072***	-0.062*
Opacity 50%:									
<i>FOPAC_{t,T,t-1}</i>	-0.094*	-0.177*	-0.159*	-0.071*	-0.149**	-0.146***	-0.086**	-0.071**	-0.078**
<i>FOPAC_{t,T+12m,t-1}</i>	-0.442***	-0.294***	-0.301***	-0.171***	-0.129**	-0.125*	-0.069*	-0.064*	-0.062*
<i>FOPAC_{t,T+1,t-1}</i>	-0.570***	-0.358***	-0.309***	-0.290***	-0.281***	-0.246***	-0.221***	-0.144***	-0.124*
Opacity 75%:									
<i>FOPAC_{t,T,t-1}</i>	-0.142*	-0.265*	-0.238*	-0.107*	-0.224**	-0.220***	-0.129**	-0.106**	-0.117**
<i>FOPAC_{t,T+12m,t-1}</i>	-0.664***	-0.441***	-0.452***	-0.256***	-0.194**	-0.188*	-0.103*	-0.096*	-0.094*
<i>FOPAC_{t,T+1,t-1}</i>	-0.855***	-0.537***	-0.463***	-0.436***	-0.422***	-0.369***	-0.332***	-0.216***	-0.186*
Opacity 100%:									
<i>FOPAC_{t,T,t-1}</i>	-0.189*	-0.354*	-0.318*	-0.143*	-0.298**	-0.293***	-0.173**	-0.142**	-0.156**
<i>FOPAC_{t,T+12m,t-1}</i>	-0.885***	-0.588***	-0.603***	-0.342***	-0.259**	-0.251*	-0.138*	-0.129*	-0.125*
<i>FOPAC_{t,T+1,t-1}</i>	-1.141***	-0.717***	-0.618***	-0.581***	-0.563***	-0.492***	-0.442***	-0.288***	-0.248*
Null opacity:									
<i>FOPAC_{t,T,t-1}</i>	0.189*	0.354*	0.318*	0.143*	0.298**	0.293***	0.173**	0.142**	0.156**
<i>FOPAC_{t,T+12m,t-1}</i>	0.885***	0.588***	0.603***	0.342***	0.259**	0.251*	0.138*	0.129*	0.125*
<i>FOPAC_{t,T+1,t-1}</i>	1.141***	0.717***	0.618***	0.581***	0.563***	0.492***	0.442***	0.288***	0.248*
Total opacity:									
<i>FOPAC_{t,T,t-1}</i>	-0.918*	-1.713*	-1.538*	-0.692*	-1.445**	-1.419***	-0.838**	-0.687**	-0.758**
<i>FOPAC_{t,T+12m,t-1}</i>	-2.482***	-1.649***	-1.594***	-0.959***	-0.728**	-0.664*	-0.387*	-0.361*	-0.332*
<i>FOPAC_{t,T+1,t-1}</i>	-2.506***	-1.575***	-1.358***	-1.278***	-1.236***	-1.081***	-0.973***	-0.634***	-0.546*

Note: Shocks of fiscal opacity refer to an increase of X% concerning the average signal-to-noise ratio of the government's budget deficit. Null opacity is the situation in which the signal-to-noise ratio is zero; that is, the agents perfectly anticipate the deficit. Total opacity is the situation in which the signal-to-noise ratio is greater than or equal to one; that is, the agents lose the ability to predict the deficit. Model 1 corresponds to equation (7). Model 2 corresponds to equation (8). Model 3 corresponds to equation (9). Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. GMM – one-step estimation.

The results indicate that as fiscal opacity shocks increase (25%, 50%, 75%, and 100%) concerning the average signal-to-noise ratio of the government's budget deficit, it increases the negative impact on expectations of economic growth. Based on the results in Table 5, we see that, on average, a 25% increase over $FOPAC_{t,T,t-1}$ implies a reduction in growth expectations (average of $E(Y_{t,T})$, $E(Y_{t,T+12m})$, and $E(Y_{t,T+1})$) of approximately -0.06 p.p., while a shock of 50%, 75%, and 100% causes a fall in expectations of -0.11 p.p., -0.17 p.p., and -0.23 p.p., respectively. Considering the same shocks (25%, 50%, 75%, and 100%) for the opacity measure $FOPAC_{t,T+12m,t-1}$, the negative impact on growth expectations increases to -0.09 p.p., -0.18 p.p., -0.28 p.p., and -0.37 p.p.. Finally, when we take into account $FOPAC_{t,T+1,t-1}$ in the analysis, the negative effect on growth expectations is greater than those observed in the previous cases. Shocks of 25%, 50%, 75%, and 100% decrease growth expectations by -0.14 p.p., -0.28 p.p., -0.42 p.p., and -0.57 p.p., respectively.

The analysis of extreme shocks, that is, situations in which there is no opacity (signal-to-noise ratio is zero) and opacity is total (signal-to-noise ratio is greater than or equal to one) shows interesting results. The absence of fiscal opacity is beneficial for expectations of economic growth. A shock related to the lack of opacity causes an improvement in growth expectations (average of $E(Y_{t,T})$, $E(Y_{t,T+12m})$, and $E(Y_{t,T+1})$) of 0.23 p.p. when we consider the measure $FOPAC_{t,T,t-1}$. Regarding the measures $FOPAC_{t,T+12m,t-1}$ e $FOPAC_{t,T+1,t-1}$, a shock related to the absence of fiscal opacity causes an increase in growth expectations of 0.37 p.p. and 0.57 p.p., respectively. On the other hand, a shock related to the total opacity, that is, the loss of capacity for the agents to anticipate the government's budget deficit generates negative growth expectations. In this case, the results associated with the fiscal opacity measures ($FOPAC_{t,T,t-1}$, $FOPAC_{t,T+12m,t-1}$, and $FOPAC_{t,T+1,t-1}$), leads a reduction in growth expectations of -1.11 p.p., -1.02 p.p., and -1.24 p.p., respectively.

5. Concluding remarks

The importance of transparency related to public finances has been pointed out by both theorists and international organizations as fundamental to sound economic policy management (for example, Alesina, 2010; and IMF, 2019). The result of high fiscal transparency would be an environment that would allow greater ability for the private sector to make its investment decisions and, therefore, there would be the potential to promote economic growth. This study, based on data from the Brazilian economy for the period from 2004 to 2018, presented evidence that the fiscal opacity resulting from the lack of information to anticipate the government's budget deficit undermines expectations of economic growth.

The results of the OLS and GMM regressions show that fiscal opacity, measured by the signal-to-noise ratio for short-term horizons (current year, twelve months ahead, and next calendar year), harms expectations of economic growth. In particular, when we consider the result of a shock where there is total opacity, that is, the agents lose the ability to forecast the deficit, the most significant negative impact occurs for the next calendar year growth expectations with a fall of approximately -1.24 p.p.. Besides, the result of regressions that consider growth expectations for the main economic sectors shows that the sector that has the highest loss when there is an increase in fiscal opacity is the manufacturing sector. There is a 40% loss when compared to models that use the expectations of total GDP growth. It is important to note that although a fiscal forecast error that underestimates the good performance of the government is associated with an improvement in growth expectations, this result is insufficient to offset a fall in growth expectations due to fiscal opacity.

The results in this paper are relevant to observe how the concern for responsible fiscal policy management affects expectations of economic growth in the case of emerging economies. Several factors, other than those related to the fiscal issue, can affect growth expectations. However, in this study, we were concerned with this possibility, and thus we used several control variables, different methods, and opacity measures that combine different horizons. The results obtained from all models are univocal to say that an increase in fiscal opacity leads to a deterioration in growth expectations. In short, we provide robust empirical evidence, which suggests that the use of discretionary fiscal policies should be done with caution because they can raise the difficulty for the investors to make decisions affecting growth expectations negatively.

9. References

- ALESINA, A. (2010). “Fiscal adjustments: lessons from recent history.” Ecofin Mettin., Madrid, April.
- ALESINA, A., ÖZLER, S., ROUBINI, N., SWAGEL, P. (1996). “Political instability and economic growth” *Journal of Economic Growth*, 1(2), 189–212.
- ALT, J. E., LASSEN, D. D. (2006). “Fiscal transparency, political parties, and debt in OECD countries”, *European Economic Review*, 50, 1403–39.
- ARBATLI, E., ESCOLANO, J. (2015). “Fiscal transparency, fiscal performance and credit ratings.” *Fiscal Studies*, 36(2) 237–270.
- BEETSMA, R., GIULIODORI, M., WIERTS, P. (2009). “Planning to cheat: EU fiscal policy in real time.” *Economic Policy*, 24(60), 753-804.
- BLINDER, A. S. (2000). “Central bank credibility: Why do we care? How do we build it?” *American Economic Review*, 90 (5), 1421-1431.
- CAPISTRÁN, C., LÓPEZ-MOCTEZUMA, G. (2014) “Forecast revisions of Mexican inflation and GDP growth.” *International Journal of Forecasting*, 30(2), 177–191.
- CHEN, W. MRKAIC, M., NABAR, M. S. (2019) “The global economic recovery 10 years after the 2008 financial crisis.” *IMF Working Papers 19/83*, International Monetary Fund.
- DALGAARD, C. (2002). “Idle capital and long-Run productivity.” *EPRU Working Paper Series 02-06*, Copenhagen.
- de MENDONÇA, H.F., SILVA, R. (2016). “Observing the influence of fiscal credibility on inflation: Evidence from an emerging economy.” *Economics Bulletin*, 36(4), 2333-2349.
- de MENDONÇA, H.F., de GUIMARÃES e SOUZA, G.J. (2012). “Is inflation targeting a good remedy to control inflation?” *Journal of Development Economics*, 98(2), 178-191.
- de MENDONÇA, H.F., MACHADO, M.R. (2013). “Public debt management and credibility: Evidence from an emerging economy.” *Economic Modelling*, 30(1), 10-21.
- de MENDONÇA, H.F., TOSTES, I. (2015). “The effect of monetary and fiscal credibility on exchange rate pass-through in an emerging economy.” *Open Economies Review*, 26(4), 787-816.
- DINCER, N.N., EICHENGREEN, B. (2014). “Central bank transparency and independence: Updates and new measures.” *International Journal of Central Banking*, 10 (1), 189–259.
- DOVERN, J., FRITSCH, U., SLACALEK, J. (2012). “Disagreement among forecasters in G7 countries.” *Review of Economic and Statistics*, 94 (4), 1081–1096.
- EBERHARDT, M., PRESBITERO, A. (2015). “Public debt and growth: Heterogeneity and non-linearity.” *Journal of International Economics*, 97(1), 45-58.

- ERICSSON N.R. (2017). "How biased are U.S. government forecasts of the federal debt?" *International Journal of Forecasting*, 33(2), 543-559.
- FUJIWARA, I. (2005). "Is the central bank's publication of economic forecasts influential?" *Economics Letters*, 89(3), 255-261.
- GERAATS, P.M. (2002). "Central bank transparency." *Economic Journal*, 112(483), 532-565.
- GREENWOOD, J., HERCOWITZ, Z., HUFFMAN, G. W. (1988). "Investment, capacity utilization, and the real business cycle." *American Economic Review*, 78(3), 402-417.
- HABIB, M.M., MILEVA, E., STRACCA, L. (2017). "The real exchange rate and economic growth: Revisiting the case using external instruments." *Journal of International Money and Finance*, 73(PB), 386-398.
- IMF (2019). "The Fiscal Transparency Code", IMF fiscal transparency code, Washington DC.
- KHOLODILIN, K., SILIVERSTOV, B. (2009). "Do forecasters inform or reassure? Evaluation of the German real-time data." *Applied Economics Quarterly*, 55(4), 269-294.
- KOPITS, G., CRAIG, J., (1998). "Transparency in government operations." *IMF occasional paper 158*.
- KRKOSKA, L., TEKSOZ, U. (2009). "How reliable are forecasts of GDP growth and inflation for countries with limited coverage?" *Economic Systems*, 33(4), 376-388.
- MEROLA, R., PÉREZ, J. J. (2013), "Fiscal Forecast Errors: governments versus independent agencies?". *European Journal of Political Economy*, 32(C), 285-299.
- MONTES, G. C., VEREDA, L., NICOLAY, R., CURI, A. (2016). "Effects of transparency, monetary policy signalling and clarity of central bank communication on disagreement about inflation expectations." *Applied Economics*, 48(7), 590-607.
- PEDERSEN, M., (2015) "What affects the predictions of private forecasters? The role of central bank forecasts in Chile." *International Journal of Forecasting*, 31(4), 1043-1055.
- PERRON, P. (1989). "The great crash, the oil price shock and the unit root hypothesis". *Econometrica*, 57(6), 1361-1401.
- PERRON, P. (1993). "Erratum [The Great Crash, the Oil Price Shock and the Unit Root Hypothesis]." *Econometrica*, 61(1), 248-249.
- PINA, A.M., VENES, N. (2011), "The Political Economy of EDP fiscal forecasts: an empirical assessment". *European Journal of Political Economy*, 27(3), 534-546.
- REINHART, A. M., ROGOFF, K. S. (2010). "Growth in a Time of Debt." *American Economic Review*, 100(2), 573-578.
- WOOLDRIDGE, J.M. (2001). "Applications of Generalized Method of Moments Estimation." *Journal of Economic Perspectives*, 15(4), 87-100.

Appendix

Table A.1

Description of the variables, sources of data, and descriptive statistics

Variable name	Variable description	Data Source	Mean	Median	Maximum	Minimum	Std. Dev.
$E(Y_{i,T})$	Expectations of economic growth (current year - nowcast).	TSMS/CBB	2.269	2.975	7.600	-3.860	2.596
$E(Y_{i,T+12m})$	Expectations of economic growth (12 months ahead).	TSMS/CBB	2.612	3.306	5.909	-2.985	1.930
$E(Y_{i,T+1})$	Expectations of economic growth (next calendar year).	TSMS/CBB	3.043	3.540	5.030	-2.550	1.368
$E(Y_{i,T,pri})$	Expectations of economic growth – primary sector (current year - nowcast).	TSMS/CBB	2.207	2.520	5.420	-2.920	2.064
$E(Y_{i,T+12m,pri})$	Expectations of economic growth – primary sector (12 months ahead).	TSMS/CBB	2.465	2.830	4.850	-2.018	1.662
$E(Y_{i,T+1,pri})$	Expectations of economic growth – primary sector (next calendar year).	TSMS/CBB	2.801	3.070	4.330	-1.840	1.292
$E(Y_{i,T,man})$	Expectations of economic growth – manufacturing sector (current year - nowcast).	TSMS/CBB	3.374	3.500	12.220	-5.320	2.704
$E(Y_{i,T+12m,man})$	Expectations of economic growth – manufacturing sector (12 months ahead).	TSMS/CBB	3.397	3.631	6.007	0.008	1.277
$E(Y_{i,T+1,man})$	Expectations of economic growth – manufacturing sector (next calendar year).	TSMS/CBB	3.556	3.750	4.870	0.700	0.815
$E(Y_{i,T,serv})$	Expectations of economic growth – service sector (current year - nowcast).	TSMS/CBB	2.056	2.970	10.820	-6.120	3.630
$E(Y_{i,T+12m,serv})$	Expectations of economic growth – service sector (12 months ahead).	TSMS/CBB	2.605	3.255	7.280	-4.444	2.468
$E(Y_{i,T+1,serv})$	Expectations of economic growth – service sector (next calendar year).	TSMS/CBB	3.096	3.695	5.660	-3.850	1.655
$FOPAC_{i,T}$	Fiscal opacity measure - (current year - nowcast).	Equation (4) – devised by authors	0.171	0.069	1.000	0.000	0.256
$FOPAC_{i,T+12m}$	Fiscal opacity measure - (12 months ahead).	Equation (4) – devised by authors	0.262	0.134	1.000	0.000	0.328
$FOPAC_{i,T+1}$	Fiscal opacity measure - (next calendar year).	Equation (4) – devised by authors	0.312	0.131	1.000	0.000	0.368
$FOPAC_{pc}$	Fiscal opacity measure – principal component.	Equation (4) – devised by authors	1.19E-17	-0.259	1.210	-0.441	0.494
GAP	Output gap measured using as a proxy the industry’s installed capacity.	IPEADATA	81.097	81.650	85.100	74.900	2.533
$E(GBudget_{t,+12m})$	Market expectations for the primary result of the consolidated public sector (% of GDP - Government Budget Result) for the next 12 months.	TSMS/CBB	2.004	2.730	4.410	-2.340	2.211
$\Delta E(Exchange_{t,+12m})$	Variation in market expectations of the exchange rate (R\$/US\$ average – end-of-year) for the next 12 months.	TSMS/CBB	0.003	-0.005	0.335	-0.259	0.071
$E(\pi_{t+12m})-Target(\pi_{t+12m})$	Difference between market expectations for inflation in the next 12 months and the inflation target announced by the CBB.	Devised by authors	0.737	0.774	3.057	-0.785	0.982
$DISGOV$	Dissatisfaction with the federal government.	BNCI	27.533	17.750	82.000	3.000	23.540
$Uncertainty$	Brazilian economy uncertainty index.	BIE/FGV	102.072	97.900	136.800	85.100	10.873
$GFCrisis$	Dummy regarding the effect of the Global Financial Crisis of 2008 on the Brazilian economy - value “1” from October 2008 to June 2009, and “0” otherwise.	Devised by authors					
$FISCALPBE_{t,h}$	Dummy variable - equal to “1” for periods when the projections for the government’s budget deficit are more pessimistic than the one realized, and it assumes a value “0” otherwise.	Devised by authors - equation (1).					

Note: TSMS/CBB - Time Series Management System/Central Bank of Brazil. BNCI - Brazilian National Confederation of Industry. BIE/FGV Brazilian Institute of Economics – Fundação Getúlio Vargas.