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ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

UNVEILING THE IMPACT OF GEOPOLITICAL RISKS ON TURKISH ECONOMY AND FISCAL DYNAMICS*

JEOPOLİTİK RİSKLERİN TÜRKİYE EKONOMİSİNE VE MALİ DİNAMİKLERE ETKİSİNİN ORTAYA ÇIKARILMASI**

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Abstract

This research aims to examine the impact of geopolitical risks on Türkiye's trade openness, household consumption, investment, inflation, government debt, and budget deficit for the quarters 2006:I–2022:IV. There are no empirical studies in the literature that examine the relationship between geopolitical risks and Turkish fiscal policy. The vector autoregressive (VAR) approach is utilized to examine the relationships among the variables. Geopolitical risks contribute to a severe increase in inflation in Türkiye. The increase in geopolitical risks negatively affects consumption and investment and increases budget deficits and government debt. Additionally, Türkiye's trade volume has also decreased as a result of rising geopolitical risks, according to the VAR model's results. These findings demonstrate how vulnerable the Turkish economy is to geopolitical risks. Succinctly, Türkiye's public finances and economy are negatively impacted by geopolitical risks, according to the findings of the analysis. As a matter of fact, taking precautionary fiscal policy measures against geopolitical risks is important in eliminating the fiscal and economic losses that may arise. This study aims to make a new contribution to the fiscal policy literature and to guide fiscal policy makers.

Keywords: Geopolitical risks, fiscal policy, business cycle, vector autoregression (VAR)
JEL Codes: E31, E62, H56

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Öz

Bu araştırma, jeopolitik risklerin Türkiye'nin ticari açıklığı, hane halkı tüketimi, yatırımı, enflasyonu, devlet borcu ve bütçe açığı üzerindeki etkisini 2006:I–2022:IV çeyrekleri için incelemeyi amaçlamaktadır. Literatürde jeopolitik riskler ile Türk maliye politikası arasındaki ilişkiyi inceleyen ampirik bir çalışma bulunmamaktadır. Değişkenler arasındaki ilişkileri incelemek için vektör otoregresif (VAR) yaklaşımı kullanılmıştır. Jeopolitik riskler Türkiye'de enflasyonun çok ciddi bir oranda yükselmesine katkıda bulunmaktadır. Jeopolitik risklerin artması tüketimi ve yatırımı olumsuz etkileyerek bütçe açıklarını ve devlet borçlarını artırmaktadır. Ayrıca VAR modeli sonuçlarına göre, artan jeopolitik riskler nedeniyle Türkiye'nin ticaret hacmi de azalmaktadır. Bu bulgular Türkiye ekonomisinin jeopolitik risklere karşı ne kadar kırılgan olduğunu ortaya koymaktadır. Kısacası analiz bulgularına göre Türkiye'nin kamu maliyesi ve Türk ekonomisi jeopolitik risklerden olumsuz etkilenmektedir. Bu bulgu, Türkiye'de jeopolitik risklerin politika oluşturma süreçlerine dahil edilmesinin önemini vurgulamaktadır. Nitekim jeopolitik risklere karşı ihtiyati maliye politikası tedbirleri alınması ortaya çıkacak mali zararların giderilmesi bakımından önemlidir. Bu yönüyle bu çalışma maliye politikası literatürüne yeni bir katkı yapma ve maliye politikası yapıcılara yol gösterici olması bakımından bir potansiyele sahiptir.

Anahtar Kelimeler: Jeopolitik riskler, maliye politikası, konjonktürel dalgalanma, vektör otoregresyon (VAR)

JEL Kodları: E31, E62, H56

Bad things come in threes: geopolitical, economic, and policy uncertainty (Mark Carney[1]).

1. Introduction

Political changes, monetary policy implementations, financial circumstances, and geopolitical events all have an impact on fiscal realizations, both directly and indirectly. Caldara and Iacoviello (2022: 1197) define geopolitical risk as threat, growth, and occurrence of unfavorable events associated with terrorism, war, and any conflict between nations and political actors that impede the normal course of international relations. Caldara and Iacoviello (2022) created a geopolitical risk index in the framework of this definition. This index is considerably larger since it includes not just terrorist acts but also other sorts of geopolitical tensions such as war risks, military threats, and Middle East tensions, thereby representing a broader set of external global concerns (Balcilar et al., 2018: 296). Indeed, such incidents have a sufficiently large influence on economic actors' expectations as well as the economies of countries. These events include the Gulf War, the September 11 attacks, the invasion of Iraq, the Paris terrorist attack, Russia's invasion of Ukraine, the Israel-Palestine dispute, and the trade tensions between China and the United States.

Unfavorable geopolitical events and threats can affect macroeconomic factors in a number of ways, such as increased military spending, capital stock collapse, death tolls, or heightened caution. (Caldara & Iacoviello, 2022: 1194). There is also a drop in tourism income, a fall in foreign direct investment, economic deterioration as a consequence of infrastructure destruction, and opportunity costs as a result of using resources in various regions (Enders & Sandler, 1996: 331). Terrorist acts, for example, shift expenditure from investments to government expenditure, harming emerging

1 This sentence is quoted from Mr. Mark Carney's speech who is Governor of the Bank of England and Chairman of the Financial Stability Board on June 30, 2016.

country's economic growth (Blomberg et al., 2004: 1030). Terrorism and conflicts, in fact, can cause economic contraction by lowering future expectations (Cheng & Chiu, 2018: 305). Globally and nationally, terrorism has a detrimental effect on the increase of per capita income (Gaibulloev & Sandler, 2008).

Geopolitical hazards are another important aspect influencing foreign direct investment. Indeed, the high level of geopolitical risk causes long-term projects to be delayed or canceled, as well as a negative impact on foreign direct investments (Enders & Sandler, 1996; Chanegriha et al. (2017); Nguyen et al. (2022)). Furthermore, geopolitical risks are likely to increase business costs and have an influence on global commerce not just by introducing new dangers, but also by exacerbating existing ones (Gupta et al., 2019: 516). Problems in supply chains can cause a negative supply shock, causing commodity prices to surge. On the demand side, uncertainty about the consequences of geopolitical events drives businesses to delay investment and employment decisions, decreasing consumer confidence and tightening financial conditions. However, budget deficits can alleviate the negative effects on demand. According to Bilgin et al. (2020), government investment spending rose as a result of geopolitical risks. In highly geopolitically risk-sensitive countries, economic actors demand compensation for the risks and raise government expenditures accordingly to offset negative outcomes. Consequently, inflationary consequences might arise depending on which factor takes precedence (Caldara et al., 2023: 2).

Geopolitical risks can affect the behavior of investors in financial markets. If there is a negative event, such as a terrorist attack or military conflict, investors tend to seek safer financial assets and engage in panic selling (Chen & Siems, 2004: 349). Additionally, as knowledge asymmetry increases, global investors are becoming more hesitant to participate in the portfolios of foreign countries (Kim et al., 2019: 293). During times of increased geopolitical risk, investors often shift their funds to other countries, resulting in fluctuations in the exchange rates of affected economies (Salisu et al., 2022: 180). Furthermore, geopolitical risks affect bond yields of different maturities in various nations (Huang et al., (2015); Subramaniam (2021)).

There is limited research on the connection between geopolitical risks and fiscal policy. Geopolitical risks can impact tax collections through multiple channels. Gupta et al. (2002: 5) discovered that violence and insecurity can result in economic barriers, thereby decreasing tax collections. Moreover, armed conflict and terrorism could reduce the revenue base and impede tax administration efficiency. Terrorism, risks of war, and political tensions in domestic and international affairs have an impact on the macroeconomic outlook and distort the fiscal outlook. Fragile and conflict-affected governments exhibit lower revenue-to-GDP ratios compared to other developing countries (Akitoby et al., 2020: 8). This phenomenon can be largely attributed to the high level of uncertainty about the future affecting such countries. Furthermore, terrorism and its related activities serve to amplify the volatility of fiscal policies (Yogo, 2015: 4). For example, terrorist incidents being perpetrated in a country create an atmosphere of fear, which further intensifies the level of uncertainty (Ağırman et al., 2014: 100). This, in turn, has a negative impact on the confidence environment and undermines economic actors' expectations. Furthermore, the absence of a secure business environment in areas with such

incidents results in a failure to collect corporate and income taxes, primarily caused by low labor force participation (Çiçek et al., 2014: 411). In regions with a high risk of terrorism, corporations typically avoid paying corporate taxes (Xu & Moser, 2022: 176). As a result, other taxpayers experience higher taxes to make up for the lost revenue (Gallant, 2007: 455), which undermines tax fairness.

There is evidence that states increase military spending during periods of geopolitical risks. According to Gupta et al. (2002), civil unrest and terrorism increase the proportion of defense spending in total government expenditure. Similarly, Drakos and Konstantinou (2014) found that an increase in crime and terrorism results in a rise in public order and security expenditures. Furthermore, Caldara et al. (2023) found that an increase in geopolitical risks leads to higher defense spending in both developed and developing countries. The authors demonstrated that increased defense spending and increased government debt lead to an inflationary effect. Therefore, there are sizeable negative externalities from geopolitical risks (Glick & Taylor, 2010: 102). Policymakers and investors must prioritize the evaluation of geopolitical risks.

The research aims to investigate the impact of geopolitical risks on various economic indicators in Türkiye, including its budget deficit, inflation rate, household consumption, investment, government external debt, and trade openness. The current study utilizes the vector autoregressive (VAR) technique to examine the relationships among the previously stated variables. The model proposed by Caldara et al. (2023) is employed in this context. The relationship between geopolitical risk and fiscal policy in Türkiye has not been the subject of any empirical research. As a consequence, this study is intended to provide a new contribution to the literature on fiscal policy.

2. Methodology

The study utilizes the VAR method to analyze how geopolitical risks affect the fiscal policy and economy of Türkiye. Before proceeding to VAR analysis, it is investigated whether the variables have a unit root with minimum LM unit root test with one structural break from Lee and Strazicich (2013).

Based on the Lagrange Multipliers unit root test proposed by Schmidt and Philips (1992), Lee and Strazicich (2013) created a minimum LM unit root test with one structural break. The authors' main objective in creating this test is to show that researchers can wrongly assume that a time series is stationary with one break, or "trend break stationary", when in fact the series is non-stationary with one break (Yılancı, 2009: 330). This leads to false conclusions. Lee and Strazicich (2013) created a minimal LM unit root test with one structural break to reduce estimation bias and spurious rejections. According to Lee and Strazicich (2013: 2484), the minimum LM unit root test with one structure break is free of bias and prevents spurious rejections under the zero and alternative hypotheses. Furthermore, the authors argued that including additional breaks can lower statistical significance by generating loss of power, and hence a one break test is preferable.

The VAR approach is commonly used in identifying the dynamic relationships between various variables. The interaction between these factors is then analyzed to reveal their dynamic relationships. This procedure incorporates the past values of the dependent variable and other variables in the model.

Creating a model, selecting an appropriate lag length, ensuring VAR model stability, estimating, and conducting specification tests are the primary steps in analyzing the dynamic interactions between variables. Additionally, the VAR method assists us in determining the impulse-response linkages between one variable in the system and another variable. In simpler terms, this method can be used to trace the impact of an external shock or innovation on one or more variables. This type of impulse-response analysis is also referred to as "multiplier analysis" (Lütkepohl, 2005: 51). Additionally, the forecast error variance decomposition in the VAR method provides researchers with information regarding the relative impact of factors on each other (i.e., innovation accounting).

2.1. Data and Model

An empirical analysis is conducted in the study to examine the influence of geopolitical risks on fiscal policy and macroeconomic factors. Descriptive statistics of the variables (raw values) are given in Table 1.

Table 1: Descriptive Statistics (raw values)

	georisks	*inflation*	*consumption*	*investment*	*deficit*	*debt*	*trade*
Mean	95.540	13.950	83.956.346	37.410.668	-0.019	0.107	0.464
Median	88.935	9.409	92.597.744	40.398.055	-0.017	0.101	0.447
Maximum	228.559	81.103	143.000.000	66.285.010	0.025	0.139	0.788
Minimum	69.691	4.344	21.805.199	72.458.34	-0.090	0.084	0.350
Std. Dev.	23.698	15.338	33.699.144	15.476.679	0.022	0.016	0.083
Skewness	3.079	3.484	-0.395	-0.416	-0.646	0.630	1.536
Kurtosis	16.326	14.359	1.912	2.072	4.221	2.213	5.915
Jarque-Bera	610.570	503.106	5.121	4.400	8.958	6.252	50.818
Observations	68	68	68	68	68	68	68

As can be seen Table 1, and variables reflect geopolitical risks, annual consumer inflation rate, final consumption expenditure of resident households, gross fixed capital formation, the ratio of central government budget deficit to GDP, central government external debt to GDP and the ratio of the sum of imports and exports to GDP, respectively. The modified model of Caldara et al. (2023) was used in the current study for the Turkish economy and a VAR model with seven variables was constructed:

$$Ay_t = \sum_{k=1}^{p} B_k y_{t-k} + \varepsilon_t \tag{1}$$

$$y_t = [georisks_t, inflation_t, consumption_t, investment_t, deficit_t, debt_t, trade_t] \tag{2}$$

$$\varepsilon_t = [\varepsilon_t^{georisks}, \varepsilon_t^{inflation}, \varepsilon_t^{consumption}, \varepsilon_t^{investment}, \varepsilon_t^{deficit}, \varepsilon_t^{debt}, \varepsilon_t^{trade}] \tag{3}$$

All variables in the model are denominated in dollars. The variables are included in the model at the logarithmic level, except for the inflation rate and the ratio of the budget deficit to GDP. and are

also seasonally adjusted. The model includes annual percentage changes of the variables to ensure stationarity.[2]

An important issue with the model has to do with the restrictions in the VAR model. Geopolitical risks are considered to be exogenous to the Turkish economy in this model. Therefore, the following restrictions was added to the VAR model: $A_{1,j} = A_{k,1,j} = B_{k,1,j} = 0$, for j = 2, … ,7, and k = 1,2, … ,p. Because geopolitical risks are exogenous to the Turkish economy, they have an instantaneous impact on all variables and are unaffected by these variables in the VAR system. Inflation, consumption, and investment factors have an immediate impact on budget deficits, whereas these variables have a one-quarter lag. These shocks were decomposed using the conventional Cholesky decomposition of the covariance matrix of the VAR reduced-form residuals. After all, a one lag restiricted-VAR model was built utilizing quarterly data from 2006 to 2022.[3]

3. Results

3.1. Unit Root Test Results

Table 2 displays the findings of Lee and Strazicich's (2013) minimum LM unit root test with a one structural break.

Table 2: Lee ve Strazicich (2013) One-Break Minimum LM Unit Root Test Results

Variables	LM-stat	Break date	Fraction
Georisks	-5.236*** (0)	2021:I	0.897
Inflation	-2.567 (1)	2018:III	0.750
Consumption	-6.690*** (2)	2009:II	0.206
Investment	-4.485***(3)	2009:II	0.206
Deficit	-5.470***(0)	2010:IV	0.294
Debt	-3.552* (0)	2009:III	0.221
Trade	-3.458***(4)	2020:IV	0.882

Source: The results are author's estimations.
Notes: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels. Values in parentheses indicate lag length. Critical values are – 4.239, – 3.566, and – 3.211 at the 1%, 5%, and 10% levels respectively. Critical values are taken from Lee and Strazicich (2013) p. 2488.

Table 2 shows that the null hypothesis of a unit root with structural break is rejected for all variables except inflation, which is stationary at the I(1) level. Consequently, the other variables are included in the VAR(1) model using their level values, except for inflation. The break dates indicate important geopolitical events.

2 More detailed information about the variables in the VAR(1) model is given in the Appendix.

3 The Schwarz information criterion was used in the selection of the lag length. The Schwarz information criterion is 15.325.

3.2. Correlation Relationships Between Variables

It is crucial to ascertain the direction of the link between the variables before estimating the VAR(1) model. Therefore, the relationship between the variables in the model is analyzed using the correlation coefficients calculated by the "Pearson's method". Figure 1 shows the correlation relationships between variables in the VAR(1) model.

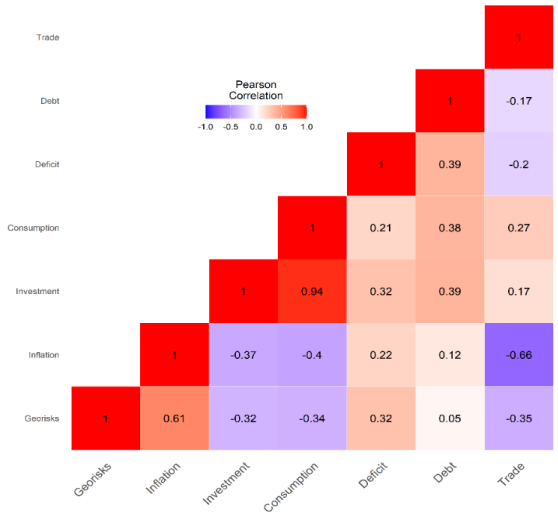

Figure 1. Correlation Coefficients Between Variables in the VAR(1) Model

Note: The results are author's estimations.

Correlation coefficients between geopolitical risks and other variables indicate results consistent with theory. Geopolitical risks are positively correlated with inflation, debt, and budget deficits while negatively correlated with investment, consumption, and trade. All coefficients, except for the correlation coefficient between geopolitical risks and debt, are statistically significant at the 1% level. The analysis results also reveal that there is a theory-consistent relationship between the variables. For example, there is a positive relationship between inflation and budget deficits and debt but a negative correlation between inflation and consumption and investment. In a similar vein, fiscal deficits, investment, consumption, and inflation all positively correlated. However, a more precise understanding of these relationships requires conducting an econometric analysis.

3.3. VAR Results

Figure 2 presents the effects of one standard deviation increase in geopolitical risks on the Turkish economy.

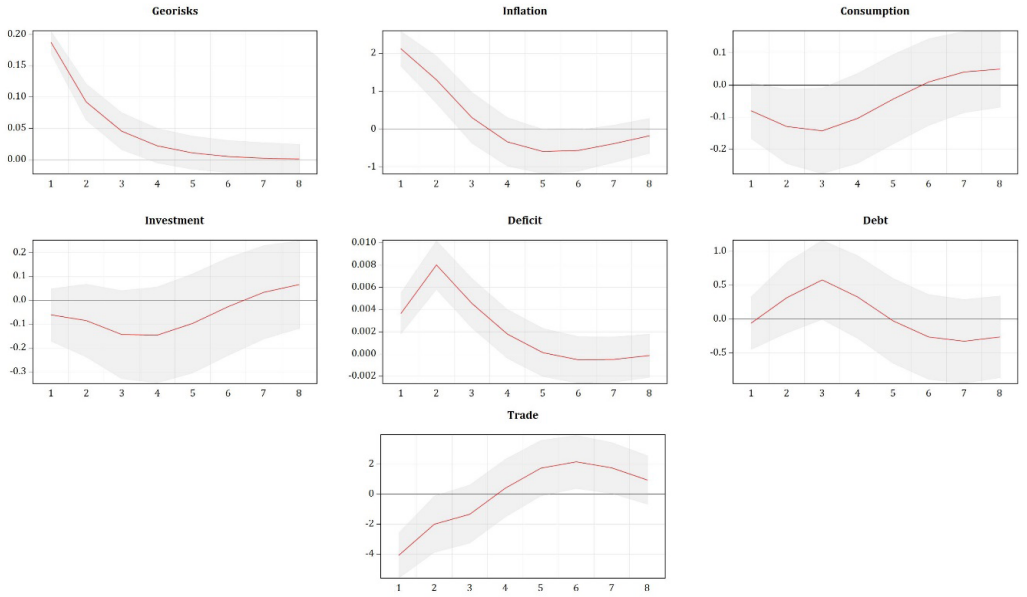

Figure 2. VAR(1) Model Impulse-Response Results

Note: The red lines represent the responses of variables to Cholesky one standard deviation shock in geopolitical risks. The gray area shows 68% MCMC confidence bands calculated with 10000 replications. The results are author's estimations.

As observed in Figure 2, rises in geopolitical risks (positive shocks) negatively impact the Turkish economy by leading to a statistically significant increase in inflation. To clarify, such risks represent a vital external shock that propels inflation up in Türkiye. The effect of geopolitical risks on inflation lasts for about four quarters. This coincides with the previous results found by Caldara et al. (2023). Geopolitical risks have distortive effects on consumption and investment. The effects of geopolitical risk shocks on consumption and investment reach a minimum in the fourth quarter and disappear in the seventh quarter. Figure 2 illustrates that the impact of geopolitical risks on the budget deficit and debt has a deteriorating effect on the fiscal outlook. The negative impact of a geopolitical risk shock on the budget deficit reaches a maximum in the second quarter and diminishes by the sixth quarter. This can be described as a fiscal policy response to the uncertainty caused by geopolitical risks. Increased risks lead to lower revenues and higher expenditures, which in turn increase budget deficits.

Figure 3 shows the cumulative impulse-response graphs of the variables. Upon examining the cumulative impulse-response graphs, the analysis's findings validate the above-mentioned findings. Put a different way, variables are negatively impacted by geopolitical risks.

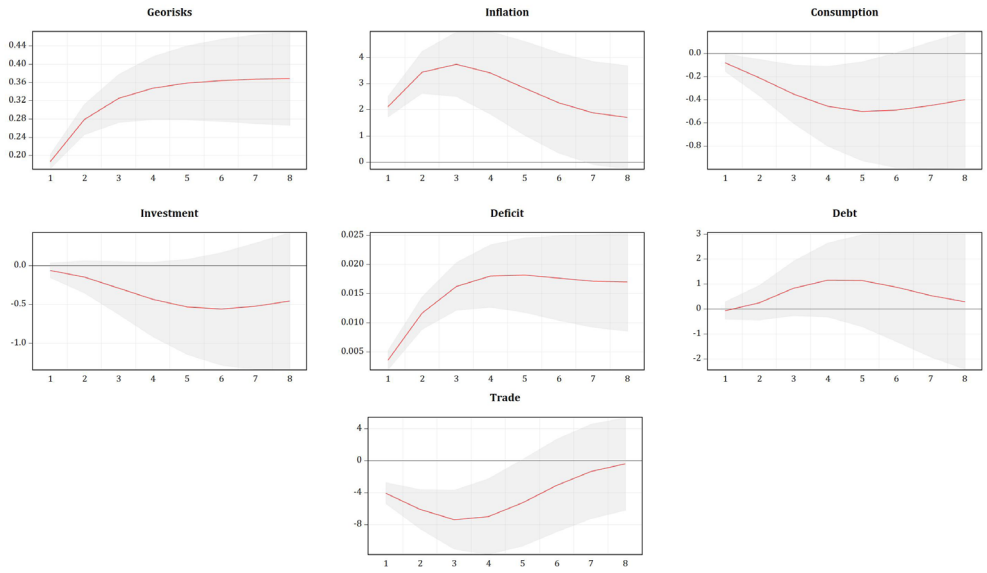

Figure 3. VAR(1) Model Cumulative Impulse-Response Results

Note: The red lines represent the responses of variables to Cholesky one standard deviation shock in geopolitical risks. The gray area shows 68% MCMC confidence bands calculated with 10000 replications. The results are author's estimations.

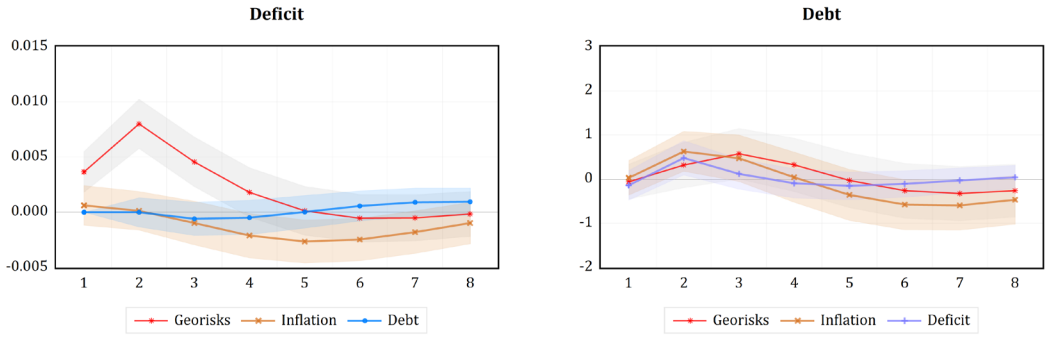

Figure 4. Budget Deficits and Debt Response to Shocks

Note: The lines represent the responses of variables to Cholesky one standard deviation shock. The filled areas show 68% MCMC confidence bands calculated with 10000 replications. The results are author's estimations.

Figure 4 displays how various shocks impact the budget deficit and debt. The left panel demonstrates the effect of geopolitical risk, inflation, and debt on budget deficits. Conversely, the right panel illustrates how geopolitical risk, inflation, and budget deficits influence debt. The impulse response analysis in the left panel shows that a shock in geopolitical risk leads to larger budget deficits than shocks to inflation and debt. The findings show that the effect of the shock from geopolitical risks on

the budget deficit lasts longer than that of other shocks. The results in the right panel point out that he impact of the variables on debt is similar. These findings suggest that geopolitical risks play a key role in the budget.

4. Conclusion

Empirical evidence points to geopolitical risks driving up inflation and budget deficits. In addition, the findings obtained from the model indicate that geopolitical risks adversely affect private consumption and investments in Türkiye. The results from the VAR(1) model showed that the increase in geopolitical risks has reduced Türkiye's trade size. These results prove that the Turkish economy is economically sensitive to global geopolitical risks. Therefore, in order to increase its resilience to international geopolitical shocks, the Turkish economy must first diversify its international trade structure and differentiate its production structure based on imports. In addition, it should take measures to stabilize budget revenues and develop fiscal policies that will ensure fiscal sustainability.

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Appendix

Table Appendix. Variables

Variables	Definition	Source
Georisks	Geopolitical risk index, logarithmic.	https://www.matteoiacoviello.com/gpr.htm
Inflation	Inflation rate, annual percentage change.	TCMB-EVDS TP.FG.J0-3
Consumption	Final consumption expenditure of resident households in chain linked volume, $, logarithmic, annual percentage change.	TCMB-EVDS TP.GSYIH20.HY.ZH
Investment	Gross fixed capital formation in chain linked volume, $, logarithmic, annual percentage change.	TCMB-EVDS TP.GSYIH22.HY.ZH
Deficit	The ratio of central government budget deficit to GDP, $.	TCMB-EVDS TP.KB.GEL001 TP.KB.GID001
Debt	The ratio of central government long-term external debt to GDP, $, logarithmic, annual percentage change.	TCMB-EVDS TP.DB.B23
Trade	The ratio of the sum of imports and exports to GDP, $, logarithmic, annual percentage change.	TCMB-EVDS TP.ODANA6.Q02 TP.ODANA6.Q03
GDP	GDP by expenditure approach, current prices, $.	TCMB-EVDS TP.GSYIH26.HY.CF
USD	US Dollar (Banknote Selling)	TCMB-EVDS TP.DK.USD.S.EF.YTL