Uncertainties and disagreements in expectations of professional forecasters

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Abstract
This paper investigates whether news-based uncertainties affect disagreements in professional forecasters expectations for different economic variables in Brazil. We consider two groups of disagreements in expectations: one related to economic policy instruments (interest rate, exchange rate and primary result), and the other related to economic performance variables (inflation, GDP growth, debt/GDP, current account balance and foreign direct investment). Regarding news-based uncertainties, we use the economic policy uncertainty index of Baker et al. (2016), and we construct an index of "economic uncertainty unrelated to economic policy". The results show that as both economic policy uncertainty and economic uncertainty unrelated to economic policy increase, most disagreements in expectations also increase. However, news-based uncertainties do not affect disagreements in inflation expectations, suggesting the importance of the inflation targeting regime to guide inflation expectations of professional forecasters. Moreover, the results suggest that in the eyes of professional forecasters, monetary and fiscal policies are not so coordinated in the task of guiding expectations: if, on the one hand, economic policy uncertainty can affect disagreement in expectations related to fiscal policy; on the other hand, economic policy uncertainty is not able to affect disagreement in expectations related to monetary policy. The results also show that economic uncertainty has a stronger impact on fiscal policy uncertainty than on monetary policy uncertainty, suggesting the strength of the inflation targeting regime in shielding the monetary side.

Keywords: disagreement, expectation, uncertainty, forecast, credibility

JEL: D84, E44, E58

Resumo
Este artigo investiga se as incertezas baseadas em notícias afetam os desacordos nas expectativas de analistas profissionais para diferentes variáveis econômicas no Brasil. Consideramos dois grupos de desacordos nas expectativas: um relacionado aos instrumentos de política econômica (taxa de juros, câmbio e resultado primário), e outro relacionado às variáveis de desempenho econômico (inflação, crescimento do PIB, dívida/PIB, saldo em conta corrente e investimento direto estrangeiro). Em relação às incertezas, usamos o índice de incerteza da política econômica de Baker et al. (2016), e construímos um índice de "incerteza econômica não relacionada à política econômica". Os resultados mostram que, à medida que aumentam a incerteza da política econômica e a incerteza econômica não relacionada à política econômica, a maioria dos desacordos nas expectativas também aumenta. No entanto, as incertezas baseadas em notícias não afetam os desacordos nas expectativas de inflação, sugerindo a importância do regime de metas para inflação para orientar as expectativas de inflação de analistas profissionais. Além disso, os resultados sugerem que, aos olhos dos analistas profissionais, as políticas monetária e fiscal não são tão coordenadas na tarefa de orientar as expectativas: se, por um lado, a incerteza da política econômica pode afetar o desacordo nas expectativas relacionadas à política fiscal; por outro lado, a incerteza da política econômica não é capaz de afetar o desacordo nas expectativas relacionadas à política monetária. Os resultados também mostram que a incerteza econômica tem um impacto mais forte na incerteza da política fiscal do que na incerteza da política monetária, sugerindo a força do regime de metas para inflação em blindar o lado monetário.

Palavras-chave: desacordo, expectativa, incerteza, previsão, credibilidade

JEL: D84, E44, E58

Área 4 - Macroeconomia, Economia Monetária e Finanças

1. Introduction

This paper analyzes whether news-based uncertainties related to economic policy and the economy affect disagreements in expectations for different economic variables formed by professional forecasters in Brazil (an inflation targeting developing country). The study uses a wide set of disagreements in expectations formed for the following variables: primary result as a proportion of GDP, exchange rate, monetary policy interest rate, GDP growth, inflation, public debt as a proportion of GDP, current account balance and foreign direct investment in the country. As a first contribution, among the existing studies to date, this study is the one that uses the largest set of disagreements in expectations for different economic variables, and the first to analyze the effects of news-based uncertainties related to economic policy and the economy on this wide set of disagreements in expectations.

The analyzed relationships deserve attention since uncertainties related to the state of the economy and the conduct of economic policies may affect the expectations formation process of professional forecasters, and both uncertainties and expectations about economic conditions represent significant part in risk assessment, impacting the decisions of households, firms and policymakers (Montes and Ferreira, 2019; Zhang et al., 2021; Goodell et al., 2021; Hauzenberger et al., 2021; Montes and Nogueira, 2022).[1] Expectations of professional forecasters play an important role in the economy, making firms and policymakers monitor these expectations once forecasts of macroeconomic variables drive government policies and corporate decisions (Baker et al., 2020). However, expectations of professional forecasters related to economic variables may differ, and such disagreements have implications on the economy since they enter the decision-making process of various economic agents. Despite the adverse effects of disagreements in expectations on the economy (Montes and Ferreira, 2019), disagreements obtained from professional forecasters have a useful function as increases in disagreement may help predict recessions (Bürgi and Sinclair, 2021) and thus the business cycle.

The existence of disagreements in expectations of economic variables caught the attention of researchers in the field of expectations, who sought to explain why forecasters disagree in their expectations, to identify the determinants of disagreements in expectations, and whether such disagreements affect financial and economic outcomes (e.g., Mankiw et al., 2003; Patton and Timmermann, 2010; Dovern et al. 2012; Andrade et al., 2016; Oliveira and Curi, 2016; Montes et al., 2016; Binder, 2017; Montes and Luna, 2018; Montes and Ferreira, 2019; Seelajaroen et al., 2020; Bürgi and Sinclair, 2021).

Private-sector expectations are based on information, and information can be obtained from several sources, such as, for instance, from the traditional media.[2] The informational content provided by the media can describe situations of greater (or lesser) uncertainty in relation to economic policies and the economy, which can affect the expectations formation process of professional forecasters in relation to different economic variables and generate disagreements in this process. Regarding the consequences of news-based economic uncertainty and economic policy uncertainty on professional forecasters' expectations, the literature is scarce, and there are gaps to be filled. Since expectations of macroeconomic variables and the uncertainties surrounding these expectations are crucial to different economic

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[1] As stressed by Andrade (2014), "What households or firms expect for future macroeconomic outcomes affects their current choices of consumption, investment, or pricing decisions. Measures of expectations are therefore informative about the state of the economy. They are also often used as an input to economic policymaking."

[2] Although information provided by official institutions is important for the expectations formation process and for disagreements in expectations (see, for instance, Montes et al., 2016), this study is not intended to explore the effects of information from official institutions. Our focus is on economic uncertainties and economic policy uncertainties captured by information provided by traditional media.

agents' decisions (including policymakers' decisions), these gaps are particularly important to be filled.

These literatures (the one dealing with news-based economic uncertainty and economic policy uncertainty, and the other addressing disagreements), despite being quite consolidated individually, have few related studies. Binder (2017), for instance, is one of the few studies that verifies the relationship between news-based economic policy uncertainty and disagreements in inflation expectations in an important developed economy (the US economy). Hence, verifying whether disagreements in expectations for different economic variables are related to news-based economic policy uncertainty and news-based economic uncertainty is crucial for developing economies where expectations play a key role (such as Brazil, an inflation targeting country).

Therefore, the main goal of this study is to identify, for the Brazilian case, whether news-based uncertainties affect disagreements in different economic variables expectations formed by professional forecasters. As a novelty, unlike Binder (2017) which focus on an important developed country and analyzed only disagreements in inflation expectations, we analyze an important developing country (Brazil), and we consider two groups of disagreements in expectations: one related to economic policy instruments (called "instruments"), and the other related to economic performance variables (called "outcomes"). In the "instruments" group, we analyzed the disagreements in expectations for the exchange rate, interest rate and primary result; and, in the "outcomes" group, we analyzed the disagreements in expectations for inflation, GDP growth, current account balance, foreign direct investment in the country and debt/GDP.

To obtain the disagreements in expectations, we applied the same methodology used by Oliveira and Curi (2016), Montes et al. (2016), Montes and Acar (2018) and Montes and Luna (2018), which is the one that allows the calculation of disagreements in expectations for different variables for the Brazilian case. The disagreements were calculated based on surveys of expectations provided by professional forecasters to the Central Bank of Brazil (CBB).

Regarding news-based uncertainty indexes, we can access two indicators for the Brazilian case: the economic policy uncertainty index (EPU) created by Baker et al. (2016), and the Media Uncertainty Indicator provided by IBRE FGV. However, the indicator provided by IBRE FGV is an index obtained from information in the media that captures economic uncertainties as well as uncertainties related to economic policy. In this sense, another contribution of the paper is the creation of an index of "economic uncertainty unrelated to economic policy. The idea of creating this index is to purge economic policy uncertainty from the Media Uncertainty Indicator, leaving only the economic uncertainty. To obtain this index, we extract the residual series of the regression that uses the two uncertainty indexes, the Media Uncertainty Indicator provided by IBRE FGV (used as a dependent variable in the regression) and the EPU created by Baker et al. (2016) (used as an explanatory variable in the regression). After the regression we obtain the residual series, which captures the economic uncertainty unrelated to economic policy.

Brazil is an interesting case study, as it is one of the 10 largest economies in the world and an important developing country that adopts the inflation targeting regime, having a concern to guide agents' expectations. Furthermore, Brazil is one of the few countries that has a wide database of expectations obtained from surveys conducted with professional forecasters, thus allowing the construction of disagreements in different economic variables expectations.

Using data from January 2002 to January 2021, we run ordinary least squares (OLS) and generalized method of moments (GMM) regressions to investigate the relationships between news-based uncertainties and disagreements in expectations. In addition, to verify whether there are asymmetries in the relationships between uncertainties and disagreements in expectations at different levels, we estimate the models using the quantile regression method.

The results indicate to the extent that both economic policy uncertainty and economic uncertainty unrelated to economic policy increase, most of the disagreements in expectations increase too. However, unlike Binder's (2017) findings for the US case, news-based uncertainties are not significant to explain the disagreements in inflation expectations in Brazil, suggesting the importance of the inflation targeting regime and the commitment of the CBB with price stability to guide inflation expectations of professional forecasters.[3] Regarding disagreements in inflation expectations, we observe that inflation volatility and monetary policy credibility are the most important determinants, corroborating Oliveira and Curi (2016).

Our study contributes to the literature as follows. First, it investigates the effects of news-based economic policy uncertainty on a set of disagreements in expectations of professional forecasters for different economic variables. Second, since the EPU created by Baker et al. (2016) captures news-based uncertainties related to economic policies, and the Media Uncertainty Indicator provided by IBRE FGV captures news-based uncertainties related to both economic policies and the economy, we calculate a measure that captures the economic uncertainty unrelated to economic policy, and we analyze the relationships of this measure with the disagreements in expectations of professional forecasters. Third, we analyze a wide set of disagreements in expectations divided into two subgroups: "instruments" and "outcomes". And finally, we contribute to the literature that seeks to identify the determinants of disagreements in expectations, since our study is the first to analyze the effects of news-based uncertainties on different disagreements in expectations in an important inflation targeting emerging economy.

2. Data and methodology

The data comprise the period between January 2002 and January 2021. The macroeconomic and market expectations series used to construct the variables were obtained from the Central Bank of Brazil (CBB). The main variables of this study are the disagreement in inflation expectations ($disag\_infl$), the disagreement in the SELIC interest rate expectations ($disag\_ir$), the disagreement in the exchange rate expectations ($disag\_exch$), the disagreement in the GDP growth expectations ($disag\_gdp$), the disagreement in expectations for public debt as a proportion of GDP ($disag\_debt$), the disagreement in expectations for the primary surplus as a proportion of GDP ($disag\_budget$), the disagreement in expectations for the current account of the balance of payments ($disag\_cc$), disagreement in foreign direct investment expectations ($disag\_fdi$), and, economic policy uncertainty and economic uncertainty indexes.

The disagreements in expectations were calculated based on the literature, following, for example, Oliveira and Curi (2016), Montes et al. (2016), Montes and Curi (2017) and Montes and Luna (2018).[4] The disagreements in expectations formed for the analyzed variables (inflation, interest rate, exchange rate, GDP growth, public debt, primary surplus, current account of the balance of payments and foreign direct investment) are constructed from expectations data available at the CBB website. Thus, based on a survey of expectations provided by the CBB, we calculate disagreements in expectations for a 12-months forecast horizon since this is a high concern forecast horizon for the CBB, because policymakers closely monitor the performance of economic variables within a window of one year (Montes and Lima, 2021), being attentive to the behavior of expectations for these variables for the next 12 months.

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[3] Another difference from Binder (2017) is that while she focuses on household inflation uncertainty, and thus on disagreement in inflation expectations formed by households, our study analyzes the disagreements in inflation expectations formed by professional forecasters.

[4] This methodology was applied because it is the only possible way to calculate the disagreements in expectations based on data provided by the CBB for the Brazilian case. For more details, see Oliveira and Curi (2016).

In the estimations, all series of disagreements in expectations will be expressed in natural logarithm (*ln*) – i.e., *ln_disag_infl_12*, *ln_disag_ir_12*, *ln_disag_exch_12*, *ln_disag_gdp_12*, *ln_disag_debt_12*, *ln_disag_budget_12*, *ln_disag_cc_12* and *ln_disag_fdi_12*. With the variables in natural logarithm, the elasticities are directly known, and the interpretation is direct, allowing to know the reaction of a disagreement variable in percentage points due to a 1% increase in an explanatory variable (which will also be expressed in natural logarithm).

With respect to news-based economic policy uncertainty and economic uncertainty, we use two indicators: the first is the EPU created by Baker et al. (2016), and the second is the index of economic uncertainty unrelated to economic policy that we calculate in this paper.
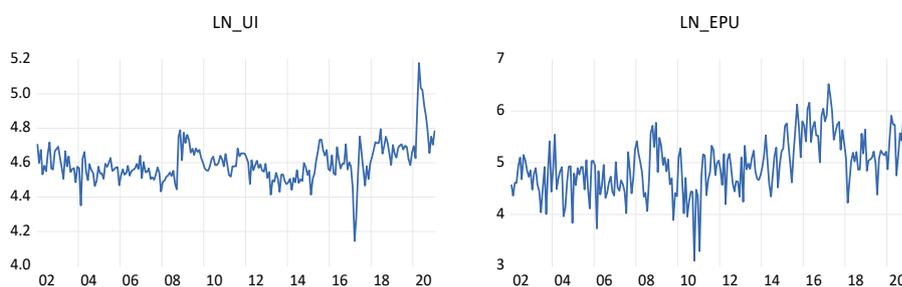
The EPU proposed by Baker et al. (2016) is taken from the Economic Policy Uncertainty web page (for Brazil).[5] The indicator is based only on newspaper word count. Thus, as the value of the index increases, it means more economic policy uncertainty. Like Baker et al. (2016), we use the natural logarithm of the series (*ln_EPU*).

Regarding the indicator of economic uncertainty unrelated to economic policy that we create (henceforth called by "economic uncertainty", and expressed by UI), we obtain through the residual series of the error term of the regression in which the dependent variable is the Media Uncertainty Indicator[6], provided by IBRE FGV, and, the explanatory variable is the EPU proposed by Baker et al. (2016). The indicator provided by IBRE FGV is an index obtained from information in the media that captures economic uncertainties as well as uncertainties related to economic policy. Since the "Media Uncertainty Indicator" provided by IBRE FGV also incorporates economic policy uncertainty, then, the error term of the regression where the EPU is the explanatory variable represents the "economic uncertainty" (UI).[7] Hence, to obtain the variable of economic uncertainty through the residual series of the error term (μ), we run an OLS regression to the following model:

$$Media\_Uncertaint\_Indicator_t = \alpha_0 + \alpha_1 EPU_t + \mu_t \tag{1}$$

Figure 1 shows the behaviors of both EPU and UI in Brazil for the analyzed period. One can observe that UI captures important events such as the subprime crisis and the pandemic caused by the new coronavirus. The UI indicator also captures the strong retraction in economic uncertainty at the end of 2016 caused by the impeachment of President Dilma Rousseff.

Figure 1 *EPU* and *UI* behaviors (in natural logarithm)

Table 1 presents EPU and UI correlations with the disagreements in expectations. The correlations of both uncertainty indicators with *disag_exch_12, disag_debt_12, disag_budget_12, disag_gdp_12, disag_cc_12* and *disag_fdi_12* have relationships consistent with economic theory (i.e., positive signals), and values that cannot be ignored. On the other hand, the correlations of both uncertainty indicators with *disag_infl_12* and *disag_ir_12* present low values; in particular, *disag_infl_12* has low correlations with EPU and UI, and *disag_ir_12* has low correlations with UI. Therefore, both uncertainty indicators seem to have the ability to explain most disagreements. However, for disagreements in expectations related to monetary policy variables (i.e., *disag_infl_12* and *disag_ir_12*), the relationships with uncertainties seems to be low. This difference in behavior is probably due to the inflation targeting regime adopted in Brazil.

Table 1 Correlations between *disagreements* and uncertainties indicators

	disag_infl_12	disag_ir_12	disag_exch_12	disag_debt_12	disag_budget_12	disag_gdp_12	disag_cc_12	disag_fdi_12
EPU	-0.047	-0.134	0.477	0.362	0.328	0.337	0.380	0.380
	disag_infl_12	disag_ir_12	disag_exch_12	disag_debt_12	disag_budget_12	disag_gdp_12	disag_cc_12	disag_fdi_12
UI	0.035	0.036	0.586	0.392	0.548	0.613	0.273	0.328

2.1 Econometric strategy

To verify the impacts of EPU and UI on the disagreements in expectations formed for different economic variables, we consider two sets of disagreements in expectations. The first set of equations addresses the effects of EPU and UI on the disagreements in expectations for important monetary and fiscal policy instruments of an inflation targeting country (i.e., for the exchange rate, due to the pass-through effect from exchange rate to inflation; for the monetary policy interest rate, as it is the main instrument to control inflation, and; for the budget balance, as fiscal policy should not put pressure on inflation). Therefore, in this set, we seek to verify whether "economic policy uncertainty" as well as "economic uncertainty" influence the expectations formation process for monetary policy (exchange rate and interest rate) and fiscal policy (budget balance) variables. Thus, the following models are estimated:

$$\ln\_disag\_exch\_12_t = \alpha_0 + \beta_0 X_{0t} + \gamma_0 \ln\_EPU_t + \theta_0 \ln\_UI_t + \varepsilon_{0t} \qquad (2)$$

$$\ln\_disag\_ir\_12_t = \alpha_1 + \beta_1 X_{1t} + \gamma_1 \ln\_EPU_t + \theta_1 \ln\_UI_t + \varepsilon_{1t} \qquad (3)$$

$$\ln\_disag\_budget\_12_t = \alpha_2 + \beta_2 X_{2t} + \gamma_2 \ln\_EPU_t + \theta_2 \ln\_UI_t + \varepsilon_{2t} \qquad (4)$$

The second set of equations analyzes the effects of EPU and UI on the disagreements in expectations for macroeconomic variables. Thus, the following models are estimated for the disagreements in expectations for inflation, GDP growth, current account of the balance of payments as a proportion of GDP, foreign direct investment as a proportion of GDP, and public debt as a proportion of GDP:

$$\ln\_disag\_infl\_12_t = \alpha_3 + \beta_3 X_{3t} + \gamma_3 \ln\_EPU_t + \theta_3 \ln\_UI_t + \varepsilon_{3t} \qquad (5)$$

$$\ln\_disag\_gdp\_12_t = \alpha_4 + \beta_4 X_{4t} + \gamma_4 \ln\_EPU_t + \theta_4 \ln\_UI_t + \varepsilon_{4t} \qquad (6)$$

$$\ln\_disag\_cc\_12_t = \alpha_5 + \beta_5 X_{5t} + \gamma_5 \ln\_EPU_t + \theta_5 \ln\_UI_t + \varepsilon_{5t} \qquad (7)$$

$$\ln\_disag\_fdi\_12_t = \alpha_6 + \beta_6 X_{6t} + \gamma_6 \ln\_EPU_t + \theta_6 \ln\_UI_t + \varepsilon_{6t} \qquad (8)$$

$$\ln\_disag\_debt\_12_t = \alpha_7 + \beta_7 X_{7t} + \gamma_7 \ln\_EPU_t + \theta_7 \ln\_UI_t + \varepsilon_{7t} \tag{9}$$

where, $\varepsilon_0, \varepsilon_1, \varepsilon_2, \varepsilon_3, \varepsilon_4, \varepsilon_5, \varepsilon_6$ and ε_7 are the error terms. In turn, X is the vector of control variables. The set of control variables common to all models is formed by: output gap (*gap*) and monetary policy credibility (*credib*). In addition, the volatilities related to each variable of interest enter their respective control groups as well as the log of the variable of interest (for instance, both inflation volatility (*Vol_infl*) and the log of the inflation rate (*ln_infl*) enter in equation 4 of the disagreement in inflation expectations).

Regarding the control variables, the study follows the literature (e.g., Söderlind, 2011; Oliveira and Curi, 2016; Montes et al., 2016) and uses the variables described below.

Volatilities (*Vol_Y*): the volatility of a given variable (*Y*) is important in determining the disagreement in expectations for *Y*, this is because if *Y* has high volatility, it is more difficult to predict its future behavior, which increases the disagreement in expectations for *Y* (Mankiw et al., 2003; Söderlind, 2011). Thus, as in Oliveira and Curi (2016), we use the following measure of volatility for a given variable,

$$Vol\_Y_t = (Y_t - Y_{t-1})^2 \tag{10}$$

where, *Y* represents the following variables: inflation rate, Selic interest rate, exchange rate, real GDP, public debt, primary surplus, current account balance and direct investment in the country.[8]

Output gap (*gap*): this variable represents the evolution of economic activity. To calculate the *gap*, we use the real GDP series, and based on this series, we apply Hamilton's (2018) methodology to obtain the output gap. Real GDP is calculated using the 12-months accumulated GDP (obtained from the CBB – code 4382) deflated by the general price index (obtained from the IPEADATA website). In the estimations, we analyze the series of the *gap* where the real GDP is in natural logarithm (*ln_gap*).

Monetary policy credibility (*credib*): following Oliveira and Curi (2016), we also consider the effect of monetary policy credibility. The monetary policy credibility variable is particularly important as it reflects the forward guidance capacity of the inflation targeting regime. In this sense, we use the index proposed by de Mendonça (2007). The index captures the variations in central bank credibility in a way compatible with the inflation targeting framework (Seelajaroen et al., 2020). This index uses the inflation target and the tolerance intervals defined by the Brazilian monetary authority. Thus, the measure does not impose any ad hoc threshold below or above which credibility is considered to be null. The credibility index shows a value between 0 (low credibility) and 1 (high credibility). We use the natural logarithm of monetary policy credibility (*ln_credib*). As the credibility index prepared by de Mendonça (2007) has values between 0 and 1, *ln_credib* was calculated by changing the scale

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[8] Thus, to calculate inflation volatility, we use the series of inflation rate accumulated in 12 months, measured by the Consumer Price Index – IPCA (obtained from the CBB – code 13522). Interest rate (Selic) volatility was calculated based on the series of average annualized interest rate (obtained from the CBB – code 4189). The exchange rate volatility was obtained from the series of exchange rate (provided by the CBB – code 3698). The volatility of the current account balance of the balance of payments was calculated using the series of current account balance accumulated in 12 months as a proportion of GDP (obtained from the CBB – code 23079). The volatility of foreign direct investment uses the series of accumulated foreign direct investment in 12 months as a proportion of GDP (obtained from the CBB – code 23080). Real GDP volatility was calculated based on the natural logarithm of real GDP, which was calculated using the 12-months accumulated GDP (obtained from the CBB – code 4382) deflated by the general price index (obtained from the IPEADATA website). For the volatility of the public debt, the debt of the general government was used as a proportion of GDP (obtained from the CBB – code 4536). Finally, the volatility of the primary result is calculated from the series of Public Sector Borrowing Requirements without exchange devaluation (PBSR) as a proportion of GDP, flow accumulated in 12 months (obtained from the CBB – code 5793). In the estimations, all volatility series will be in natural logarithm.

of the index, i.e., applying the natural logarithm to the series of *credib* + 1 (this procedure was adopted by de Mendonça and Finn, 2022).

Table A1 (Appendix) presents the descriptive statistics for all variables.

The results are based on time series analysis. Thus, to check unit root and stationarity of the series, we perform Augmented Dickey-Fuller (ADF), Phillips -Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin KPSS tests (the results of the tests are reported in Table A2 in the Appendix). Based on the tests, we observe that all variables are stationary.

Estimates are obtained from ordinary least squares (OLS), generalized method of moments (GMM), and quantile regression. OLS and GMM estimates use the Newey-West matrix (HAC) (Newey and West, 1987) to correct autocorrelation and heteroskedasticity problems identified. In GMM estimates, we follow Johnston (1984) to select the instruments, i.e., the instruments were dated to the period t-1 or earlier to assure the exogeneity.[9] According to Cragg (1983), overidentification has an important role in the selection of instrumental variables to improve the efficiency of the estimators. Therefore, a standard J-test was performed aiming at testing this property for the validity of the overidentifying restrictions, i.e., the J-statistic indicates whether the orthogonality condition is satisfied (Hansen, 1982). Finally, to analyze the endogeneity of the equation regressors, we report the results of the Durbin–Wu–Hausman (DWH) test. As can be seen in all tables, both J and DWH tests validate all GMM estimates.

In turn, quantile regression is used to observe the effect that uncertainties have on disagreements in expectations at different disagreements levels. Introduced by Koenker and Basset (1978), the quantile regression method estimates the relationship between the dependent variable and the explanatory variables at any chosen point in the conditional distribution of the dependent variable. Thus, we obtain several sets of coefficient estimates with each set describing the relationship between the dependent variable and the explanatory variables at a particular quantile of the dependent variable.

3. Results

In this section, the results will be analyzed by groups of variables. Disagreements in exchange rate, interest rate and budget balance expectations are found in the "instruments" group (section 4.1); and disagreements in expectations about inflation, GDP growth, current account balance, foreign direct investment and public debt are found in the "outcomes" group (section 4.2).

3.1 Effects of uncertainties on the disagreements of the "instruments" group

Table 2 shows the results for the estimations of equations 4, 5 and 6. We found that EPU is statistically significant and positively related with disagreements in exchange rate and budget balance expectations. The economic importance of EPU can be directly evaluated by considering the estimated values of the coefficients: a 1% increase in EPU increases, on average, 0.33% and 0.65% the disagreement in exchange rate expectations and the disagreement in budget balance expectations, respectively. However, EPU is not significant in determining the disagreement in interest rate expectations. This result is probably a consequence of the institutional framework of the inflation targeting regime, i.e., given the confidence in the autonomy of the CBB due to the adoption of the inflation targeting regime, professional forecasters' disagreement in expectations about monetary policy interest rate are not affected by news-based economic policy uncertainty. Thus, the findings reveal that,

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[9] The list of instruments can be made available upon request.

regardless of the economic policy uncertainty reported in the media, the expectations formation process about the conduct of monetary policy will not be affected by these uncertainties, and these expectations will probably be in line with the goal of price stability (as the results for credibility will demonstrate). On the other hand, the results indicate the disagreement in primary surplus expectations is affected by economic policy uncertainty, suggesting the adoption of the inflation targeting regime is not enough to shield this disagreement in expectations related to a fiscal policy from economic policy uncertainty reported by the media. These results suggest that in the eyes of professional forecasters, monetary and fiscal policies may not be so coordinated in the task of guiding expectations: if, on the one hand, economic policy uncertainty can affect disagreement in expectations related to a fiscal policy; on the other hand, economic policy uncertainty is not able to affect disagreement in expectations related to monetary policy.

In turn, the estimated coefficients for UI are positive and, in most cases, significant. The economic effect of UI can be directly observed by considering the estimated values of the coefficients: a 1% increase in economic uncertainty (UI) raises, on average, the disagreements in exchange rate and budget balance expectations by 1.35% and 1.68%, respectively. Furthermore, a 1% increase in UI raises the disagreement in interest rate expectations by 0.48%, as observed in the estimation by GMM. The results show that economic uncertainty has a stronger impact on fiscal policy uncertainty than on monetary policy uncertainty, suggesting the strength (and probably, the bias) of the inflation targeting regime in shielding the monetary side.

Therefore, the results reveal that, regarding the disagreements in expectations for economic policy instruments analyzed, the disagreement most affected by uncertainties is the one related to fiscal policy (i.e., *ln_disag_budget_12*). This result reinforces the idea in Montes and Acar (2020) that the absence of clear rules about fiscal policy (and, in particular, in relation to the primary surplus) increases uncertainties regarding fiscal policy (capture by the disagreement). Montes and Acar (2020) show that the lack of commitment to the fiscal target makes it difficult to form expectations about the future path of the fiscal results, heightening disagreement in the forecasts. In this sense, when news-based economic uncertainty and economic policy uncertainty arise, the expectations formation process related to fiscal policy is the most affected among economic policies.

The coefficients obtained for the monetary policy credibility are negative for the disagreements in interest rate and primary result expectations. Based on the statistically significant coefficients, the results show that a 1% increase in *credib* reduces, on average, by 0.74% the disagreement in primary result expectations and by 0.53% the disagreement in interest rate expectations. These results are in line with and reflect the forward guidance capacity of the inflation targeting regime. In turn, monetary policy credibility did not show statistical significance for the disagreement in exchange rate expectations. The latter is probably a result of the exchange rate fluctuation regime adopted. The findings related to the effect of monetary policy credibility on disagreements in interest rate and exchange rate expectations are in line with the results reported by Oliveira and Curi (2016), and by Seelajaroen et al. (2019) for the disagreement in interest rate expectations only.[10]

The output gap (*gap*) is related to the disagreements in exchange rate and primary result expectations. The *gap* presents a positive and significant relationship with the disagreement in primary result expectations through GMM estimation, and a negative and significant relationship with the disagreement in exchange rate expectations through both OLS and GMM

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[10] Although Seelajaroen et al. (2020) found that the effect of credibility is negative but insignificant at any conventional significance level; the coefficient on the interaction term between the transparency and credibility indices is significantly negative, suggesting that central bank transparency and credibility of the Bank of England are considered to be complements in reducing disagreement about interest rate forecasts.

estimations (this latter reinforces the results presented in Oliveira and Curi, 2016). Finally, all volatilities proved to be significant and positively correlated with the respective disagreements, corroborating the findings in the literature (e.g., Oliveira and Curi (2016) and Montes and Luna (2018)).

Table 2 OLS and GMM estimates for the effects of EPU and UI on the disagreements in exchange rate, interest rate and primary result expectations

Variables	OLS ln_disag_exch_12	GMM ln_disag_exch_12	Variables	OLS ln_disag_ir_12	GMM ln_disag_ir_12	Variables	OLS ln_disag_budget_12	GMM ln_disag_budget_12
c	-8.06***	-7.53***	c	0.12	-0.64	c	-10.40***	-10.90***
	(1.80)	(2.54)		(1.23)	(1.06)		(3.79)	(2.99)
ln_EPU	0.28***	0.38***	ln_EPU	-0.06	-0.07	ln_EPU	0.46***	0.84***
	(0.07)	(0.10)		(0.06)	(0.06)		(0.12)	(0.10)
ln_UI	1.45***	1.25***	ln_UI	0.33	0.48**	ln_UI	1.82**	1.54**
	(0.38)	(0.46)		(0.22)	(0.21)		(0.76)	(0.64)
ln_credib	-0.03	0.31	ln_credib	-0.56***	-0.51***	ln_credib	-0.20	-0.74***
	(0.19)	(0.27)		(0.17)	(0.13)		(0.25)	(0.21)
ln_gap	-3.45***	-3.52***	ln_gap	0.92	1.58	ln_gap	1.55	6.45***
	(0.95)	(1.35)		(1.08)	(1.05)		(2.03)	(1.62)
ln_vol_exch	0.05***	0.09***	ln_vol_ir	0.40***	0.60***	ln_vol_budget	0.84***	1.37***
	(0.01)	(0.02)		(0.09)	(0.08)		(0.18)	(0.21)
Adj. R^2	0.59	0.52	Adj. R^2	0.27	020	Adj. R^2	0.38	0.24
F-Statistic	66.78		F-Statistic	17.94		F-Statistic	27.53	
Prob F-Statistic	0.00		Prob F-Statistic	0.00		Prob F-Statistic	0.00	
LM test	121.29		LM test	148.01		LM test	146.66	
Prob LM test	0.00		Prob LM test	0.00		Prob LM test	0.00	
Arch test	87.33		Arch test	103.94		Arch test	80.37	
Prob Arch test	0.00		Prob Arch test	0.00		Prob Arch test	0.00	
J-statistic		26.64	J-statistic		25.75	J-statistic		24.50
Prob J-statistic		0.78	Prob J-statistic		0.77	Prob J-statistic		0.75
DWH test		4.11	DWH test		1.86	DWH test		5.30
Prob DWH		0.53	Prob DWH		0.87	Prob DWH		0.38
Instruments		39	Instruments		38	Instruments		36
Obs.	228	219	Obs.	228	221	Obs.	218	213

Note: Marginal significance levels: *** Denotes p-value<0.01; ** Denotes p-value <0.05; * Denotes p-value <0.1. Robust (Newey-West) standard errors are in parentheses.

3.2 Effects of uncertainties on the disagreements of the "outcomes" group

Table 3 shows the results of the estimations for equations 7, 8, 9, 10 and 11. The results reveal that EPU is significant and positively related to disagreements in expectations of almost all variables, except for the disagreement in inflation expectations. Analyzing the economic impacts of economic policy uncertainty, we observe that a 1% increase in EPU raises, on average, by 0.21%, 0.50%, 0.48% and 0.41% the disagreements in expectations for GDP growth, the current account balance, foreign direct investment in the country and public debt, respectively. Regarding the disagreement in inflation expectations, the findings suggest the adoption of the inflation targeting regime reinforces the confidence in CBB's commitment with price stability, and does not let news-based economic policy uncertainty affect professional forecasters' disagreement in inflation expectations. In turn, the estimates show that economic policy uncertainty has a greater effect on expectations for external sector variables (i.e., on current account balance expectations and foreign direct investment expectations), suggesting a lack of clarity of forecasters regarding the consequences of economic policies (and especially when these policies become uncertain) on the country's foreign trade and on the attractiveness of foreign direct investment to the country, or a lack of clarity regarding external policies adopted to stimulate foreign trade and make the country more attractive for foreign investment. Economic policy uncertainty also makes it difficult to form GDP growth expectations, which, therefore, brings adverse consequences for the decision-making process of agents.

Regarding economic uncertainty, we observe that UI has positive and significant coefficients for almost all disagreements analyzed in this group, except for the disagreement in inflation expectations. In relation to the economic impacts, one can observe that economic uncertainty exerts a stronger influence on disagreements in expectations for the variables of this group than economic policy uncertainty. A 1% increase in UI raises, on average, by 1.55%

the disagreement in GDP growth expectations, by 1.22% the disagreement in expectations about current account balance, by 1.30% the disagreement in expectations about foreign direct investment in the country, and by 1.16% the disagreement in public debt expectations. The disagreement in inflation expectations is not influenced by news-based economic uncertainty due to the same reasons mentioned above related to the adoption of the inflation targeting regime, i.e., the inflation targeting regime might be helping to reinforce the confidence in CBB's commitment with price stability.

Monetary policy credibility is not significant for the disagreements in public debt and current account balance expectations. In turn, a 1% increase in credibility reduces, on average, by 0.94% the disagreement in inflation expectations, and by 0.27% the disagreement in GDP growth expectations. Therefore, as monetary policy credibility increases, making the macroeconomic environment more stable, the expectations formation process for two important performance variables (GDP growth and inflation) becomes less uncertain, reducing both inflation and GDP growth uncertainties. However, the impact of monetary policy credibility on the disagreement in expectations about foreign direct investment in the country is not clear once OLS and GMM show different results (in the GMM estimation, the coefficient is not significant).

The output gap is not significant to determine any variable in this group. In addition, volatilities are only significant to determine the disagreements in inflation and public debt expectations, having positive impacts on both.

Table 3 OLS and GMM estimates for the effects of EPU and UI on the disagreements in inflation, GDP growth, current account balance, foreign direct investment and public debt expectations

Variables	OLS ln_disag_infl_12	GMM ln_disag_infl_12	Variables	OLS ln_disag_gdp_12	GMM ln_disag_gdp_12	Variables	OLS ln_disag_cc_12	GMM ln_disag_cc_12	Variables	OLS ln_disag_fdi_12	GMM ln_disag_fdi_12	Variables	OLS ln_disag_debt_12	GMM ln_disag_debt_12
c	0.54	0.53	c	-6.67***	-8.10***	c	-3.62*	-6.05	c	-4.51*	-6.43***	c	-5.32**	-5.69***
	(1.39)	(1.18)		(1.27)	(1.34)		(2.17)	(1.98)		(2.29)	(1.92)		(2.28)	(1.94)
ln_EPU	-0.03	-0.05	ln_EPU	0.20***	0.23***	ln_EPU	0.37***	0.64***	ln_EPU	0.36***	0.60***	ln_EPU	0.29***	0.53***
	(0.06)	(0.05)		(0.04)	(0.05)		(0.11)	(0.11)		(0.09)	(0.11)		(0.07)	(0.08)
ln_UI	0.20	0.21	ln_UI	1.43***	1.68***	ln_UI	1.06**	1.39***	ln_UI	1.21***	1.40***	ln_UI	1.28***	1.07***
	(0.27)	0.22		(0.26)	(0.28)		(0.42)	(0.40)		(0.44)	(0.37)		(0.47)	(0.38)
ln_credib	-1.11***	-0.77***	ln_credib	-0.26**	-0.28**	ln_credib	0.52	-0.38	ln_credib	0.60*	0.26	ln_credib	-0.08	0.10
	(0.27)	(0.11)		(0.11)	(0.11)		(0.43)	(0.28)		(0.31)	(0.24)		(0.29)	(0.21)
ln_gap	-0.08	-0.58	ln_gap	-0.49	-0.59	ln_gap	-1.12	3.26	ln_gap	-1.34	1.87	ln_gap	-0.65	-0.29
	(1.19)	(0.89)		(0.91)	(1.08)		(2.22)	(2.01)		(1.67)	(1.58)		(1.48)	(1.45)
ln_vol_infl	0.04***	0.07***	ln_vol_gdp	-0.00	-0.02	ln_vol_cc	-0.00	-0.29	ln_vol_fdi	-0.35	-1.21	ln_vol_debt	0.15***	0.39***
	(0.02)	(0.01)		(0.01)	(0.01)		(1.14)	(0.96)		(0.41)	(0.74)		(0.05)	(0.09)
Adj. R²	0.42	0.15	Adj. R²	0.39	0.38	Adj. R²	0.19	0.12	Adj. R²	0.26	0.18	Adj. R²	0.32	0.21
F-Statistic	33.23		F-Statistic	30.57		F-Statistic	11.71		F-Statistic	17.09		F-Statistic	22.29	
Prob F-Statistic	0.00		Prob F-Statistic	0.00		Prob F-Statistic	0.00		Prob F-Statistic	0.00		Prob F-Statistic	0.00	
LM test	156.23		LM test	114.18		LM test	187.77		LM test	192.29		LM test	150.00	
Prob LM test	0.00		Prob LM test	0.00		Prob LM test	0.00		Prob LM test	0.00		Prob LM test	0.00	
Arch test	149.77		Arch test	50.99		Arch test	111.51		Arch test	109.71		Arch test	58.04	
Prob Arch test	0.00		Prob Arch test	0.00		Prob Arch test	0.00		Prob Arch test	0.00		Prob Arch test	0.00	
J-statistic		25.96	J-statistic		29.29	J-statistic		29.37	J-statistic		29.71	J-statistic		25.98
Prob J-statistic		0.72	Prob J-statistic		0.45	Prob J-statistic		0.17	Prob J-statistic		0.48	Prob J-statistic		0.30
DWH test		1.80	DWH test		0.71	DWH test		0.98	DWH test		0.48	DWH test		4.76
Prob DWH		0.88	Prob DWH		0.98	Prob DWH		0.96	Prob DWH		0.99	Prob DWH		0.45
Instruments		37	Instruments		35	Instruments		29	Instruments		36	Instruments		29
Obs.	228	213	Obs.	228	216	Obs.	228	222	Obs.	228	222	Obs.	228	222

Note: Marginal significance levels: *** Denotes p-value<0.01; ** Denotes p-value <0.05; * Denotes p-value <0.1. Robust (Newey-West) standard errors are in parentheses.

4 Analysis of asymmetric effects using quantile regression

In order to verify the existence of possible asymmetries in the relationships between news-based uncertainties and disagreements in expectations when disagreements are at different levels, we used the quantile regression method. We also verify the existence of

possible asymmetries regarding the effects of monetary policy credibility on the disagreements in expectations when they are at different levels.

4.1 Asymmetric analysis of the "instruments" group

Figure 2 presents the estimates for this group. In line with the results presented above, the EPU does not show significance in any quantile of the disagreement in interest rate expectations. However, regarding the disagreements in exchange rate and primary result expectations, the EPU has positive and significant coefficients in all quantiles. For both disagreements, the impacts of EPU are greater when disagreements are very low or very high (i.e., at quantiles 0.1 and 0.9). A 1% increase in EPU increases by 0.34% the disagreement in exchange rate expectations at both quantiles 0.1 and 0.9; and, a 1% increase in EPU increases the disagreement in primary result expectations by 0.53% and 0.60% at quantiles 0.1 and 0.9, respectively. The results for the disagreement in primary result expectations reveal that the effect of economic policy uncertainty is slightly greater when this disagreement is higher and, therefore, when uncertainty related to the primary surplus is also greater. The findings reinforce the results previously reported and indicate the disagreement in primary result expectations is the most affected by news-based economic policy uncertainty. The results suggest the inflation targeting regime framework is able to shield professional forecasters' expectations related to monetary policy from economic policy uncertainties. However, regarding expectations for the fiscal side, the findings suggest that professional forecasters do not have their expectations guided in relation to fiscal policy when news-based economic policy uncertainties arise, which may indicate a coordination failure between fiscal and monetary policies in the inflation targeting regime in Brazil.

In relation to the effects of economic uncertainty (UI), they occur in different ways. For the disagreement in exchange rate expectations, UI has positive and significant coefficients in all quantiles, and the largest coefficients are in the upper central quantiles. At the extremes, in turn, we observe that a 1% increase in UI raises the disagreement in exchange rate expectations by 1.27% at quantile 0.1, and by 1.44% at quantile 0.9. Thus, the results indicate that the effect of economic uncertainty on disagreement in exchange rate expectations is stronger when this disagreement is higher. Since Brazil adopts a floating exchange rate regime, then, when the disagreement in exchange rate expectations is high, economic uncertainty exerts an even stronger impact on this disagreement due to the absence of an anchor for the expectation formation process for the exchange rate.

In turn, in relation to the disagreement in interest rate expectations, UI has significant coefficients only when this disagreement is low (i.e., up to quantile 0.4). All coefficients are positive, however, there is a downward trend in the magnitude of the coefficients. For instance, a 1% increase in UI raises the disagreement in interest rate expectations by 0.61% at quantile 0.1, and by 0.38% at quantile 0.4. The findings reveal that the effect of economic uncertainty on disagreement in interest rate expectation is stronger when uncertainty related to interest rate is lower. Therefore, when economic uncertainty increases, professional forecasters do not form higher dispersed expectations for the interest rate, which suggests that they believe the central bank will act to mitigate uncertainties in the economy.

Analyzing the economic uncertainty (UI) coefficients for the disagreement in primary result expectations, we observe they are positive and significant in most quantiles. The coefficients show a downward trend up to quantile 0.4, where a 1% increase in UI raises the disagreement in primary result expectations by 1.55% at quantile 0.1, and by 1.17% at quantile 0.4. Nevertheless, at the highest levels of disagreement (quantiles 0.8 and 0.9), the effect of UI is stronger and increasing: a 1% increase in UI raises the disagreement in primary result expectations by 2.38% at quantile 0.8, and by 2.43% at quantile 0.9. Hence, the lack of credible

fiscal policy rules (Montes and Acar, 2020) causes economic uncertainty to further increase fiscal policy uncertainty when the disagreement in expectations for the primary surplus is already high. In the absence of clear and credible rules, agents don't know for sure how the government will conduct fiscal policy in times of economic uncertainty, which increases the dispersion in primary surplus expectations.

Monetary policy credibility has different relationships with disagreements in expectations. For the disagreement in exchange rate expectations, credibility does not present significant coefficients in any of the quantiles. This result corroborates the estimates above and the findings reported by Oliveira and Curi (2016). For the disagreement in interest rate expectations, the coefficients are negative and significant (except the coefficient at quantile 0.2, which is not significant). We observe that a 1% increase in credibility reduces the disagreement in interest rate expectations by 0.62% and 0.71%, at quantiles 0.1 and 0.9, respectively. In this sense, credibility is important, especially when the uncertainty in the expectations formation process for the interest rate (evidenced in its disagreement) is greater. In turn, regarding the disagreement in primary result expectations, monetary policy credibility has significant coefficients only at quantiles 0.3, 0.4, 0.5, 0.6 and 0.9. While from quantile 0.3 to 0.6 the impact is negative, ranging between -0.56% and -0.43% due to a 1% increase in credibility, at quantile 0.9 the coefficient becomes positive. Thus, with a low level of disagreement in expectations for the primary result, an increase in credibility has the capacity to reduce it, but, when this disagreement is very high, an increase in credibility increases it even more.

Figure 2 Quantile regressions for disagreements in exchange rate, interest rate and primary result expectations

ln_exch_12

	Quantile	Coefficient	Std. Error
ln_EPU	0.1	0.34***	0.10
	0.2	0.29***	0.09
	0.3	0.23***	0.07
	0.4	0.27***	0.07
	0.5	0.24***	0.06
	0.6	0.26***	0.05
	0.7	0.30***	0.05
	0.8	0.31***	0.04
	0.9	0.34***	0.04
ln_UI	0.1	1.27***	0.28
	0.2	1.70***	0.27
	0.3	1.59***	0.32
	0.4	1.80***	0.50
	0.5	1.73***	0.43
	0.6	1.91***	0.34
	0.7	1.95***	0.36
	0.8	1.80***	0.37
	0.9	1.44***	0.30
ln_credib	0.1	-0.21	0.21
	0.2	-0.12	0.17
	0.3	-0.07	0.17
	0.4	-0.15	0.17
	0.5	-0.05	0.15
	0.6	-0.10	0.12
	0.7	-0.06	0.11
	0.8	-0.01	0.10
	0.9	0.08	0.10

ln_ir_12

	Quantile	Coefficient	Std. Error
ln_EPU	0.1	-0.06	0.07
	0.2	-0.05	0.06
	0.3	-0.04	0.05
	0.4	-0.03	0.05
	0.5	-0.03	0.04
	0.6	-0.02	0.04
	0.7	-0.02	0.04
	0.8	-0.06	0.05
	0.9	-0.07	0.06
ln_UI	0.1	0.61*	0.35
	0.2	0.49*	0.26
	0.3	0.51**	0.22
	0.4	0.38**	0.21
	0.5	0.24	0.20
	0.6	0.14	0.20
	0.7	0.31	0.22
	0.8	0.16	0.21
	0.9	-0.03	0.36
ln_credib	0.1	-0.62***	0.23
	0.2	-0.30	0.20
	0.3	-0.32*	0.18
	0.4	-0.42***	0.16
	0.5	-0.50***	0.12
	0.6	-0.54***	0.11
	0.7	-0.55***	0.10
	0.8	-0.53***	0.11
	0.9	-0.71***	0.19

ln_disag_budget_12

	Quantile	Coefficient	Std. Error
ln_EPU	0.1	0.53***	0.18
	0.2	0.36***	0.12
	0.3	0.39***	0.11
	0.4	0.43***	0.10
	0.5	0.38***	0.09
	0.6	0.39***	0.10
	0.7	0.41***	0.10
	0.8	0.48***	0.11
	0.9	0.60***	0.10
ln_UI	0.1	1.55***	0.48
	0.2	1.29***	0.45
	0.3	1.17**	0.48
	0.4	1.00**	0.56
	0.5	0.90	0.64
	0.6	1.32	0.82
	0.7	1.37	0.91
	0.8	2.38*	1.28
	0.9	2.43***	0.55
ln_credib	0.1	-0.05	0.42
	0.2	-0.27	0.28
	0.3	-0.45*	0.24
	0.4	-0.56***	0.21
	0.5	-0.43*	0.23
	0.6	-0.54***	0.24
	0.7	-0.29	0.27
	0.8	-0.11	0.32
	0.9	0.40*	0.24

Note: Marginal significance levels: *** Denotes p-value<0.01; ** Denotes p-value <0.05; * Denotes p-value <0.1. The Blue line represents the estimated coefficients, and the red lines represent the 0.95 confidence interval.

4.2 Asymmetric analysis of the "outcomes" group

Figure 3A shows the results of the quantile regressions for disagreements in inflation and GDP growth expectations, while Figure 3B presents the results of the quantile regressions for disagreements in expectations for current account balance, foreign direct investment in the country and public debt.

Regarding the disagreement in inflation expectations, we observe that most coefficients for EPU and UI are not significant, suggesting the strength of the inflation targeting regime to anchor expectations and shield the inflation expectations formation process from existing uncertainties in the economy. In turn, the effects of monetary policy credibility on disagreement in inflation expectations are negative and significant in all quantiles. The estimates reveal that the greater the disagreement in inflation expectations, the greater the negative effect of credibility. While a 1% increase in monetary policy credibility reduces the disagreement in inflation expectations by -0.66% at quantile 0.1 (i.e., when the disagreement is low), a 1% increase in monetary policy credibility reduces this disagreement by -1.71% at quantile 0.9 (i.e., when the disagreement is high). The results corroborate the estimates above, reinforce the findings of Oliveira and Curi (2016), and strengthens the idea that monetary policy credibility is important to guide future expectations and reduce inflation uncertainty – as suggested by Montes and Bastos (2014).

The estimates for the disagreement in GDP growth expectations reveal that the coefficients of EPU, UI and monetary policy credibility have the expected signals and most present statistical significance. Increases in economic policy uncertainty and economic uncertainty increase the disagreement in GDP growth expectations. While the effect of EPU on the disagreement in GDP growth expectations is practically the same at the lowest and highest quantiles; the results for economic uncertainty (UI) reveal that the effect is increasing as the disagreement in GDP growth expectations increases. If, on the one hand, a 1% increase in UI raises the disagreement in GDP growth expectations by 0.88% at quantile 0.1 (i.e., when the disagreement is low), on the other hand, a 1% increase in UI raises the disagreement in GDP growth expectations by 1.64% at quantile 0.9 (i.e., when the disagreement is high). The findings reveal that economic uncertainty has a greater impact on the GDP growth expectations formation process than economic policy uncertainty. In this sense, professional forecasters, when forming expectations for economic growth, are more affected by uncertainties about the economic context than by uncertainties regarding economic policy actions. This result can also be interpreted as a consequence of the adoption of the inflation targeting regime, since the conduct of economic policies (especially monetary policy) becomes clearer under this regime. In turn, monetary policy credibility has negative and significant coefficients in practically all quantiles (except at quantile 0.5, in which the coefficient is not significant). Contrary to the result for the disagreement in inflation expectations, we verify that the greater the disagreement in GDP growth expectations, the lower the negative effect of monetary policy credibility. While a 1% increase in monetary policy credibility reduces the disagreement in inflation expectations by -0.60% at quantile 0.1, a 1% increase in monetary policy credibility reduces the disagreement in inflation expectations by -0.23% at quantile 0.9 (i.e., when the disagreement is high). This weakening of the monetary policy credibility effect on the disagreement in GDP growth expectations as disagreement increases does not invalidate the important role that credibility plays to the expectations formation process in relation to GDP growth and to reduce uncertainties regarding economic growth.

Estimates for the disagreement in public debt expectations indicate that both uncertainties (EPU and UI) affect this disagreement, causing it to increase when uncertainties increase. In addition, the estimates reveal that the effects of both uncertainties are stronger when the disagreement in public debt expectations is greater. A 1% increase in EPU raises the

disagreement in public debt expectations by 0.23% at quantile 0.2 (first significant quantile) and by 0.31% at quantile 0.9. In turn, a 1% increase in *UI* raises the disagreement in public debt expectations by 1.27% at quantile 0.1 and by 1.45% at quantile 0.9. Thus, public debt expectations are sensitive to uncertainties, especially when public debt uncertainties are already high. This difficulty in the expectations formation process for the public debt when uncertainties increase and disagreements are already high results from the history of mismanagement of the Brazilian public debt over decades, which is in line with arguments presented in Montes and Luna (2018) and Montes and Acar (2020). However, monetary policy credibility is practically unrelated to the disagreement in public debt expectations (8 of the 9 estimated coefficients are not significant; only at quantile 0.1 the result indicates a positive and significant effect).

Regarding external sector variables, i.e., the disagreements in foreign direct investment and current account balance expectations, we observe that economic policy uncertainty and economic uncertainty have positive and, in most cases, significant coefficients. However, the analysis of the quantiles deserves attention. If, on the one hand, the greater these disagreements, the weaker the EPU impact on them; on the other hand, the effect of UI is stronger as the disagreement in current account balance expectations increase, and the effect of UI is weaker as the disagreement in foreign direct investment expectations increase. In turn, the effect of monetary policy credibility on *disag_fdi_12* is positive and significant in most cases (except for quantiles 0.7 and 0.8, which are not significant), however, from quantile 0.2 onwards, there is a reduction in coefficients and, therefore, the effect reduces, showing that credibility has less of an impact on disagreement when it is already high. Finally, the disagreement in expectations for the current account balance is the only that shows a signal change in the significant coefficients. When this disagreement is low, the credibility impact is positive, but it shows a reduction up to the 0.3 quantile, from a 1.38% increase in the 0.1 quantile to a 0.74% increase in the 0.3 quantile, given a 1% increase in credibility. After that, the coefficients lose significance, which is only recovered in the 0.9 quantile, where a 1% increase in credibility reduces the disagreement by -0.50%.

Figure 3A Quantile regressions for disagreements in inflation and GDP growth expectations
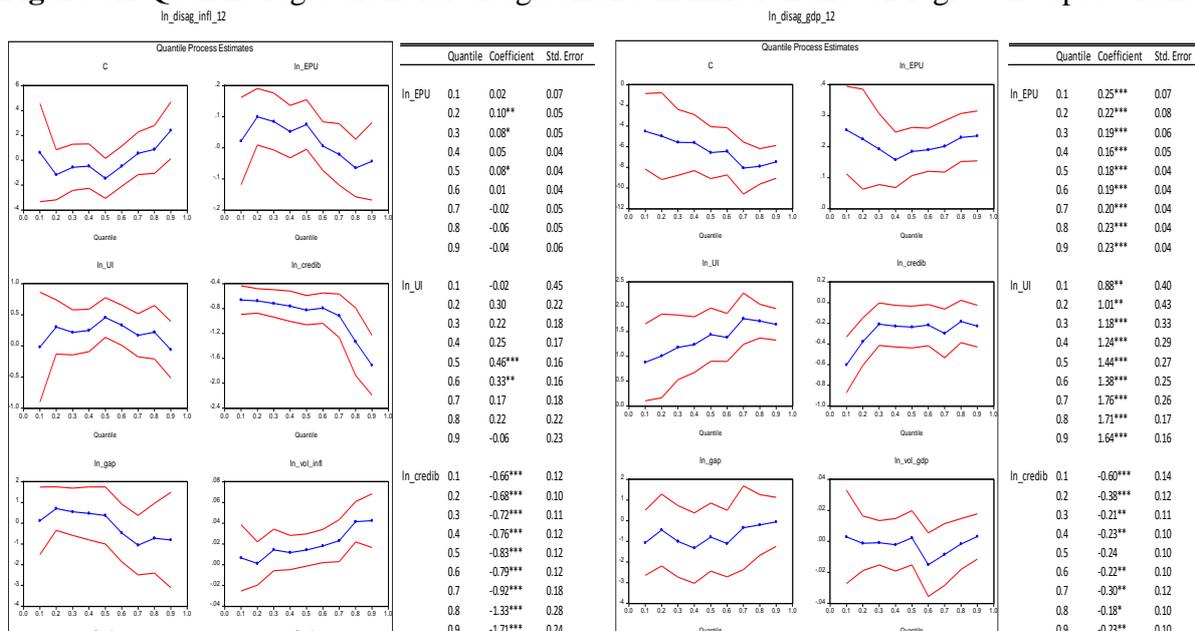
Note: Marginal significance levels: *** Denotes p-value<0.01; ** Denotes p-value <0.05; * Denotes p-value <0.1. The Blue line represents the estimated coefficients, and the red lines represent the 0.95 confidence interval.

Figure 3B Quantile regressions for disagreements in current account balance, foreign direct investment and public debt expectations

	Quantile	Coefficient	Std. Error
ln_EPU	0.1	0.59***	0.09
	0.2	0.57***	0.10
	0.3	0.56***	0.12
	0.4	0.54***	0.13
	0.5	0.35***	0.10
	0.6	0.31***	0.09
	0.7	0.29***	0.08
	0.8	0.21***	0.07
	0.9	0.27***	0.07
ln_UI	0.1	1.15***	0.34
	0.2	1.24***	0.35
	0.3	1.21***	0.42
	0.4	0.96**	0.46
	0.5	1.05***	0.36
	0.6	1.19***	0.34
	0.7	1.08***	0.31
	0.8	1.08***	0.30
	0.9	1.40***	0.33
ln_credib	0.1	1.38***	0.20
	0.2	1.19***	0.25
	0.3	0.74**	0.35
	0.4	0.19	0.32
	0.5	0.01	0.27
	0.6	-0.06	0.25
	0.7	-0.16	0.22
	0.8	-0.26	0.22
	0.9	-0.50**	0.24

	Quantile	Coefficient	Std. Error
ln_EPU	0.1	0.50*	0.29
	0.2	0.60***	0.09
	0.3	0.54***	0.09
	0.4	0.48***	0.10
	0.5	0.39***	0.12
	0.6	0.32***	0.11
	0.7	0.17**	0.07
	0.8	0.16***	0.06
	0.9	0.12**	0.05
ln_UI	0.1	1.16	1.00
	0.2	1.05**	0.45
	0.3	1.01***	0.34
	0.4	0.95***	0.36
	0.5	1.06***	0.35
	0.6	1.07***	0.36
	0.7	0.77**	0.34
	0.8	0.89***	0.32
	0.9	0.90***	0.27
ln_credib	0.1	0.55**	0.23
	0.2	0.74***	0.20
	0.3	0.67***	0.20
	0.4	0.61**	0.23
	0.5	0.64**	0.28
	0.6	0.45*	0.27
	0.7	0.37	0.26
	0.8	0.34	0.24
	0.9	0.38*	0.19

	Quantile	Coefficient	Std. Error
ln_EPU	0.1	0.14	0.08
	0.2	0.23**	0.11
	0.3	0.23***	0.10
	0.4	0.28***	0.08
	0.5	0.27***	0.07
	0.6	0.30***	0.06
	0.7	0.32***	0.06
	0.8	0.33***	0.07
	0.9	0.31***	0.10
ln_UI	0.1	1.27***	0.37
	0.2	1.02**	0.43
	0.3	1.16**	0.54
	0.4	1.30***	0.49
	0.5	1.08**	0.49
	0.6	1.35***	0.49
	0.7	1.70***	0.55
	0.8	2.13***	0.51
	0.9	1.45***	0.42
ln_credib	0.1	0.34*	0.19
	0.2	0.34	0.21
	0.3	0.20	0.21
	0.4	0.08	0.23
	0.5	0.00	0.24
	0.6	-0.26	0.25
	0.7	-0.31	0.24
	0.8	-0.27	0.22
	0.9	-0.22	0.20

Note: Marginal significance levels: *** Denotes p-value<0.01; ** Denotes p-value <0.05; * Denotes p-value <0.1. The Blue line represents the estimated coefficients, and the red lines represent the 0.95 confidence interval.

5. Concluding remarks and implications

Since uncertainties and expectations affect the decisions of households, firms and policymakers, this study sought to verify whether uncertainties related to the state of the economy and the conduct of economic policies affect the expectations formation process of professional forecasters. Using news-based indicators to capture economic policy uncertainty and economic uncertainty unrelated to economic policy, the study analyzed the effects of these uncertainties on the disagreements in expectations formed by professional forecasters in Brazil.

The professional forecasters expectations database provided by the Central Bank of Brazil allows the calculation of disagreements in expectations for different variables. In this sense, this study, among all existing studies, is the one that uses the largest set of disagreements in expectations for different economic variables. Thus, disagreements in expectations were separated into two groups of variables, "instruments" and "outcomes". In the "instruments" group, we analyzed the disagreements in expectations for economic policy instruments (exchange rate, interest rate and primary result), and in the "outcomes" group, we analyzed the disagreements in expectations for economic performance variables (inflation, GDP growth, public debt, current account balance and direct investment in the country). Since Brazil is an inflation targeting country, this separation of groups is particularly interesting and represents a contribution of the paper, as it allows analyzing the effects of uncertainties in different areas, for example: within the "instruments" group we compared the effects of uncertainties on both monetary and fiscal policies; and within the "outcomes" group, we were able to observe the effects of uncertainties on economic performance variables, and whether the inflation targeting

regime, in fact, is able to shield inflation expectations from uncertainties. We were also able to compare which groups are most affected by uncertainties, "instruments" or "outcomes".

Regarding uncertainties, we used the economic policy uncertainty indicator by Baker et al. (2016), and, as another contribution of the study, we built an indicator to represent economic uncertainty unrelated to economic policy.

The results for the "instruments" group suggest the inflation targeting regime is able to shield professional forecasters' expectations related to monetary policy from economic policy uncertainties. However, regarding expectations for the fiscal side, the findings indicate that professional forecasters do not have their expectations guided in relation to fiscal policy when economic policy uncertainties arise, which may indicate a coordination failure between fiscal and monetary policies in the inflation targeting regime in Brazil. In turn, economic uncertainty is able to affect disagreements in expectations for monetary and fiscal policies, however, this uncertainty has a stronger impact on fiscal policy uncertainty than on monetary policy uncertainty, suggesting the strength of the inflation targeting regime in shielding the monetary side.

Considering the "outcomes" group, the findings indicate that economic policy uncertainty and economic uncertainty unrelated to economic policy are positively related to most disagreements in expectations, except for the disagreement in inflation expectations. This result suggests the strength of the inflation targeting regime to guide expectations and shield the inflation expectations formation process from existing uncertainties in the economy. In turn, regarding disagreement in GDP growth expectations, the findings indicate that economic uncertainty has a greater impact on the GDP growth expectations formation process than economic policy uncertainty, suggesting that professional forecasters, when forming expectations for economic growth, are more affected by uncertainties related to the state of the economy than by economic policy uncertainties. This result can be a consequence of the inflation targeting regime, since the conduct of economic policies (especially monetary policy) becomes clearer under this regime.

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Appendix

Table A1 Descriptive statistics

	disag_exch_12	disag_debt_12	disag_infl_12	disag_gdp_12	disag_budget_12	disag_ir_12	disag_cc_12	disag_fdi_12	vol_ir	vol_budget
Mean	0.755	8.336	2.196	2.415	1.693	3.543	32.844	23.694	0.231	0.106
Median	0.637	7.134	1.816	2.200	1.223	3.256	33.275	25.972	0.048	0.012
Maximum	2.346	27.572	12.579	7.483	10.036	12.326	84.318	69.548	6.150	5.712
Minimum	0.279	2.910	1.022	1.169	0.351	1.821	5.852	7.093	0.000	0.000
Std. Dev.	0.409	4.222	1.553	0.910	1.684	1.434	16.519	11.199	0.664	0.463
Observations	228	228	228	228	218	228	228	228	228	218

	vol_cc	vol_fdi	EPU	credib	gap	UI	vol_exch	vol_debt	vol_infl	vol_gdp
Mean	0.027	0.036	163.536	0.547	0.022	-0.048	0.016	0.969	0.283	0.000
Median	0.008	0.012	139.087	0.586	0.025	-2.559	0.004	0.160	0.053	0.000
Maximum	0.348	0.608	676.955	0.987	0.113	77.441	0.295	41.603	8.762	0.011
Minimum	0.000	0.000	22.296	0.000	-0.124	-36.801	0.000	0.000	0.000	0.000
Std. Dev.	0.049	0.077	95.064	0.310	0.038	11.937	0.037	3.569	0.841	0.001
Observations	228	228	228	228	228	228	228	228	228	228

Table A2 Unit root tests

Series	ADF				PP				KPSS			
	Lag	I/T	Test	10%	Band	I/T	Test	10%	Band	I/T	Test	1%
disag_infl_12	6	I/T	-3.84941	-3.13866	3	I	-3.71493	-2.573502	10	I/T	0.175502	0.216
disag_ir_12	0	I/T	-4.3615	-3.13835	8	I/T	-4.41324	-3.138345	11	I/T	0.137698	0.216
disag_exch_12	1	I/T	-3.48634	-3.1384	7	I	-2.38575	-2.573502	11	I	0.707466	0.739
D(disag_exch_12)					14	N	-12.113	-1.615768				
disag_gdp_12	0	I/T	-4.52982	-3.13835	3	I/T	-4.79139	-3.138345	10	I/T	0.068095	0.216
disag_debt_12	0	I/T	-4.25742	-3.13835	0	I/T	-4.25742	-3.138345	11	I/T	0.230121	0.216
D(disag_debt_12)									6	I	0.13593	0.739
disag_budget_12	1	I	-3.7452	-2.57353	6	I	-3.19106	-2.573502	10	I/T	0.089751	0.216
disag_cc_12	0	I/T	-3.96149	-3.13835	3	I/T	-3.77422	-3.138345	11	I/T	0.259089	0.216
D(disag_cc_12)									8	I	0.036142	0.739
disag_fdi_12	0	I/T	-5.00229	-3.13835	6	I/T	-5.01638	-3.138345	10	I/T	0.141725	0.216
EPU	0	I/T	-7.66024	-3.13835	6	I/T	-7.87223	-3.13835	10	I/T	0.112042	0.216
UI	0	I/T	-6.13015	-3.13835	3	I/T	-6.05007	-3.13835	10	i/t	0.202949	0.216
Credib	2	I	-2.76816	-2.57356	4	I	-3.31943	-2.573502	11	I/T	0.174877	0.216
Gap	0	I/T	-5.65071	-3.13835	4	I/T	-5.60364	-3.138345	10	I/T	0.144992	0.216
vol_infl	12	N	-3.291	-1.61572	3	I/T	-9.53437	-3.138397	7	I/T	0.257376	0.216
D(vol_infl)									47	I	0.107861	0.347
vol_ir	7	I/T	-3.42633	-3.13877	7	I/T	-6.4563	-3.138397	7	I/T	0.179264	0.216
vol_exch	0	I	-9.29519	-2.57353	3	I	-9.35707	-2.573533	8	I	0.424723	0.739
vol_gdp	0	I	-12.6558	-2.57353	0	I	-12.6558	-2.573533	4	I	0.256965	0.739
vol_debt	1	I	-6.17897	-2.57356	0	I	-9.1138	-2.573533	6	I/T	0.204779	0.216
vol_budget	2	I	-7.07705	-2.57392	3	I	-7.77438	-2.57385	7	I	0.44362	0.739
vol_cc	3	I	-5.7358	-2.57363	5	I	-9.51463	-2.573533	9	I	0.157118	0.739
vol_fdi	0	I	-15.8493	-2.57353	2	I	-15.8691	-2.573533	3	I	0.130764	0.739

Note: ADF: the final choice of lag was made based on Schwarz information criterion. PP and KPSS: Band is the bandwidth truncation chosen for the Bartlett kernel. "I" denotes intercept, and "I/T" denotes intercept and trend.