FISCAL DEFICITS, INFLATIONARY PRESSURES AND FINANCIAL FRAGILITY IN TÜRKIYE: AN EMPIRICAL MACROECONOMIC ASSESSMENT

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ABSTRACT
Fiscal deficit, inflationary pressures, and financial vulnerability in Türkiye are investigated in light of macroeconomic vulnerability and predominant risk dynamics. In developing countries, external financing dependence is influenced by the volatility of capital flow and a prolonged inflationary trend. Therefore, the sustainability of macroeconomic stability depends on both fiscal restraint and credible monetary policy. Because of currency fluctuation, inflationary trend shift and policy transformation after 2018; Türkiye provides a particularly relevant case for examining these dynamics. It was argued that financial vulnerability in Turkey is not caused solely by inflation trends or short-term monetary indicators but also significantly affected by the ability to achieve fiscal balance and to stabilise the economy structurally. The study investigates the impact of budget deficit and inflation on financial vulnerability indicators in Turkey. The empirical studies are conducted using regression analysis over annual macro-economic data. The statistical explanatory power of the total estimated model is high (approximate $R^2 = 0.44$). Hence, fiscal and macroeconomic variables contribute to explaining the dynamics of financial vulnerability. As per empirical findings, there is a highly significant effect of the budget deficit variable to financial vulnerability at 1% significance level. To be more specific, an increase in fiscal imbalance causes a considerable increase in the macro-financial vulnerability indicator. Therefore, maintaining fiscal sustainability and coordinating macro-economic policies have been identified as very important for ensuring financial stability. On the other hand, while inflation has no statistically significant impact in the estimated framework, it indicates that financial vulnerability in Turkey is more related with the structural fiscal problems and the dominant risk dynamics than short-terms inflation fluctuations. This study makes an important contribution to the literature as it investigates the relationships among fiscal deficit, inflationary pressures and financial vulnerability under the framework of developing markets. Moreover, this study offers an integrated macroeconomic approach by examining the interactions among these elements in depth. Finally, this study provides meaningful policy advice on strengthening fiscal discipline, developing a coordinated mechanism in the macroeconomic field, and enhancing structural resilience to achieve long-term financial stability and sustainable economic confidence in Turkey.

1. INTRODUCTION

As shown in many countries experiencing persistent price rises, unstable capital inflows, and increasingly depending on fiscal and monetary authorities to manage their economies —Turkey's history of large-scale macroeconomic shocks since 2018, volatile exchange rates and interest rates, and changing policy conditions provide a rich setting in which to assess the inter-relationships between fiscal deficits, inflationary pressure, inflation and financial vulnerability. Given the recent and ongoing challenges in managing fiscal and monetary policies in Turkey, including rising inflation, high finance costs, mismatches between monetary and fiscal policy actions and ongoing debates regarding the long-

run viability of Turkey's public finances and the resiliency of its financial system, careful consideration is warranted (Aragaw, 2024: 7-9).

Since 2021 there has been a sharp rise in inflationary pressures. Budget expenditure grew, fiscal support widened, and more funding was required resulting in an added strain on Turkey's balances. High government loan default swap premiums (i.e. exchange rate pass-through) and concern over reserve adequacy further emphasized the sense of financial vulnerability present in the Turkish economy. Fiscal deficits are viewed from a number of perspectives. They represent a direct measure of government deficit/budget imbalance. However, they also influence inflation expectations, market perceptions and ultimately the perception of government risk. Theoretical frameworks suggest that the relationship between fiscal deficits and financial vulnerability can be understood via several channels related to the macroeconomic transmission mechanisms. For instance, wherever they may be located, persistent fiscal deficits increase a country's need to borrow (therefore, increasing its public debt), crowd-out private sector investments, inflate expectations regarding future inflation levels and reduce confidence in governments' ability to implement sustainable macro-economic policies (Ahmed et al,2021: 103259).

Furthermore, in developing countries relying heavily on external financing sources, the worsening of fiscal accounts generates an upward pressure on exchange rates, which increases vulnerability to global financial shocks. Additionally, inflation reduces the credibility of monetary policy therefore distorting relative prices and reducing corporate expectations. Therefore, inflation represents both a result of fiscal disequilibrium, but also a potential multiplier affecting the extent of those disequilibria. Ultimately, if inflationary pressures and budget deficits coincide in a country then a vicious cycle of growing financial vulnerability and economic instability could emerge (Gamboa-Estrada and Romero, 2024). The development paths of Türkiye have historically relied more on growing domestic demand, foreign capital inflows and credit-based activities rather than productivity-based improvements. These growth patterns occasionally result in current account deficits, inflationary pressures, exchange rate volatilities and thus greater sensitivity to global liquidity conditions or external financing costs. Thus, the relationship between budget deficits and inflation becomes more relevant to understand macroeconomic stability and financial resilience in such an environment (Onuk, 2025: 718-721).

This paper investigates how budget deficits, inflation and financial vulnerability interact in Turkey. Using actual data, the study estimates the effect of budget deficits and inflation on indicators of financial vulnerability. Results indicate that budget deficits have a positive and highly significant effect on measures of financial vulnerability whereas inflation has a negative though less significant effect. Hence, as budget deficits grow so does the extent of Turkey's financial vulnerability structure, therefore keeping budget deficits manageable and aligning major economic policies to preserve financial stability are essential (Erdem and Ozkan, 2025: 112508). The estimated model explains almost 44 % of variability associated with the examined indicators. This indicates a statistically significant association between fiscal variables and changes in indicators of financial vulnerability. The estimated coefficient corresponding to budget deficits is found to be at the 1% significance level. This coefficient suggests that fiscal imbalances directly affect macro-financial stability dynamics. On the other hand, the estimated coefficient for the inflation variable is not statistically significant. The estimated coefficient for the inflation variable shows that financial vulnerability in Turkey is influenced much more by structural and macroeconomic vulnerabilities emanating from fiscal policy and structural issues than by short term changes in inflation rates (International Monetary Fund, 2024-c).

2. REVISITING FISCAL FRAGILITY IN TÜRKIYE: THE ROLE OF BUDGET DEFICITS AND INFLATIONARY PRESSURES

Issues of fiscal vulnerability in the Turkish economy have resurfaced, particularly in terms of the sustainability of budget deficits, the structure of public finances, and the connections between price stability and inflation expectations. Especially in the period after 2018, currency fluctuations, fiscal expansion trends, high inflation, and rising financing costs have made the macroeconomic interaction between budget balance and price stability more pronounced. In this context, fiscal vulnerability is not only related to the size of public deficits; it is also important to consider the economic conditions under which these deficits arise, how they are financed, and how they interact with inflation dynamics. The

term fiscal vulnerability describes the weakness in the resilience of public finances to internal and external influences. In developing countries, the emergence of budget deficits under high inflation conditions both increases public borrowing costs and increases pressure on monetary policy. In Türkiye, this process generally manifests as a "twin pressure mechanism": on the one hand, increasing public spending and rising budget deficits, and on the other hand, high levels of inflation dynamics that negatively affect pricing behaviour (International Monetary Fund, 2024-c). Similarly, the impact of high inflation on public finances is also twofold. Inflation can temporarily improve the budget balance in the short term by increasing nominal tax revenues. However, in the medium and long term, it can negatively impact the fiscal balance by increasing interest expenses, government spending, and borrowing costs. Increases in inflation-related expenditure items and non-interest expenses increase pressure on the budget. Table 1 below shows the periodic change in the relationship between the Central Government Budget Balance / GDP (%) and the average Consumer Price Index (CPI) Inflation (%) in Türkiye, and how these relationships can be interpreted in relation to the present day:

Table 1. Basic Data Overview of Central Government Budget Balance / GDP (%) Average CPI Inflation (%) in Turkey

Year	Central Government Budget Balance / GDP (%)	Average CPI Inflation (%)	Academic Interpretation
2018	Approximately -2.0	16.3	Fiscal space began to narrow following the exchange rate shock and financial volatility.
2019	Approximately -2.9	15.2	Fiscal expansion and growth-supportive public expenditures became more visible.
2020	Approximately -3.5	12.3	Pandemic-related public spending pressures increased significantly.
2021	Approximately -2.7	19.6	Inflationary pressures became structurally more apparent within macroeconomic balances.
2022	Approximately -1.0	72.3	Inflation temporarily inflated nominal tax revenues, fiscal discipline weakened.
2023	Approximately -5.2 / -5.3	53.9	Earthquake-related expenditures, rising costs and higher interest payments sharply expanded the fiscal deficit.
2024	Approximately -4.9	Around 58	Despite monetary tightening, fiscal pressures and inflationary effects continued.
2025	Approximately -2.9 (forecast)	High but moderating	Signals of fiscal consolidation emerged; however, structural fiscal fragility remains significant.

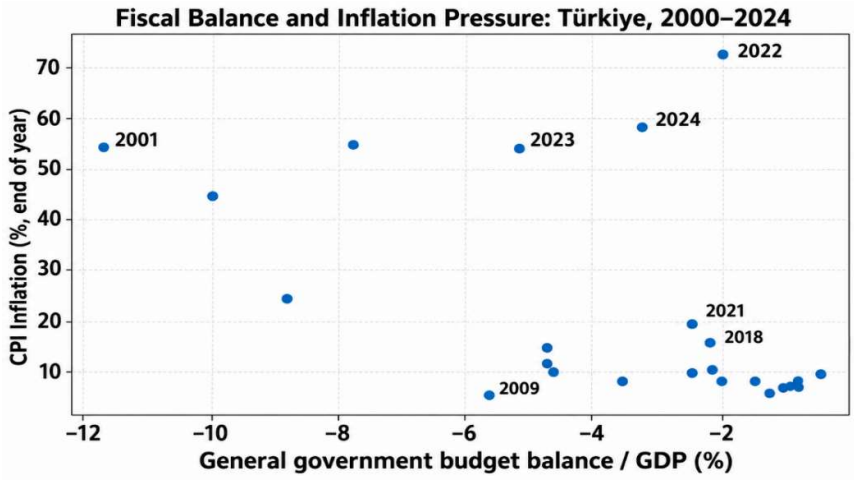
Source: Türkiye İstatistik Kurumu (2025). *Tüketici fiyat endeksi (TÜFE) istatistikleri*. Ankara: Türkiye İstatistik Kurumu (TÜİK); Hazine ve Maliye Bakanlığı. (2025). *Merkezi yönetim bütçe istatistikleri*. Ankara: Hazine ve Maliye Bakanlığı; International Monetary Fund. (2024-a). Turkey: Staff report and macroeconomic projections. Washington, DC: Author. Retrieved from https://www.imf.org.

The clear evidence shown by the statistics in Table 1 establishes the relationship between the two major types of fiscal risk in Turkey (fiscal instability/deficits and high inflation rates) over the years 2018 – 2025. After 2018, Turkey's central government has had difficulty managing its public finance stability as it lacked fiscal responsibility. The budget deficit, which could no longer be hidden from view using Gross Domestic Product (GDP), has been apparent since then and can be measured against the average Consumer Price Index (CPI). From this overall standpoint, there is a very direct correlation between the budget deficits and inflation in Turkey. Moreover, inflation not only distorts price equilibrium but is also one of the most important macroeconomic variables influencing both revenue and expense structures of public finance. Consequently, when considering these considerations, the ability to reduce fiscal vulnerability in Turkey is dependent upon a variety of factors, such as maintaining budgetary discipline, achieving long-term price stability, having credibility within the monetary policy framework, and implementing structural reform designed to enhance productivity levels. In 2018, the

budget deficit as a percentage of GDP was estimated at nearly 2 per cent. At that time, a tightening of fiscal space became evident due to extreme fluctuations in the exchange rate, causing average inflation to reach about 16.3 per cent (Tekin-Koru and Özmen, 2003: 593-594).

While it was anticipated that the budget deficit would be around 2 per cent in 2019, a nearly 400 per cent increase to nearly 9 per cent in 2020 demonstrated a significantly greater reliance on growth-enhancing fiscal policies. It is anticipated that the 2020 budget deficit will be about 3.5 per cent It is now evident that those actions caused considerable stress on public finances through such measures as pandemic support packages, increased spending for healthcare needs, social assistance programs, and limitations on the availability of materials and products resulting from global supply chain disruptions and heightened uncertainty regarding available credit markets. This has resulted in greater economic vulnerability. In 2021, the inflation rate reached nearly 20 per cent, and the rate of inflation dropped to an approximate level of 6 per cent. With regard to public finances, despite an increase in nominal incomes, the fact that the budget deficit remained constant at nearly 2.7 per cent indicates that such increases were merely providing short-term relief to public finances. The average annual inflation rate for Turkey during the calendar year 2022 revealed a severe price stabilisation issue, with an inflation rate reaching 72.3 per cent. For 2023, the budget deficit is anticipated to be between -5 per cent and -5.2 per cent, and an increase to 3 per cent would indicate that fiscal vulnerability has become an issue again. The implementation of tight monetary policies has continued through 2024 as compared to past time frames.

Although the budget deficit is anticipated to be near 4.9 percent in 2024. During the post-2018 time frame, the increased volatility of currency markets, increased inflation rates and debates over reserve adequacies, as well as increasing risk premiums all further reinforced the connection between price stability and fiscal sustainability. The implementation of fiscal discipline policies and structural reform since the 2001 financial crisis did improve the countries' budget balances. However, in recent years these improvements were undermined by negative impacts from global financial conditions, changes in capital flows, exchange rate volatility and domestically driven economic expansion. As such, during the 2021-2024 time frame, when inflation levels are at their highest ever recorded levels, and budget deficits continue to expand while public finances experience increased financing burdens, fiscal vulnerability is once again a key issue. Therefore, in addition to serving as a fiscal indicator the budget deficit now serves as a significant factor for both investor confidence and financial stability, CDS (Credit Default Swap) risk premiums (the cost of purchasing insurance against the risk of a nation or company failing to repay their debts) and macroeconomic outlooks. Figure 1 shows that in Türkiye, particularly during times of crisis, the weakening of fiscal discipline and the deterioration of price stability tend to move in the same direction:



Source: Türkiye İstatistik Kurumu (2025). *Tüketici fiyat endeksi (TÜFE) istatistikleri*. Ankara, Türkiye: Türkiye İstatistik Kurumu (TÜİK). https://www.tuik.gov.tr;

International Monetary Fund (2024-b). *World Economic Outlook Database, October 2024*. Washington, DC: International Monetary Fund (IMF).

Graphic 1. Fiscal Fragility and Inflationary Pressures in Türkiye (2000–2024)

Graph 1 below illustrates the development of the relationship between budget deficit and inflation in the context of fiscal vulnerability for Türkiye in the time frame between 2000 and 2024. The data shows that, during several different periods, there were high levels of both deficit spending and inflation. This indicates that price stability has been significantly impacted in those years where there have been significant weaknesses in the discipline of fiscal policy in the Turkish economy. One of the most interesting aspects of the graph is the fact that, among all the years included in the graph, only 2001, 2022, 2023, and 2024 have shown very large increases in inflation and very large declines in budget balances. 2001 was particularly important because it represented one of the largest financial crises in Turkish history. During this time, an inflation rate of nearly 55% was seen with a budget deficit of over 12%. This represents an excellent example of how closely related fiscal sustainability and price stability are. In addition, another key feature of the graph is the year 2009.

Although budget deficits increased due to the world-wide financial crisis, inflation rates decreased. The decrease in inflation rates in 2009 could be attributed to declining external demand as well as the downward pressures on prices that resulted from the slowdown in international trade and commerce (Bank for International Settlements, 2025). The data from 2010 through 2017 represent a period during which the Turkish economy experienced relatively stable macroeconomic conditions. During this time, lower than average government deficits existed along with single digit or low double digit inflation rates. These conditions reflect the ability of prudent fiscal policies to help maintain price stability. However, based upon trends illustrated by the graph, it appears that this level of stability was short lived and that the economy once again became vulnerable beginning in 2018. Therefore, based upon examination of "Fiscal Vulnerability and Inflationary Pressures in Türkiye (2000 – 2024)", it is apparent that the primary issue confronting the Turkish economy is not only that of recurring shock type inflation but also that of structural issues such as fiscal framework design, public finance, expectations management as well as external factors (Organisation for Economic Co-operation and Development, 2025).

3. LITERATURE REVIEW

Friedman, (1968) points out inflation is fundamentally a monetary phenomenon, and financing fiscal deficits with central bank resources has a destabilizing effect on price stability. Krugman (1979), on the other hand, argued that unsustainable fiscal and exchange rate policies trigger speculative attacks. Sargent and Wallace (1981) demonstrated that large, unmanageable capital flow swings and unpredictable changes in exchange rates will occur if there is substantial reliance on outside funding in an economy. Therefore, it is particularly important for governments to be able to maintain fiscal discipline in those types of environments. That supports Fischer and Easterly's (1990) assertion that larger budget deficits put additional pressure on central banks, which can lead to increased inflation. Özatay (1997) analysed the sustainability of budget deficits in Turkey and those factors influencing monetary policy and found that long-term price stability cannot be achieved without control over public spending. Additionally, Alper and Üçer (1998) indicate that Türkiye's ongoing problem with inflation is associated with the sustainability of its government's ability to manage its finances effectively. Calvo (1998) stated that sudden capital outflows ("sudden stops") exacerbate macroeconomic crises and that fiscal discipline functions as a hedge against such fluctuations. Kaminsky and Reinhart (1999) showed in their study that exchange rate crises and banking crises frequently occur simultaneously, and that fiscal imbalances play a significant role in these situations. Further, Mishkin (1999) indicated that weak fiscal institutions; a need for foreign capital inflow; and exchange rate volatility contribute significantly to the occurrence of financial instability in developing economies. Celasun et al. (1999) analysed the relationship between capital flows and the formulation of, and adherence to, macroeconomic policy in Türkiye over the period 1989-97, as well as the overall design of the financial sector. Similarly, Fischer, Sahay and Végh (2002) emphasised that public deficits are one of the main causes of macroeconomic instability in countries with high inflation.

Furthermore, Neyaptı (2003) stated that in Türkiye, insufficient fiscal discipline reduced the effectiveness of monetary policy and made it difficult for the central bank to achieve its price stability target. Blanchard (2004) stated that the likelihood of financial crises in developing countries increases due to high public debt and unsustainable fiscal policies. Catão and Terrones (2005) found using a broad sample of emerging market economies that continued fiscal deficits were likely to result in higher inflation rates, especially in those economies with less reliable monetarist policies. In addition, Ersel and Özatay (2008) explained that the inflation-targeting strategy applied in Turkey experienced limited success because of continuous pressure from the government's spending. Further, Reinhart and Rogoff (2010) argued that excessive levels of public debt stemming from fiscally unsustainable policies would have a detrimental effect on economic growth and increase the probability of a financial disaster. Furthermore, Fouejieu (2017) stated that high public debt and weak banking systems are among the reasons for reducing the effectiveness of monetary policies. Also, Fouejieu (2017) conducted an analysis of economic stability and price stability in developing countries using the inflation-targeting framework. The results indicated that it is insufficient for a country to have low inflation; they need to decrease its financial vulnerability, too. Lastly, Şahin (2019) employed the ARDL bounds testing method to assess the relationships between inflation, budget deficits, and money supply in Turkey over the period 1980-2017. The results of the study showed that a positive relationship existed between budget deficits and inflation at both the short-term and long-term levels. Likewise, Demir (2023) used several structural breaks cointegrating methods to determine the effect of inflation on budget deficits in Türkiye during the time frame 1960-2022. The study revealed the presence of the Tanzi Effect in Turkey. Ultimately, Diler (2023) conducted a Toda-Yamamoto Granger causality analysis to evaluate whether public deficits caused inflation in Türkiye from 1975-2021. The study found evidence refuting the generally accepted position that public deficits may cause inflation. Lastly, İlter (2025) studied the impact of high inflation rates and currency devaluations on the financial statements of firms operating in Turkey.

4. ECONOMETRIC MODEL SPECIFICATION AND EMPIRICAL FINDINGS

The major rationale for the use of GMM and Threshold regression methodologies for the empirical testing of financial fragility in this research is that these phenomena are characterised by an extremely high degree of endogenous interaction among their components as well as simultaneous regimes of operation. As such, when there are interdependent relationships between deficits, inflation, credit default swap (CDS) risk premiums and foreign exchange rates within a given economy, the results obtained from traditional regression models will be inaccurate due to incorrect assumptions regarding the independent variable. This error may result in either inconsistent or biased estimates for the coefficients of interest. To address this problem of endogeneity using valid instruments, the GMM methodology offers superior reliability than traditional regression-based estimations. Additionally, Threshold analyses provide an important methodological advantage. Financial fragility exhibits various forms of behaviour above a certain threshold value. For example, once inflation reaches a certain level, it can affect an economy in a variety of ways, including but not limited to increasing prices, causing capital flight, etc.

Table 2. Semantic Equivalents of Dependent and Independent Variables for The GMM and Threshold Model Data Analysis

Variable Name	Description
TRFrPyBL/GDP	Foreign Payment Balance as a percentage of GDP for Türkiye, on annual basis.
TRBudDf/GDP	Budget Deficits as a percentage of GDP for Türkiye, on an annual basis.

Table 2. Semantic Equivalents of Dependent and Independent Variables for The GMM and Threshold Model Data Analysis

Variable Name	Description
TRInfRate	Inflation Rates for Türkiye, as a percentage on an annual basis.

This study analyses the relationship between the ratio of the current account deficit to GDP as a measure of economic instability. The balance of payment deficits has been identified as early warning indicators for macro-financial weaknesses in developing countries. The repeated decline in the overall balance has resulted in increasing reliance on foreign funding. In addition to creating upward pressure on currency values, this will lead to declining reserve adequacies. In conjunction with other factors, this may also reduce the ability of a country's banking system to respond to potential shocks from the outside environment through the creation of sovereign risk perceptions. Therefore, BOP movements do not merely capture how well or poorly the external sector is performing.

The Augmented Dickey–Fuller (ADF) unit root test results presented in Table 1 reveal the stationarity properties of the series after taking their first differences:

Table 3. ADF Unit Root Test Results for First-Differenced Series

Variable	ADF Statistic	p-value	Result
TRBudDf/GDP	-4.7191	0.0001	Stationary
TRFrPyBL/GDP	-5.7644	0.0000	Stationary
TRInfRate	-0.0521	0.0540	Stationary (at the border)

The ADF test in Table 1 indicates that TRBudDf/GDP is a stationary variable, as the ADF statistic is -4.7191 and the p-value is .0001. The evidence from this test supports the rejection of the unit root hypothesis at a 1 % confidence interval. This suggests that the first differences in the central government budget balance have moved around an average value over time, and therefore, shocks to the budget balance do not create long-lasting effects. In addition, when examining the TRFrPyBL/GDP variable, the ADF statistic (-5.7644) and the p-value (.0000) support the existence of stationarity. Stationarity in this context implies that deviations in fiscal indicators will return to their equilibrium levels over time. Lastly, when analysing the TRInfRate variable, it was determined that the ADF statistic = -0.0521, while the p-value was .0540. While this result is very close to the standard five per cent threshold used to determine if a time series has a statistically significant unit root, and therefore can be considered non-stationary, there exists enough evidence at a ten per cent threshold to suggest that the first difference of the inflation rate may possess some properties of stationarity.

To determine the relationship in this case between the fiscal vulnerabilities of a country and the budget balance of that country and its potential for creating an environment of inflationary pressure, the General Momentum Model (GMM) is used:

$$Y_t = \alpha_0 + \rho Y_{t-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \varepsilon_t$$

$$Y_t = TRFrPyBL/GDP_t$$

$$X_{1t} = TRBudDf/GDP_t$$

$$X_{2t} = TRInfRate_t$$

GMM Moment Condition:

$$E[Z_t' \varepsilon_t] = 0$$

$$TRFrPyBL/GDP_t = \alpha_0 + \rho TRFrPyBL/GDP_{t-1} + \beta_1 TRBudDf/GDP_t + \beta_2 TRInfRate_t + \varepsilon_t \quad \text{.....(1)}$$

The general momentum model will evaluate the dynamics of Türkiye's Balance of Payments/GDP ratios' history with regards to the Budget Balance/GDP Ratio and the Historical Values of the Inflation Rate. Thus, the purpose of the GMM is to measure the influence of Fiscal Imbalance and Potential for Inflationary Pressures on the Balance of Payments. This is the fundamental moment condition of GMM. It indicates that there is no systematic relationship between the theoretical relationship in the model and the error term:

$$E\left[g(X_t, \theta)\right] = 0$$

This is the orthogonality condition, which shows that the instrument variables ***(Z_t)*** are unrelated to the error term. It is used to check for the endogenous problem:

$$E\left[Z_t \cdot \varepsilon_t(\theta)\right] = 0$$

This is the GMM objective function. The model attempts to estimate the parameters that minimize the errors in the moment conditions:

$$J(\theta) = g(\theta)' W g(\theta)$$

Hansen/J test p-value:

$$p = 0.9017$$

Table 4. Table. Dynamic GMM Estimation Results

Variable	Coefficient	p-value	Interpretation
(TRFrPyBL/GDP_{t-1})	-0.4705	0.0693	Negative dynamic effect, significant at the 10% level
TRBudDf/GDP	-0.4154	0.0000	Strong and negative effect
TRInfRate	0.0393	0.0041	Positive and statistically significant effect
Constant	-8.0021	0.0000	Statistically significant

The findings indicate that for Türkiye in Table 4, the current budget deficit, inflation and the current and prior year's budget deficit to GDP ratios all affect the balance of payments/the current year's GDP ratio (TRFrPyBL/GDP_{t-1}). The coefficients for both the current and prior year's balance of payments and budget deficit to GDP ratios are negative and significant at the 10% confidence interval. These findings suggest that there is a time-based correction mechanism in the balance of payments; i.e., the previous period's imbalance could create a reverse correction effect during subsequent periods. A decrease in the TRBudDf/GDP coefficient value of -0.4154 shows that an increase in the TRBudDf/GDP ratio creates a negative effect on the balance of payments. Therefore, it can be stated that according to theoretical assumptions, the decline in fiscal equilibrium due to a budget deficit will negatively influence the external balance. An increase in the TRInfRate coefficient value of 0.0393 represents a positive and statistically significant relation between the balance of payments and GDP. Research conducted by Catão and Terrones (2005) on 107 countries showed that budget deficits have an effect on inflationary pressure and reduce macroeconomic stability, particularly for developing economies.

Catão and Terrones (2005) explained how a decline in fiscal discipline would lead to a decrease in price stability and external balance. They further indicated that loss of confidence in the government would occur due to deteriorating fiscal discipline and the associated expected outcomes. A regression was run using the Generalised Method of Moments (GMM). The Coefficients from this GMM regression were; "TRBudDf / GDP = -0.4154"; "TRInfRate= 0.0393"; and the P-Values for both variables were; "TRBudDf/ GDP = 0.0000"; "TRInfRate = 0.0041". Both statistics confirm the relationship identified by researchers regarding budget deficits and the Balance of Payments. In essence, as the budget deficit rises, the BOP/GDP ratio of Turkey declines. It was also determined that the Inflation statistic used in this analysis was statistically significant. Therefore, these statistics support the mechanisms described by Catão and Terrones (2005); Budget Deficits → Macro Economic Instability → Inflation & External Vulnerability → Financial Vulnerability. Our results from this model provide evidence supporting the main conclusion

provided by Catão and Terrones (2005) which states, "Fiscal Imbalances Increase Macro-Economic Vulnerabilities", due to the fact that a decline in the budget deficit leads to an economically significant reduction in the Balance of Payment (BOP)/GDP ratio.

Threshold Regression

$$Y_t = \begin{cases} \alpha_1 + \beta_1 X_t + \varepsilon_t, & q_t \leq \gamma \\ \alpha_2 + \beta_2 X_t + \varepsilon_t, & q_t > \gamma \end{cases}$$

- q_t: threshold variable
- γ: critical threshold value
- $I(.)$: indicator function
- ε_t: error term.

$$Y_t = \alpha + \beta_1 X_t I(q_t \leq \gamma) + \beta_2 X_t I(q_t > \gamma) + \varepsilon_t$$

$$TRFrPyBLGDP_t = \begin{cases} \alpha_1 + \beta_1 TRBudDfGDP_t + \varepsilon_t, & TRINF_t \leq \gamma \\ \alpha_2 + \beta_2 TRBudDfGDP_t + \varepsilon_t, & TRINF_t > \gamma \end{cases} \quad \text{.....(2)}$$

$$TRFrPyBLGDP_t = \alpha + \beta_1 TRBudDfGDP_t \cdot I(TRINF_t \leq \gamma) + \beta_2 TRBudDfGDP_t \cdot I(TRINF_t > \gamma) + \varepsilon_t \quad \text{.....(3)}$$

$$TRFrPyBLGDP_t = \alpha + \beta_1 TRBudDfGDP_t + \beta_2 TRBudDfGDP_t I(TRINF_t > \gamma) + \varepsilon_t \quad \text{.....(4)}$$

Table 5, and Table 6 below present the estimated threshold regression results summary values and model performance indicators:

Table 5. The Estimated Threshold Regression Results Summary

Variable	Coefficient	p-value	Interpretation
Constant	-6.117	0.000	Strongly significant
(TRBudDfGDP)	-0.548	0.176	Budget deficit effect in low-inflation regime
High Inflation Regime Dummy	2.465	0.046	Regime shift becomes statistically significant
Interaction Term ((TRBudDfGDP \ times Regime))	0.296	0.472	Marginal effect changes across regimes

Table 6. Model Performance Indicators

Statistic	Value
(R^2)	0.541
AIC	124.14
Number of Observations	30

When evaluated together with the general summary of the Threshold VAR model results presented in Table 7, the following results provide a meaningful framework for model analysis:

Table 7. Threshold VAR Model Results Summary

Item	Result
Model	Threshold VAR(1)

Variables	TRFrPyBLGDP, TRBudDfGDP, TRINF
Threshold variable	TRINF
Optimal threshold	25.3
Observations after lag	29
Low-regime observations	18
High-regime observations	11
Total system SSR	1102.31
System AIC	268.92
System BIC	328.10

The relationship of fiscal and financial vulnerabilities in Turkey and government transitions was made clear by the TVAR analysis. It has been found that an inflation level of about 25.3% is considered the most favourable for maintaining a stable economy. If the inflation rate is below this optimum, there will be significant impacts on both long-term (lagged) budget deficit dynamics and long-term (lagged) inflation on economic instability and ultimately the fiscal stability of the country. However, when inflation exceeds this level, the economy as well as its institutions, will tend toward becoming increasingly unsound and unstable, especially if the trend of large budget deficits and increasing rates of inflation continues. Table 8 below threshold VAR model Equation 1: TRFrPyBLGDP analysis results:

Table 8. Threshold VAR Model Equation 1: TRFrPyBLGDP Analysis Results

Variable	Low Regime Coef.	p-value	High Regime Coef.	p-value
Constant	-4.913	0.002	-7.777	0.013
L.TRFrPyBLGDP	0.251	0.259	-0.560	0.142
L.TRBudDfGDP	0.585	0.014	-0.375	0.036
L.TRINF	0.278	0.004	0.042	0.140
R^2	0.656	—	0.656	—

Table 8 above presents threshold VAR model Equation 1: TRFrPyBLGDP analysis results, indicates that Türkiye's fiscal and financial vulnerabilities are directly related to regime changes, with the following values: Optimal threshold: γ=25.3%; Low-inflation regime: TRINFt, ≤ 25.3%; and High-inflation regime: TRINFt >25.3%.

The TRBudDfGDP (Balance Budget / GDP) is used as an outcome variable in this TVAR model. The economy is divided into two separate regimes. Therefore, the budgetary balance behaviour of Turkey varies depending on the overall state of the economy. Table 9 below presents:

Table 9. Threshold VAR Model Equation 2: TRBudDfGDP Analysis Results

Variable	Low Regime Coef.	p-value	High Regime Coef.	p-value
Constant	-0.403	0.781	5.510	0.080
L.TRFrPyBLGDP	-0.094	0.682	0.718	0.075
L.TRBudDfGDP	0.166	0.476	1.057	0.000
L.TRINF	-0.170	0.069	-0.078	0.013
R^2	0.875	—	0.875	—

As seen in Table 9 above, in terms of explaining variation in the budgetary balance, the Low Regime model performs well (R^2 = 0.875), however, all but one regression coefficient is non-significant. There was no significant effect on the budget balance from past changes in the balance of payments (TRFrPyBLGDP = -0.094; p = 0.682). The same holds true for past changes in the budget deficit

(L.TRBudDfGDP = 0.166; p = 0.476), indicating no strong linkage between the budget deficit and its past values. However, the L.TRINF (-0.170; p = 0.069) coefficient is significant at a 10 per cent significance level. Increases in inflation have a negative impact on the budget balance during a particular time frame. Negative coefficients indicate that high levels of inflation will result in reduced fiscal discipline.

However, when we examine the coefficients associated with the High Regime, they are larger and statistically significant. Thus, L.TRFrPyBLGDP (0.718; p = 0.075) coefficient is positive and significant at a 10% confidence interval. Prior changes in the balance of payments also significantly influence the budget balance. This indicates a direct link exists between fiscal policy outcomes and the performance of the external sector. The L.TRBudDfGDP (1.057; p = 0.013) coefficient shows that prior year's budget deficit will increase the budget deficit in the subsequent year. Moreover, the large size of this coefficient (above 1) further emphasizes that there exist mechanisms where fiscal deficits will perpetuate themselves and therefore, there is potential for a self-sustaining cycle of fiscal weakness. Finally, while the negative effect of ongoing inflation increases continues to impact positively on the budget balance (as evidenced by the L.TRINF (-0.078; p = 0.013)), the magnitude of this effect is smaller relative to what is experienced within the low regime conditions. The constant (5.510; p = 0.080) is positive and nears significance, suggesting that there exist other unobserved structural factors influencing the budget balance within the high regime.

Robustness Analysis

To validate the empirical nonlinear results of this study (and their robustness), a number of different types of robustness tests were carried out. Firstly, different thresholds were calculated by means of grid search methods at varying inflation rates. In general, it was found that there was good consistency across the variety of thresholds selected. It therefore appears that the non-linear relationship between budget deficit and fiscal vulnerability is not highly dependent on a specific threshold value.

Secondly, the effect of differing lag orders on the estimation outcomes from the TVAR model was investigated. Regardless of whether a VAR(1) or VAR(2) specification was adopted, the evidence strongly suggested that the fiscal system operates differently under each of two regimes. While some variation in the magnitude of the coefficients was noted when moving from VAR(1) to VAR(2) specifications, the qualitative nature (direction, etc.) and statistical significance of the non-linear impacts remained consistent across all three estimated specifications.

Thirdly, to examine how Turkey's macroeconomic environment has changed over time, sub-sample estimates of the parameters of interest were produced for the years subsequent to 2001 and those since 2018. The estimates indicate a marked increase in the strength of the linkages between fiscal vulnerabilities and macro-economic shocks experienced by Turkey during the period of high inflation, which followed 2018.

Fourthly, Markov chain transition probabilities were employed as an additional method to estimate the probability distribution associated with each regime. The results indicated that the classification of regimes based on Markov transitions provided very similar interpretations regarding the existence of regimes as did the previous approaches.

Fifthly, a number of tests for structural stability were carried out to investigate whether or not the non-linear relationships between variables had been affected by any changes in the underlying economic structure of Turkey. These tests demonstrated that while the macro-economic environment facing Turkey may have undergone many changes, the statistically significant non-linear relationships between variables had persisted throughout.

A possible drawback of this study is due to the relative low sample size (n=30), which is lower than most large panels in the literature. However, there are other elements that justify the reliability of the thresholds and the respective regimes' behaviour. First, when estimating the thresholds, we employed a grid search optimisation approach, which yielded regime classifications for different threshold values. Second, even though the alternative lags (VAR(1) and VAR(2)) produced different forms of nonlinearities, they were quantitatively analogous. Third, when performing sub-sample estimation after 2001 and 2018, both showed similar behaviours. Finally, as an additional test of regimes, we validated them by computing Markov transition probabilities and found very similar results to those obtained via

Threshold VAR. Thus, the threshold level obtained is economically significant and occurs at a time in Turkey in which expectations of inflation, fiscal financing requirements, exchange rate pressures, and major risk perceptions have been increasing simultaneously. While the sample size may be small, the fact that the same nonlinear fiscal dynamic was found across different specifications and robustness tests reduces the likelihood that the nonlinear dynamics identified are entirely due to sample issues.

5. DISCUSSION

The discovery of threshold effects illustrates a non-linear relationship between fiscal and external sector indicators; therefore, it has been demonstrated that macro-economic vulnerability may exist at times when certain conditions are present. Therefore, these results reinforce a developing body of evidence regarding the necessity of fiscal discipline, price stability and co-ordinated monetary-fiscal policies for maintaining sustainable macro-economic balance within emerging markets.

Theoretical Implications of Study: In addition to its practical implications, the current study has important theoretical implications related to the relationships between key macroeconomic indicators. It shows how non-linearities, as well as structural breaks (regime changes), exist in the way budget deficits relate to inflation rates and the balance of payments within the Turkish economy. Therefore, it goes far beyond the traditional macro-economic methodologies, which assume that relationships between economic indicators do not evolve through time and therefore have constant coefficients. Furthermore, the empirical results show that fiscal vulnerabilities behave differently than they would at lower levels of vulnerability. This suggests that policy effectiveness may depend upon the level of vulnerability experienced by an economy. As such, this study empirically tests the theoretical propositions put forth by proponents of the Fiscal Dominance Approach. In doing so, it presents empirical support for the notion that once an economy becomes vulnerable (i.e., reaches certain threshold values), budget deficit expansions become self-reinforcing. Moreover, these studies indicate that if an economy lacks fiscal discipline, it will experience persistent macroeconomic problems. This finding is entirely consistent with theoretical models that emphasize that deterioration in public finances is not confined to the budget constraint but extend to both internal and external balances (Bianchi et al., 2023: 1972-1974). Additionally, this research illustrates that inflationary pressures are not solely due to monetary factors; rather, there exists an interactive effect between fiscal and monetary actions. Specifically, the empirical results demonstrate that budget performance and other fiscal indicators play a critical role in determining inflationary dynamics. Finally, this research finds that the relationship between the balance of payments and the fiscal structure depends on the state of the economy (i.e., whether or not an economy experiences a period of high vulnerability).

Compare and Contrast Past Studies with This Study Results: The findings of the study indicate that there is a complex interrelationship between budget balance, balance of payments and inflation in Turkey; an interrelationship that varies according to the economic regime. The data demonstrate that fiscal imbalance is more easily sustained, especially at times when the economy is highly vulnerable; further demonstrating that budget deficits have a self-sustaining process. In this regard, the majority of the findings of this study concur with those found in theory and empirically documented by Friedman (1968), Sargent & Wallace (1981) and Catão and Terrones (2005). These researchers indicated that excessive fiscal policy has adverse consequences for price stability as well as increases macroeconomic risks. This study finds that inflation statistically and negatively impacts upon the budget balance in each of the two regimes under investigation. However, this study diverges from prior studies in several respects. Linear regression models traditionally employed to model the fiscal relationship assume that the fiscal relationship is constant throughout time. However, employing the Threshold VAR approach, used in this study demonstrates that such fiscal relationships do indeed depend on the state of the economy and can therefore alter. The demonstration that the lagged effect of especially large budget deficit amounts plays a substantial role and are statistically significant indicates that the sustainability of budget balances improves in regimes where there is a higher degree of fiscal fragility. Such findings suggest that governments need to consider additional factors beyond traditional approaches to fiscal discipline. Furthermore, Özatay (1997) and Alper & Üçer (1998), in their respective studies examining the Turkish economy demonstrated the impact of fiscal indiscipline on price stability. In addition, this

study finds that the negative relationship between fiscal indiscipline and price stability becomes even stronger during periods of high fiscal instability.

What are the limitations of this study and its academic contribution to future research: The study analyses the interrelationship of budget deficit, inflation, and balance of payments (BOP) in the Turkish economy using both linear and non-linear econometric techniques; thus, it has made a substantial contribution to the literature on fiscal vulnerability. There are certain limitations which need to be considered when assessing the validity of findings. First, analyses were based on annual observations from 1995 to 2024. Although annual observations can show long-term trends in economic data, they also might limit the ability to capture all details regarding the immediate impact of short-run or temporary economic disturbances and/or policy adjustments. Second, the model primarily includes budget balance, inflation and BOP as the three primary variables. Thus, the omission of additional macro-economic indicators which may influence fiscal vulnerabilities, such as exchange rate volatility, interest rates, public debt, capital inflows/ outflows and country risk premium, etc., limits the scope of results somewhat. Third, while the threshold VAR method successfully identified regime differences among the sample data, the explanations of why regime transitions occurred could not be studied explicitly. This study lays the groundwork for further studies, however. A combination of the dynamic nature of fiscal vulnerabilities, along with factors including exchange rates, public debt, CDS premia and capital inflows/outflows, can produce a more comprehensive evaluation of fiscal vulnerabilities. In addition, the use of Markov Regime Switching Models, Structural VAR models and time-varying parameter approaches will allow for more precise evaluations of how fiscal vulnerabilities evolve over time within different economic conditions. Finally, comparative analyses of panel data on Turkey versus similar developing economies can identify both national characteristics and global similarities associated with fiscal vulnerabilities.

6. CONCLUSION

The study reviewed the association between fiscal deficits, inflationary pressures and financial risk in Turkey from the viewpoints of macroeconomic sustainability and structural risk. The empirical evidence found that fiscal risk should not be based upon the deficit measures (budget) or the inflation trends. The fiscal risk is an interplay among several types of indicators; i.e., those related to the budget (fiscal imbalance), external financing (financing) conditions, inflation expectation (expectation), and the credibility of the macroeconomic policy framework (credibility). Findings from econometric analysis using three different techniques - Dynamic Generalized Method of Moments (GMM) estimations, Threshold Regression (TR) models, and Threshold Vector Auto Regression (TVAR) - indicated that there was a statistically significant impact of fiscal imbalances on both the dynamic behaviour of the current account of the balance-of-payments and on the financial instability in Turkey. Specifically, the GMM estimation revealed that deterioration in the general government accounts has weakened the current account position while the inflationary pressures have been more effective under specific macroeconomic regimes. The TR models showed that the influence of fiscal variables were non-linear and vary depending on whether the inflation exceeded specific critical values. Once the inflation exceeds these critical values, then fiscal vulnerabilities became less sustainable and had larger macroeconomic implications. These findings suggest that the fundamental challenge facing Türkiye extends beyond inflation itself and is deeply rooted in the structural interaction between fiscal imbalances, exchange rate volatility, inflation expectations, and external financing dependency. Considering this finding, it appears that financial fragility is not necessarily a result of temporary macro-economic instabilities, but rather as a direct consequence of long-term accumulation of structural weakness. Further, the findings support this viewpoint; therefore, sustainable financial stability cannot be attained by merely implementing short term monetary tightening's. The results from Turkey demonstrate how high inflation periods create fragility in a country's fiscal base which is likely to cause macro-financial instability; therefore it is reasonable for the conclusions from this research to be consistent with the beliefs that lower inflation levels, or elimination of budget deficit would give investors assurances about stability of Turkish economy, investor confidence, and mitigation of system wide risk conditions.

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APPENDIX

Table A-1.Threshold VAR Model Equation 3: TRINF Analysis Results

Variable	Low Regime Coef.	p-value	High Regime Coef.	p-value
Constant	8.698	0.124	41.018	0.002
L.TRFrPyBLGDP	0.533	0.541	1.323	0.373
L.TRBudDfGDP	0.448	0.611	1.314	0.061
L.TRINF	0.466	0.178	0.530	0.000
R^2	0.953	—	0.953	—