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Measuring Türkiye's Fiscal Credibility and Transparency through Fiscal Balance and Debt Stock

İbrahim AL[1], Gizem AKBULUT YILDIZ[2], Barış YILDIZ[3]

1. Assoc. Prof. Dr., Karadeniz Technical University, ibrahimal@ktu.edu.tr, https://orcid.org/0000-0002-2653-4663

2. Assoc. Prof. Dr., Gümüşhane University, gizemakbulut@gumushane.edu.tr, https://orcid.org/0000-0001-7492-2428

3. Assoc. Prof. Dr., Gümüşhane University, barisyildiz61@hotmail.com, https://orcid.org/0000-0001-6186-4038

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Abstract

Fiscal credibility and fiscal transparency affect many basic macroeconomic variables, especially economic growth, inflation and interest rates through expectations. Therefore, increasing credibility and transparency increase the effectiveness of fiscal policy by enabling better management of expectations. The aim of this study is to determine Türkiye's fiscal credibility and transparency. For this purpose, Türkiye's fiscal credibility and transparency were measured for the 2010-2023 period with the help of various indices, based on the International Monetary Fund's fiscal balance and debt stock expectations. According to the findings, it is possible to say that fiscal credibility decreased in Türkiye, the absolute deviation between fiscal balance expectations and official targets increased, and fiscal transparency decreased, especially in the 2019-2022 period.

Keywords: Fiscal Credibility, Fiscal Transparency, Fiscal Opacity, Fiscal Balance, Debt Stock.

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1. INTRODUCTION

Future values of a macroeconomic variable are the result of the decisions made by economic agents in the current period. However, uncertainties regarding the future influence these decisions, making the concept of expectations one of the most important factors in the decision-making process. Therefore, to make accurate predictions about the future and to determine appropriate economic policies, it is essential to incorporate the concept of expectations into the theories and models used.

While various expectation hypotheses exist in macroeconomics, it can be said that the rational expectations hypothesis proposed by Muth (1961) holds a dominant position among contemporary macroeconomic theories. This hypothesis assumes that economic decision-makers will use all available information effectively when forecasting the future value of a variable, believing that the factors influencing that variable's value will impact it. As a result of using the same information set, it can be assumed that economic agents will have similar expectations. However, differences in expectations may exist and can change over time (Mankiw et al., 2003, p. 209). This indicates the presence of uncertainty in the economy. Theoretical literature highlights several key reasons for these differences: i) variations in the models used to understand and evaluate economic conditions, ii) differences in the information sets, iii) discrepancies in interpreting new information presented to the public, and iv) differing views on the nature of changes occurring within the economic system (Lahiri & Sheng, 2008; Patton & Timmerman, 2010; Wieland & Wolters, 2011; Andrade et al., 2016; Oliveira & Curi, 2016; Montes & Acar, 2020).

In this context, the effectiveness of implemented policies depends on the management of economic agents' expectations. In recent years, many countries have adopted inflation targeting strategies that rely on expectation management. In this strategy, a central bank aiming to combat inflation shares a numerical inflation target with the public in advance, attempting to align expectations with this goal. If economic agents believe in the central bank's monetary policy, they will set their inflation expectations in accordance with the target and make decisions accordingly, leading to inflation occurring at the desired rate. Theoretically, this strategy allows for reducing inflation without any loss in real output or employment.

The key components of expectation management are credibility, transparency, and communication. As former Fed Chairman J. Yellen once said "*In government institutions and in teaching, you need to inspire confidence. To achieve credibility, you have to very clearly explain what you are doing and why*". Communication and credibility go in tandem (End & Hong, 2022, p. 8). Thus, central banks and governments share not only numerical targets but also forecasts, changes in those forecasts due to developments, market expectations, risk scenarios, and more through various speeches, press releases, and reports. This is a necessary aspect of the communication and transparency strategy.

There is no universally agreed-upon definition of credibility. Cukierman and Meltzer (1986, p. 1108) define it as the absolute value of the difference between the government's plans and the public's belief in those plans, where a smaller difference indicates higher credibility. Significant changes in government plans can weaken this credibility. Conversely, if the public believes in the announced policy, it can be deemed credible (Blinder, 2000, p. 1422). Baxter (1985) and Hauner et al. (2007) relate credibility to the public's belief in how a policy's goals will be approached. Similarly, End (2023, p. 2) defines credibility as the anchoring of market expectations to official policy targets.

From the perspective of credibility, fiscal policy has certain disadvantages compared to monetary policy. For instance, the multiple objectives of fiscal policy and the potential for governments to shift priorities in the short term create significant time inconsistency problems, undermining the credibility of fiscal policies (End, 2023, p. 1). However, fiscal credibility plays a crucial role in stabilizing expectations, which can prevent increases in long-term interest rates and reduce default risk (de Mendonça & Machado, 2013, p. 10). While the importance of fiscal credibility may vary based on the and the nature of the problem, it should be built on a realistic, disciplined, prudent, and transparent fiscal policy to ensure long-term fiscal sustainability (Clark, 2011, pp. 103-104).

The literature includes studies that measure fiscal credibility through the general budget balance and the primary budget balance (Frankel & Schreger, 2013; de Mendonça & Tostes, 2015; Gaol et al., 2015; de Mendonça & da Silva, 2016; Kuncoro, 2017; End, 2020; Anzoátegui-Zapata & Galvis-Ciro, 2021; End & Hong, 2022). Additionally, there are studies directly relating fiscal credibility to expectations of public debt sustainability (de Mendonça & Machado, 2013; Montes & Acar, 2020). Empirical research indicates that fiscal credibility i) reduces the disparity in growth expectations among economic agents (Montes & Acar, 2020; Montes & Luna, 2022); ii) improves public financing conditions (End, 2023); iii) enhances the success of public debt management by preventing increases in long-term interest rates (de Mendonça & Machado, 2013); iv) contributes significantly to lowering inflation rates and inflation expectations (de Mendonça & da Silva, 2016); and v) serves as an effective tool in reducing the pass-through from exchange rates to inflation and inflation expectations (de Mendonça & Tostes, 2015).

Fiscal transparency improves financial indicators, increasing a country's credit rating and thereby reducing default risk (Arbatlı & Escolano, 2015). The absence of fiscal transparency, referred to as fiscal opacity means that economic agents are unable to accurately predict the consequences of budget deficits (Montes & Luna, 2022, p. 2361). Lack of fiscal transparency diminishes short-term growth expectations (de Mendonça & Calafate, 2021). Furthermore, discretionary fiscal policy increases the differences in economic growth forecasts among economic agents, thereby raising uncertainty (Montes & Luna, 2022).

Overall, fiscal credibility and transparency influence various macroeconomic variables, including inflation, growth, interest rates, and exchange rates, through expectations. Therefore, measuring and evaluating the credibility and transparency of fiscal policy is crucial for expectation management. This study assesses Türkiye's fiscal credibility and transparency from 2010 to 2023 using various approaches found in the literature. Bağdigen (2005); Atılgan-Yasa et al. (2020) and Pıçak (2022) calculate budget forecasting errors for Türkiye. However, these studies typically calculate forecasting errors based on the difference between the institution's budget targets and actual outcomes. In contrast, this study calculates expectation errors based on the difference between the forecasts of a different institution, such as the International Monetary Fund (IMF), and actual outcomes. It then transforms this into an index to measure fiscal credibility and transparency. Notably, no studies measuring fiscal credibility and transparency through an index were identified, suggesting that this research could contribute to the literature.

In this context, the study consists of five sections. The second section explains the methods for measuring fiscal credibility and transparency. The third section presents the relevant literature on fiscal credibility and opacity. The fourth section calculates Türkiye's fiscal credibility and transparency indices for the 2010-2023 period. The final section evaluates the obtained results.

2. MEASURING FISCAL CREDIBILITY AND TRANSPARENCY

2.1. Measuring Fiscal Credibility

In measuring fiscal credibility, an index with a value between 0 and 1 is generally created with the help of financial variables such as budget balance, primary budget balance and debt stock, and credibility degrees are determined according to the values of this index. In this direction, de Mendonça & Machado (2013) created a financial credibility index based on the public debt stock. This index is created with the help of Equation 1.

$$FCI_t = \begin{cases} 1, E_t(debt_{t+12}) \leq debt^{min} \\ 1 - \frac{[E_t(debt_{t+12}) - debt^{min}]}{debt^{max} - debt^{min}} \\ 0, E_t(debt_{t+12}) \geq debt^{max} \end{cases}, debt^{min} < E_t(debt_{t+12}) < debt^{max} \quad (1)$$

In Equation 1, $E_t(debt_{t+12})$ represents the expected public debt stock to Gross Domestic Product (GDP) ratio for the t+12 period created in period t. The values of $debt^{min}$ and $debt^{max}$ in this equation are set at 40% and 60%, respectively, based on IMF calculations and the Maastricht Criteria. However, later studies by de Mendonça & Tostes (2015), de Mendonça & Auel (2016), and Montes & Luna (2022) used the values of 30% and 70% for developing countries based on the literature. If the debt stock expectation for the t+12 period is below the lower limit, the index takes the value of 1, indicating full credibility. If the debt stock expectation exceeds the upper limit, the index takes the value of 0, indicating non-credibility. If the debt stock expectation falls between the lower and upper limits, the index takes a value between 0 and 1, indicating partial credibility.

Another fiscal credibility index was created by de Mendonça & da Silva (2016). The researchers derived a fiscal credibility index based on the primary budget balance variable. The calculation of the index is presented in Equation 2.

$$FCI = \begin{cases} 1, & FPS_{min}^{ideal} \leq E_t(FPS_{t+12}) \leq FPS_{max}^{ideal} \\ 1 - \frac{1}{FPS_{max}^{toler} - FPS_{max}^{ideal}}\left[E_t(FPS_{t+12}) - FPS_{max}^{ideal}\right], & FPS_{max}^{ideal} < E_t(FPS_{t+12}) \leq FPS_{max}^{toler} \\ 1 - \frac{1}{FPS_{min}^{toler} - FPS_{min}^{ideal}}\left[E_t(FPS_{t+12}) - FPS_{min}^{ideal}\right], & FPS_{min}^{ideal} > E_t(FPS_{t+12}) \leq FPS_{min}^{toler} \\ 0, & E_t(FPS_{t+12}) < FPS_{min}^{toler} \; ya\; da \; > E_t(FPS_{t+12}) > FPS_{max}^{toler} \end{cases} \quad (2)$$

In Equation 2, FPS represents the primary budget balance. It is a fact that expectations will deteriorate more rapidly if the primary surplus falls below the target. Thus, using different ranges creates an asymmetric framework that is useful for measuring credibility. In this context, FPS_{min}^{ideal} and FPS_{max}^{ideal} represent an ideal range corresponding to the government's strong performance in achieving the primary surplus. FPS_{min}^{toler} and FPS_{max}^{toler} indicate a tolerance range representing acceptable performance, determined using Equations 3 and 4.

$$\left[FPS_{min}^{ideal}, FPS_{max}^{ideal}\right] = [FPS^* - 0.05, FPS^* + 0.1] \quad (3)$$

$$\left[FPS_{min}^{toler}, FPS_{max}^{toler}\right] = [FPS^* - 0.15, FPS^* + 0.3] \quad (4)$$

If the expected primary surplus is within the ideal limits, the credibility index takes the value of 1, indicating full credibility. If it falls outside the tolerance range, the index takes the value of 0. In other scenarios, the credibility index falls between 0 and 1, indicating a move away from full credibility.

Another study calculating the fiscal credibility index was conducted by Montes and Acar (2018), who derived the index using the intertemporal budget constraint approach for fiscal sustainability, as presented in Equation 5.

$$FCI_t = \begin{cases} 1, E_t(ps_{t+12}) \geq ps^{ideal} \\ 1 - \left\{\frac{[E_t(ps_{t+12}) - ps^{ideal}]}{ps^{toler} - ps^{ideal}}\right\}, ps^{ideal} > E_t(ps_{t+12}) > ps^{toler} \\ 0, E_t(ps_{t+12}) \leq ps^{toler} \end{cases} \quad (5)$$

In Equation 5, $E_t(ps_{t+12})$ represents the expected primary surplus to GDP ratio for the t+12 period created in period t. The ideal and tolerance values for the primary surplus are obtained using Equations 6 and 7.

$$ps^{ideal} = (Debt_t - \%50) + Debt_t\left[\frac{[E_t(r_{t+12}) - E_t(g_{t+12})]}{1 + E_t(g_{t+12})}\right] \quad (6)$$

$$ps^{toler} = (Debt_t - \%70) + Debt_t\left[\frac{[E_t(r_{t+12}) - E_t(g_{t+12})]}{1 + E_t(g_{t+12})}\right] \quad (7)$$

In Equations 6 and 7, $Debt_t$ represents the ratio of gross debt stock to GDP in period t, $E_t(g_{t+12})$ denotes the expected growth rate for twelve months ahead, and $E_t(r_{t+12})$ indicates the expected real interest rate for the same period. Montes and Acar (2018) state that acceptable limits for

the gross public debt stock ratio to GDP for developing countries are 50% and 70%. In this context, ps^{ideal} represents the primary surplus needed to reach 50% of the gross public debt stock ratio to GDP in the next twelve months, while ps^{toler} represents the surplus required to reach 70%.

End (2020) considers the difference between government budget targets and market expectations as an indicator of fiscal credibility. This approach is based on the idea that credible governments can manage market expectations through official forecasts, leading expectations closer to targets. In this context, the deviation (bias) between official budget forecasts and market expectations is calculated as follows (End, 2020: p. 3):

$$Bias_t = E_t^o b_{t+1} - E_t^p b_{t+1} \quad (8)$$

In Equation 8, $E_t^o b_{t+1}$ represents the government's target for the general budget balance to GDP ratio for the t+1 period; $E_t^p b_{t+1}$ indicates the market experts' expectations for the same ratio. If the market's budget deficit expectation exceeds the official target, the bias will take positive values. However, this perceived measure of bias implies that a government predicting higher deficits may be seen as more credible than one predicting lower deficits. Due to the uncertainty regarding whether it is better for governments to be more or less optimistic than market experts, a symmetric indicator measuring market distrust in government targets is needed. End (2020) expressed this distrust through the absolute deviation between government and market forecasts, calculated using Equation 9.

$$Mist_t \equiv |Bias_t| = \left|E_t^o b_{t+1} - E_t^p b_{t+1}\right| \quad (9)$$

In other words, $Bias_t$ includes the signs of the deviation and represents the degree of optimism or pessimism of the private sector regarding official figures. In contrast, $Mist_t$ serves as a more direct measure of the perceived certainty of the official plans.

End and Hong (2022) further developed the approach initially used by End (2020) by adding an unanchoring measure, which reflects the distribution of market forecasts around official targets, in addition to the bias and distrust metrics. It is expected that managing expectations will reduce the distribution of credibility among private sector forecasts. Although the distribution of expectations among market participants is interpreted as internal expectation uncertainty, a lack of confidence in policy announcements is believed to increase this uncertainty. Thus, the more credible the government is perceived to be, the closer the expectations of market participants will converge. In this context, the measure of unanchoring is calculated using the following equation:

$$\delta_{t,f}^{(h)} \equiv E_t^f b_t^h - E_t^o b_t^h \quad (10)$$

$$Bias_t^{(h)} \equiv \left\langle \delta_{t,f}^{(h)} \right\rangle_{f \epsilon F} = E_t^p b_t^{(h)} - E_t^o b_t^h \quad (11)$$

$$Unanc_t^{(h)} \equiv \sqrt{\left\langle \left[\delta_{t,f}^{(h)} \right]^2 \right\rangle_{f \in F}} \quad (12)$$

In these equations, b represents the budget balance, h denotes the forecasting horizon, f indicates the expectations of market participants, p is the average expectation of market participants, and o represents the official forecast. As seen, fiscal credibility is measured either through an index derived from specific fiscal variables or by the difference between official targets and market expectations.

2.2. Measurement of Fiscal Transparency

Fiscal opacity, indicating a lack of fiscal transparency, is based on budget forecast errors and is measured by the difference between financial market experts' expectations of the budget deficit and the actual budget deficits. To develop an index measuring fiscal opacity, a four-step method is followed (de Mendonça & Calafate, 2021; Montes & Luna, 2022):

In the first step, a series of forecast errors (FE) is obtained by analyzing the difference between actual budget deficits and the expectations of economic actors regarding the budget deficit. The magnitude of this difference reflects the level of information deficiency among those making forecasts about the fiscal situation. It is believed that informative developments will reduce this difference and consequently decrease forecast errors. The forecast error series is obtained using Equation 13.

$$FE_t = B_{t-}B_t^e \quad (13)$$

In Equation 13, FE_t represents the forecast error for period t, B_t indicates the actual budget deficit for t period, and B_t^e reflects the budget deficit forecasts made by economic actors 12 months prior. The notation $B > 0$ represents a primary surplus, while $B < 0$ indicates a primary deficit. If $(B_t < B_t^e)$ the forecast error is negative, and if $(B_t > B_t^e)$ it results in positive values, which are interpreted as overestimation and underestimation of the budget deficit, respectively. However, fiscal opacity pertains not to the over- or underestimation of deficits but rather to the insufficiency of information or projections for accurately forecasting the budget deficit. Therefore, both positive and negative forecast errors signify opacity, making the mean square error (MSE) an appropriate measure for this context.

In the second step, the mean square error (MSE) is calculated using Equation 14. In this equation, N represents the number of observations made for period t.

$$MSE_t = \frac{1}{N}\sum_{n=1}^{N}(FE)^2 \quad (14)$$

In the third step, the signal-to-noise ratio (SNR) is calculated using Equation 15. To do this, the variance of the actual budget data series, represented as (σ_B^2), is first computed as a measure of

uncertainty. The SNR is then obtained by dividing the mean square error (MSE) by this calculated variance:

$$SNR = \frac{MSE_t}{\sigma_t^2} \tag{15}$$

When $SNR \geq 1, (MSE_t > \sigma_t^2)$, it indicates that forecasting economic actors have no information about the final value of the budget deficit. Conversely, when $SNR = 0, (MSE_t = 0)$, it means that forecasters possess sufficient information to accurately predict the budget deficit, indicating the absence of fiscal opacity. Therefore, a value approaching zero for SNR is desirable.

In the fourth step, a fiscal opacity (FO) index is created based on the SNR values. The SNR values are normalized using Equation 16, resulting in FO values that range between 0 and 1. This normalization allows for a standardized measure of fiscal opacity, where lower FO values indicate greater transparency and higher values suggest increased opacity.

$$FO_t = \begin{cases} 1, \ MSE_t \geq \sigma_t^2 \\ \frac{MSE_t}{\sigma_t^2}, 0 < MSE_t < \sigma_t^2 \\ 0, MSE_t = 0 \end{cases} \tag{16}$$

A fiscal opacity (FO) index value approaching 0 indicates that the government provides sufficient information about its primary budget surplus or deficit, suggesting government transparency. Conversely, an FO value nearing 1 signifies that the government is inadequate in providing enough information to mitigate the uncertainty in forecasts, resulting in greater informational deficiencies regarding future primary budget surpluses or deficits.

3. LITERATURE REVIEW

The density of studies focusing on the Brazilian economy is striking on the literature on fiscal credibility and transparency. This is largely due to the Brazilian Central Bank's monthly household and market surveys, which include questions about expectations regarding fiscal indicators. As a result, data can be obtained at a monthly frequency, allowing for the construction of credibility and transparency indices. Subsequently, the relationships between these indices and other variables are investigated in the literature. In this context, it is possible to list some studies in the literature as follows:

De Mendonça and Machado (2013) adopted the debt stock approach to measure the fiscal credibility of the Brazilian economy for the period 2002-2011. According to the index scores obtained, 2002 was the year with the lowest fiscal credibility. However, starting from 2003, there was a trend of increasing credibility, peaking in 2008. The period from 2008 to 2011 was identified as a time when fiscal credibility was fully established. Montes et al. (2019) measured Brazil's fiscal credibility during the period from December 2001 to February 2016 using a similar approach.

Montes and Acar (2020) analyzed the fiscal credibility of Brazil for the period 2003M1-2017M5. According to the findings, there is a period of credibility building, which occurs between early 2004 and goes until 2014, despite the drop in 2009 due to the Global Financial Crisis. Credibility-building phase starts a bit before 2004 and reaches its maximum value (equal to 1) at the end of 2008, and it stays practically unchanged until 2015. Also, Montes and Souza (2020), measured Brazil's fiscal credibility during the period from March 2004 to February 2016.

End (2023) measured the fiscal credibility of 27 European countries for the period 1995-2019 using the Mist approach. During this period, Spain was identified as the country with the highest average Mist values, while Austria had the lowest Mist values. This suggests that Austria can be considered the most successful country in establishing fiscal credibility. Anzoátegui-Zapata and Calvis-Ciro (2021) measured Colombia's fiscal credibility for the period 2004-2019 using the Mist approach. Findings shows that there was uncertainty about fiscal policy in the 2006-2008 period and fiscal credibility loss was high in that period. However, the loss of credibility was stable between 2012 and 2019. For the full period (2004-2019), the credibility loss was 0.9% on average.

De Mendonça and Baca (2022) investigated fiscal opacity for 13 OECD countries over the period 1980-2016. According to the findings, the opacity index trend suggests an increase in opacity during the 1980s with relative stability from the 1990s to the first decade of the 2000s. It is noticeable that there is a trend of fall at the end of the first decade of the 2000s. The findings refer that the measures to increase transparency adopted after the global financial crisis is effective. De Mendonça et al. (2024) investigated Brazil's fiscal opacity for the period from January 2010 to March 2023. According to their findings, fiscal opacity increased due to the inappropriate economic policies of 2013-2014 and the impact of the Covid-19 pandemic from 2020 to 2022.

Bağdigen (2005), analyzes the accuracy of budget forecasts in Türkiye for the 1981-2003 period. Data is based forecasted and materialized general budget revenues and outlays, the results show that there are statistically significant forecast errors and this significance, especially, indicates biases towards under-forecasting of outlays and over-forecasting of revenues. Atılgan-Yaşa et al. (2020) investigate the relationship between the deviations of budget forecasts and outlays and political instability in Türkiye for the period 1984-2018. They found that during periods of increased political instability, deviations in budget forecasts, particularly those related to budget expenditures, were more pronounced. Pıçak (2022) calculates annual forecasting errors for budget revenues and expenditures by using estimated and actual figures in Türkiye for the 1990-2020 period. This period is divided into two sub-periods: before and after 2006, when medium-term programs were first implemented. The impact of multi-year budgeting on forecasting errors is examined. According to the findings, forecasting errors for budget expenditures were statistically lower in the post-2006 period, whereas no such finding was observed for budget revenues.

4. MEASUREMENT OF TURKIYE'S FISCAL CREDIBILITY AND FISCAL TRANSPARENCY

4.1. Measurement of Fiscal Transparency

To measure Türkiye's fiscal credibility and fiscal transparency for the period 2010-2023, methods from de Mendonça and Machado (2013), Montes and Acar (2018), and End (2020) for fiscal credibility, as well as those from de Mendonça and Calafate (2021) and Montes and Luna (2022) for fiscal opacity, have been adopted. Explanations of all the variables used in the indices and information about the data sources are presented in Table 1.

Data regarding official targets is sourced from the Medium-Term Programs published by the Presidency of the Republic of Türkiye, Strategy and Budget Office. Meanwhile, expectations for the variables are compiled from the IMF's Fiscal Monitor and World Economic Outlook reports. In Türkiye, Medium-Term Programs are typically published in October, outlining both the realized forecasts for the current year and the program targets for the next three years. The IMF publishes the Fiscal Monitor and World Economic Outlook reports twice a year, in April and October, providing key fiscal and economic indicators for many countries. Since regular forecasts for Türkiye's fiscal indicators began with the April 2010 report, the study is set to start from the year 2010. In this context, Türkiye's budget targets for 2010 were included in the Medium-Term program published in October 2009, and the IMF's first expectation for 2010 was shared with the public through the April 2010 reports. Therefore, deviations between the official targets and IMF expectations are assessed by considering the expectations announced after the official targets were declared. The IMF's biannual reporting allows for the calculation of two index values for each year.

Table 1. Data Set

Variables	Symbol	Description	Data Source
General Budget Balance	b	General Government Balance, Budget Balance, Borrowing Need/ GDP, annual	The Presidency of the Republic of Türkiye, Strategy and Budget Office, Indicators and Statistics
Primary Surplus	FPS	General Government Balance, Primary Surplus, Borrowing Need Excluding Interest/ GDP, annual	The Presidency of the Republic of Türkiye, Strategy and Budget Office, Indicators and Statistics
Primary Surplus Target	FPS^*	General Government Balance, Primary Surplus/ GDP, annual	The Presidency of the Republic of Türkiye, Strategy and Budget Office, The Medium-Term Programs
Primary Surplus Expectation	$E(FPS)$	General Government Balance, Primary Surplus/ GDP, annual	IMF Fiscal Monitor
Debt Stock	$Debt$	EU Defined General Government Gross Debt Stock (% of GDP), annual	Republic of Türkiye Ministry of Treasury and Finance, Statistics
Debt Stock Expectation	$E(Debt)$	Gross Debt Stock Expectation (% of GDP)	IMF Fiscal Monitor
Nominal Interest Rate	r	Two-Year Bond Rate, April and October 1st, End of Day Rate, %, annual	investing.com
Real Interest Rate Expectation	$E(r)$	%, annual	$E(r)_t = \frac{1+i_t}{1+E(\pi)_t} - 1$
Inflation Expectation	$E(\pi)$	Consumer Prices, %, annual	IMF World Economic Outlook
Growth Expectation	$E(g)$	GDP, %, annual	IMF World Economic Outlook

In Montes and Acar (2018), the fiscal credibility index approach requires expectations of the real interest rate for the upcoming year to determine the ideal and tolerance limits for the primary surplus. However, while the Central Bank of the Republic of Türkiye (CBRT) publishes various maturities of inflation expectations in its monthly Market Participants Survey, data for the expectation of the one-week repo auction rate (the policy interest rate) is only available for 12 months ahead. Using the policy rate is not suitable, as it does not accurately reflect the government's borrowing costs.

Since the credibility index relates to fiscal sustainability and is based on the intertemporal budget constraint approach, an expectation for a relevant interest rate variable used in borrowing should be applied. Therefore, the study uses the two-year bond yield as a benchmark for Türkiye. However, there is no available data on the market's expectations for the two-year bond yield covering the study period. To address this, closing rates of the two-year bond yields on the first days of the IMF's report releases in April and October, along with the inflation expectations published in the same month, are utilized. The expectation for the real interest rate for the upcoming year is calculated using Equation 17.

$$E(r)_t = \frac{1+i_t}{1+E(\pi)_t} - 1 \qquad (17)$$

In Equation 17, $E(r)_t$ represents the expectation for the interest rate for the upcoming year in period t; i_t denotes the annual yield of the two-year bond rate in period t; and E(π)t indicates the inflation expectation for the upcoming year in period t. This equation helps to derive the real interest rate expectation based on the nominal yield and inflation expectations.

4.2. Findings

The fiscal credibility index was derived using the approaches of de Mendonça and Machado (2013) and Montes and Acar (2018). To ensure internal consistency in the study, boundary values for the gross debt stock were set at 30% and 70%, referencing works by de Mendonça and Tostes (2015), de Mendonça and Auel (2016), and Montes and Luna (2022), due to differences in the boundary values in the two studies. Additionally, the method used by End (2020) was applied to measure fiscal credibility. The findings for Türkiye from 2010 to 2023 obtained from these measurements are presented in Table 2.

The FCI1 fiscal credibility index was derived using the approached of de Mendonça and Machado (2013) and the FCI2 fiscal credibility index was derived using the approached of Montes and Acar (2018). To ensure internal consistency in the study, boundary values for the gross debt stock were set at 30% and 70%, referencing works by de Mendonça and Tostes (2015), de Mendonça and Auel (2016), and Montes and Luna (2022), due to differences in the boundary values in the two studies. Additionally, the method used by End (2020) was applied to measure the Mist fiscal credibility. The findings for Türkiye from 2010 to 2023 obtained from these measurements are presented in Table 2.

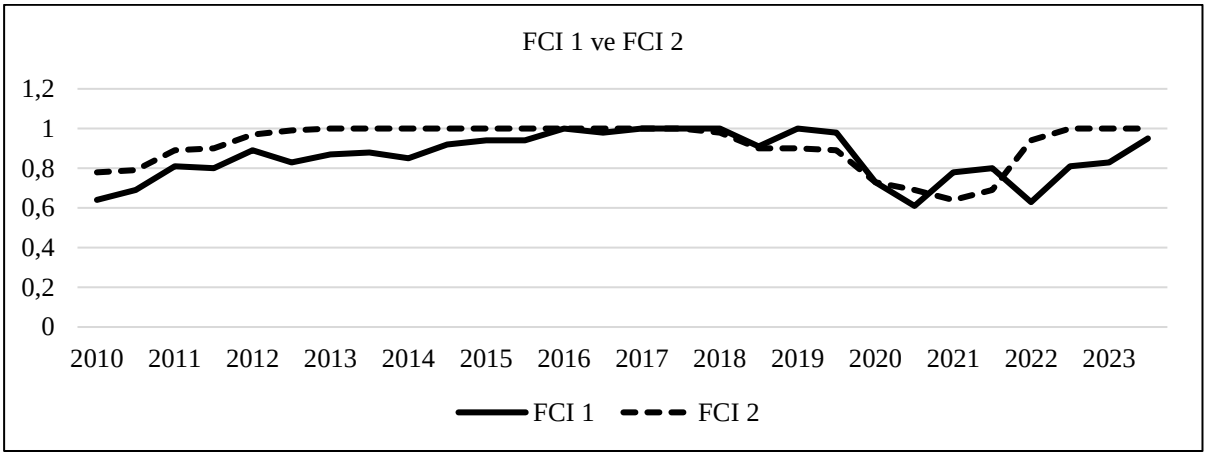
Table 2. Fiscal Credibility Index (2010-2023)

FCI1 (de Mendonça & Machado,				FCI2 (Montes & Acar, 2018)				Mist (End, 2020)			
Year	**Score**	**Year**	**Score**	**Year**	**Score**	**Year**	**Score**	**Year**	**Score**	**Year**	**Score**
2010	0.64	2017	1	2010	0.78	2017	1	2010	0.013	2017	0.013
	0.69		1		0.79		1		0.012		0.015
2011	0.81	2018	1	2011	0.89	2018	0.98	2011	0.004	2018	0.010
	0.80		0.91		0.90		0.90		0.012		0.021
2012	0.89	2019	1	2012	0.97	2019	0.90	2012	0.009	2019	0.016
	0.83		0.98		0.99		0.89		0.009		0.030
2013	0.87	2020	0.73	2013	1	2020	0.73	2013	0.007	2020	0.046
	0.88		0.61		1		0.69		0.008		0.050
2014	0.85	2021	0.78	2014	1	2021	0.64	2014	0.013	2021	0.012
	0.92		0.80		1		0.69		0.009		0.004
2015	0.94	2022	0.63	2015	1	2022	0.94	2015	0.009	2022	0.034
	0.94		0.81		1		1		0.003		0.007
2016	1	2023	0.83	2016	1	2023	1	2016	0.012	2023	0.030
	0.98		0.95		1		1		0.012		0.019

The Fiscal Credibility Index 1 (FCI 1) obtained using the method of de Mendonça and Machado (2013) showed values of 1 or very close to 1, particularly during the period of 2016-2018. Therefore, it can be stated that fiscal credibility was complete or nearly complete during this sub-period. According to this index, the lowest level of fiscal credibility occurred in October 2020, with an index value of 0.61. On the other hand, the Fiscal Credibility Index 2 (FCI 2) derived from the method of Montes and Acar (2018) maintained a value of 1 during the periods of 2013-2017 and after October 2022, indicating complete fiscal credibility. The lowest value for FCI 2 occurred in April 2021, at 0.64. According to the method of End (2020), which expresses the absolute deviation of budget balance forecasts from official targets through the Mist values, the highest absolute deviation was recorded in 2020, while the lowest was in 2015.

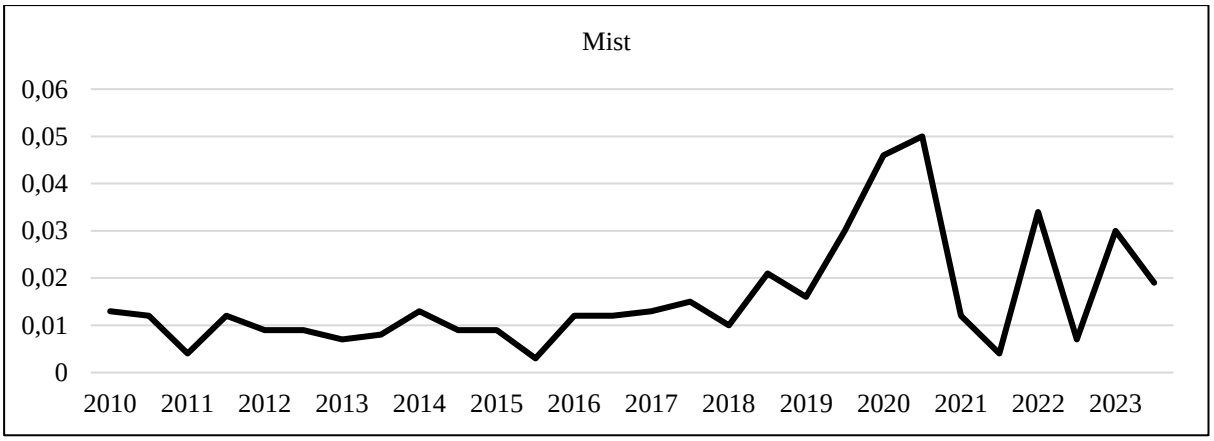
The changes in the credibility indices FCI 1 and FCI 2 from 2010 to 2023 are illustrated in Figure 1, while the changes in the Mist values are presented in Figure 2. Figure 1 shows that fiscal credibility has increased since 2010 and remained high until 2019. However, a notable decline in fiscal credibility occurred during the period from 2019 to 2022. Since 2022, fiscal credibility has begun to rise again.

Figure 1. Fiscal Credibility of Türkiye (2010-2023)



In Figure 2, it is observed that the absolute deviations between budget balance expectations and targets were relatively low during the period from 2010 to 2018. However, in the post-2019 period, these absolute deviations increased significantly, with considerable differences noted between the two forecasts made within the same year. These results suggest that fiscal credibility declined after 2019, leading to expectations moving further away from the targets.

Figure 2. Absolute Deviations Related to Türkiye's Fiscal Balance (2010-2023)



The Fiscal Opacity Index (FO) is derived using the actual values of the general government overall balance and the primary balance. Both current year and next year forecasts provided by the IMF for these variables, along with their actual values for the relevant year, were utilized to calculate the index. The use of two different variables related to the budget aims to test the consistency of the results. The obtained index values are presented in Table 3.

Table 3. Türkiye's Fiscal Opacity Index (2010-2023)

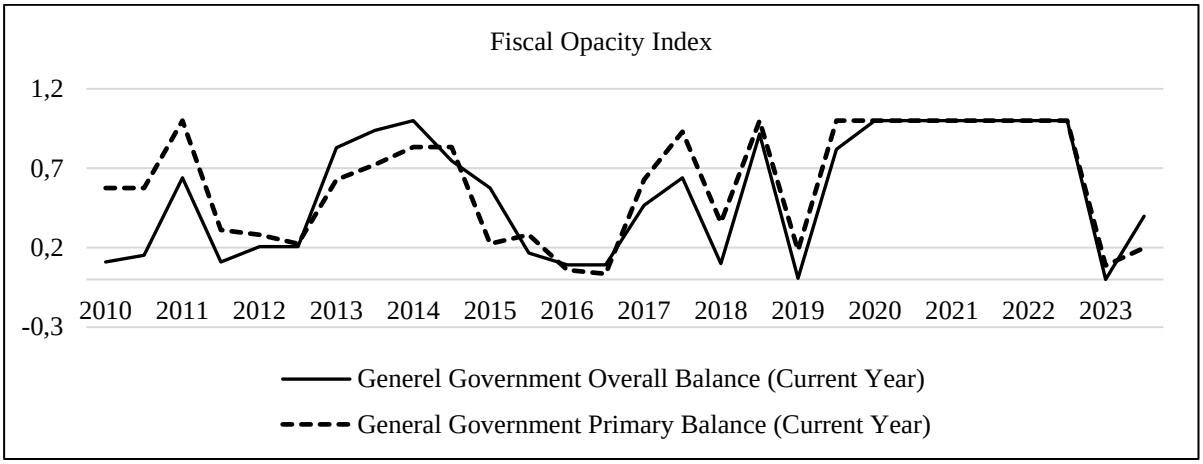
Year	General Government Overall Balance				General Government Primary Balance			
	Current Year		Next Year		Current Year		Next Year	
	B-BE	FO	B-BE	FO	B-BE	FO	B-BE	FO
2010	0.0057	0.11	0.0267	1	0.0133	0.58	0.0218	1
	0.0067	0.15	0.0227	1	0.0133	0.58	0.0208	1
2011	0.0137	0.64	0.0058	0.24	0.0208	1	0.0113	0.22
	0.0057	0.11	0.0008	0.00	0.0098	0.31	0.0043	0.00
2012	0.0078	0.21	0.0136	1	0.0093	0.28	0.0139	1
	0.0078	0.21	0.0126	1	0.0083	0.22	0.0109	1
2013	0.0156	0.83	0.0178	1	0.0139	0.63	0.0150	1
	0.0166	0.94	0.0178	1	0.0149	0.72	0.0160	1
2014	0.0188	1	0.0220	1	0.0160	0.83	0.0183	1
	0.0148	0.75	0.0180	1	0.0160	0.83	0.0183	1
2015	0.0130	0.58	-0.0048	0.16	0.0083	0.22	-0.0087	0.15
	0.0070	0.17	-0.0058	0.24	0.0093	0.28	-0.0077	0.22
2016	0.0052	0.09	-0.0053	0.20	0.0043	0.06	-0.0071	0.18
	0.0052	0.09	-0.0023	0.04	0.0033	0.04	-0.0061	0.03
2017	0.0117	0.47	-0.0036	0.09	0.0139	0.63	-0.0015	0.08
	0.0137	0.64	0.0004	0.01	0.0169	0.93	0.0035	0.01
2018	0.0054	0.10	0.0015	0.02	0.0105	0.36	0.0075	0.01
	0.0164	0.92	0.0205	1	0.0185	1	0.0165	1
2019	0.0015	0.01	-0.0114	0.91	0.0075	0.18	-0.0042	0.84
	0.0155	0.82	0.0076	0.40	0.0225	1	0.0138	0.37
2020	0.0356	1	0.0406	1	0.0358	1	0.0329	1
	0.0396	1	0.0526	1	0.0398	1	0.0439	1
2021	0.0306	1	0.0530	1	0.0329	1	0.0456	1
	0.0226	1	0.0480	1	0.0239	1	0.0396	1
2022	0.0610	1	0.0102	0.73	0.0526	1	-0.0018	0.67
	0.0340	1	-0.0088	0.54	0.0386	1	-0.0108	0.50
2023	0.0002	0.01			0.0052	0.09		
	-0.0108	0.40			-0.0078	0.20		

Note: As budget realization data for 2024 is not yet available, the budget forecast realization for 2024, corresponding to 2023, could not be calculated.

According to the data in Table 3, the IMF's budget balance forecasts tend to be excessively high, as evidenced by 27 out of 28 forecasts overestimating the budget deficit. Türkiye's fiscal opacity reached a value of 1, particularly during the 2020-2022 period, indicating a lack of fiscal transparency and insufficient information being provided to economic agents. The negative impacts on budget revenues and expenditures during the Covid-19 pandemic contributed to these forecasting errors, leading to an inability to accurately predict budget outcomes.

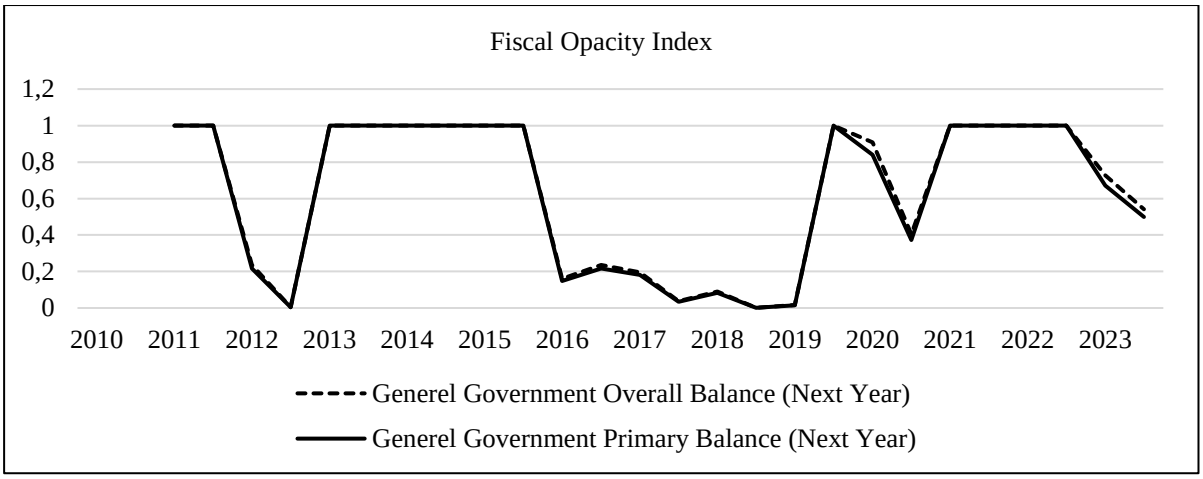
The results from both variables show similarities, supporting the consistency of the obtained data. Figure 3 visually presents these changes.

Figure 3. Türkiye's Fiscal Opacity Index (Budget Forecasts for the Current Year)



The changes in the opacity index derived from Türkiye's forecasts for the general government overall balance and the primary balance for the upcoming year are presented in Figure 4. As shown in Figure 4, uncertainty increases with longer time horizons, making it challenging for economic agents to form realistic expectations. Indeed, except for the years 2012 and the period from 2016 to 2019, the opacity index has mostly registered values close to 1, indicating a lack of fiscal transparency or very low levels of it.

Figure 4. Türkiye's Fiscal Opacity Index (Budget Forecasts for the End of Next Year)



5. CONCLUSION

Fiscal credibility and transparency enhance the effectiveness of fiscal policy by managing expectations. Therefore, measuring a country's fiscal credibility and transparency is crucial for formulating strategies that facilitate the acceptance of policies by economic agents and their incorporation into decision-making processes. This study evaluates Türkiye's fiscal credibility and transparency using the IMF's forecasts for various fiscal and economic variables alongside the government's budget and debt targets outlined in Medium-Term Programs.

Fiscal policies adopted in the 2000s has created different results in Türkiye subsequently yielded huge reductions in budget deficits, public debt ratios and interest payments, which have enabled Türkiye to create the fiscal space needed (Kasal & Özpençe, 2020, p.33). During the period from 2010 to 2018, Türkiye's gross debt-to-GDP ratio consistently declined, falling below the widely accepted threshold of 30% in the literature, which in turn led the IMF to lower its debt expectations for the following year. Consequently, fiscal credibility increased, achieving full credibility. A similar trend is observed in the index approach of Montes and Acar (2018), which measures fiscal sustainability based on intertemporal budget constraints. The decrease in the debt-to-GDP ratio alleviated concerns about fiscal sustainability during a period of relatively stable growth and real interest rate expectations, thereby enhancing fiscal credibility.

However, during the period from 2019 to 2021, there was a decline in fiscal credibility index values, indicating a weakening of Türkiye's fiscal credibility. One of the reasons for this development was the impact of the Covid-19 pandemic, which increased public spending and reduced budget revenues, thus harming fiscal balance. The rising budget deficits further increased the debt stock, pushing expectations for the debt stock beyond lower boundary values. Additionally, the partial lockdowns resulting from the pandemic negatively affected economic growth and growth expectations, leading to a significant decline in these expectations. This situation raised concerns about the sustainability of debt and weakened credibility. From 2022 onwards, index values began to rise again, indicating an increase in credibility. This improvement was due, on one hand, to a reduction in the debt-to-GDP ratio and, on the other hand, to a rapid increase in inflation expectations during this period, which significantly lowered real interest rate expectations, thereby alleviating concerns about fiscal sustainability.

The Mist values, derived from End (2020)’s approach and reflecting the absolute deviation between official budget targets and the IMF’s budget balance expectations, were relatively low and stable during the 2010-2018 period. This indicates that the IMF had expectations closely aligned with official targets, suggesting high fiscal credibility during this time. However, from 2019 onwards, Mist values increased, and their volatility rose. In other words, the IMF’s expectations diverged from the official targets, implying a lack of confidence in the government's budget goals and indicating low fiscal credibility.

Additionally, the need for the IMF to continuously update its expectations, resulting in significant differences between forecasts made within the same year, has contributed to this volatility. Factors contributing to this situation include the overly optimistic setting of budget targets, the inability to fully grasp the damages to fiscal balance caused by the pandemic during that period, leading to excessively cautious expectations from the IMF. Furthermore, the potential additional burden of monetary policy measures during this period and the financial impact of the February 2023 earthquake,

which was not fully understood, weakened the link between budget targets and budget balance expectations.

According to the fiscal opacity index, derived from the difference between the IMF's budget balance expectations and the actual budget balance, Türkiye's fiscal opacity was extremely high during the 2019-2022 period, indicating a lack of fiscal transparency. Furthermore, a comparison of budget expectations and actual budget values during this period reveals that the IMF tends to overestimate the budget deficit. This situation may stem from insufficient transparency regarding fiscal policy when forming expectations, a lack of information, overly cautious expectations from the IMF, and deviations from previous targets weakening confidence in official objectives.

In general, the higher a country's budget deficit and debt stock, and the more frequently and significantly it deviates from fiscal targets or changes those targets, the lower its fiscal credibility tends to be. In such cases, fiscal rules and bodies can help increase credibility. Policymakers can enhance fiscal credibility by establishing better institutions, providing consistent forecasts, and maintaining regular communication regarding achieving targets. Historical performance of fiscal variables is crucial for building confidence in fiscal targets, as systematic optimism regarding targets can undermine fiscal credibility. Therefore, targets should be set realistically.

Additionally, a strong communication strategy and a clear accountability framework for fiscal policy should be established. Institutions that regularly monitor market expectations, such as central banks, can incorporate expectations regarding fiscal targets into their surveys, allowing for closer tracking of changes in fiscal target expectations. This way, the government can respond more swiftly to changing circumstances and implement necessary measures. Given the positive impact of political stability and multi-year budget plans on budget forecasting errors in the literature, the continuation of political stability and the implementation of medium-term programs are crucial for fiscal credibility and transparency, alongside fiscal and economic discipline.

Ethics Committee approval was not required for this study.

The authors declare that the study was conducted in accordance with research and publication ethics.

The authors declare that Artificial Intelligence (AI) tools were used solely to enhance spelling, grammar, and overall readability of the article.

The authors declare that there are no financial conflicts of interest involving any institution, organization, or individual associated with this article. Additionally, there are no conflicts of interest among the authors.

The authors affirm that they contributed equally to all aspects of the research.

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