İktisat Politikası Araştırmaları Dergisi -
Journal of Economic Policy Researches
E-ISSN: 2148-3876

RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

The Role of Global Financial Risk Shocks on Macroeconomic Fluctuations and Government Debt: The Case of Türkiye

Küresel Finansal Şokların Makroekonomik Dalgalanmalar ve Kamu Borcu Üzerindeki Rolü: Türkiye Örneği

Süleyman KASAL[1]

ABSTRACT

Global financial conditions are one of the key elements that should be considered while formulating fiscal policy. Investments and capital inflows to small open emerging economies are impacted by global financial conditions. Investments in the assets of emerging economies rise during times of favorable global financial circumstances. Thus, the amount of borrowing, the cost of borrowing, and the debt structure of emerging economies are all impacted by the existence of favorable global financial conditions. In contrast, similar to the COVID-19 pandemic in 2020 and the 2008 global financial crisis, the worsening in global financial conditions has a negative impact on emerging economies. Global financial conditions are an important component of public finance and play a significant role in government debt. This study attempts to investigate the impact of global financial shock risks on macroeconomic fluctuations and government debt in Türkiye from 2003:1 to 2020:12 using a vector autoregressive model. The results of the analysis showed that a positive shock in global financial risks increases government debt. The findings pointed out that the government debt is sensitive to global shock risk. Global financial conditions account for approximately 12% of changes in government debt at the end of two years. The findings of this study also indicated that global financial shock risks have a significant impact on macroeconomic fluctuations. These findings imply that reducing vulnerability of Türkiye to external shocks is a key policy priority for the sustainability of government debt. Because the country's sensitivity to external shocks may enhance the likelihood of a government debt crisis. To avoid concerns about debt sustainability, the share of foreign currency liabilities in government debt should be reduced.

Keywords: Global financial risks, Macroeconomic fluctuations, Government debt, Türkiye, VAR
Jel Classification: E62, H63, G10

DOI: 10.26650/JEPR1112862

[1]Assist. Prof., Anadolu University, Faculty of Economics and Administrative Sciences, Department of Public Finance, Eskişehir, Turkiye

ORCID: S.K. 0000-0001-8409-1090

Corresponding author/Sorumlu yazar:
Süleyman KASAL,
Anadolu University, Faculty of Economics and Administrative Sciences, Department of Public Finance, Eskişehir, Turkiye
E-mail/E-posta:
skasal@anadolu.edu.tr

Submitted/Başvuru: 05.05.2022
Revision Requested/Revizyon Talebi: 29.12.2022
Last Revision Received/Son Revizyon: 24.01.2023
Accepted/Kabul: 26.01.2023

Citation/Atıf: Kasal, S. (2023). The role of global financial risk shocks on macroeconomic fluctuations and government debt: the case of Türkiye. *İktisat Politikası Araştırmaları Dergisi - Journal of Economic Policy Researches, 10*(2), 337-360.
https://doi.org/10.26650/JEPR1112862

ÖZ

Maliye politikalarını tasarlarken dikkate alınması gereken önemli unsurlardan birisi küresel finansal koşullardır. Küresel finansal koşullar dışa açık gelişmekte olan ülkelere yönelik sermaye akımlarını ve yatırımları etkiler. Küresel finansal koşulların iyi olduğu dönemlerde özellikle gelişmekte olan ülkelerin varlıklarına yönelik yatırımlar artmaktadır. Dolayısıyla pozitif küresel finansal koşulların varlığı gelişmekte olan ülkelerin borçlanma miktarını, maliyetini ve borç yapısını etkilemektedir. Küresel finansal koşullardaki bozulma ise tıpkı 2008 küresel finansal krizi ve 2020 COVID-19 pandemisinde olduğu gibi ülke ekonomileri üzerinde bozucu etkilere neden olmaktadır. Küresel finansal koşullar, kamu maliyesinin önemli bir bileşenidir ve kamu borcu üzerinde önemli bir rol oynamaktadır. Bir vektör otoregresif (VAR) modeli kullanan bu çalışma, 2003:1'den 2020:12'ye kadar küresel finansal risk şoklarının makroekonomik dalgalanmalar ve kamu borcu üzerindeki rolünü Türkiye için incelemeye çalışmaktadır. Analiz sonuçları, küresel finansal risklerdeki pozitif standart sapmalık bir şokun kamu borcunu artırdığını göstermiştir. Bulgular, kamu borcunun küresel risk şokuna duyarlı olduğuna işaret etmektedir. Küresel finansal koşullar, dönem sonunda (2 yıl) kamu borcundaki değişikliklerin yaklaşık %12'sini oluşturmaktadır. Bu çalışmanın bulguları küresel finansal risk şoklarının makroekonomik dalgalanmalar üzerinde önemli bir etkiye sahip olduğunu da göstermiştir. Bu bulgular, Türkiye'nin dış şoklara karşı kırılganlığının azaltılmasının kamu borcunun sürdürülebilirliği için kilit bir politika önceliği olduğunu ima etmektedir. Çünkü ülkenin dış şoklara duyarlılığı, bir kamu borcu krizi olasılığını artırabilir. Borç sürdürülebilirliği konusundaki endişelerden kaçınmak için, kamu borcundaki yabancı para cinsinden yükümlülüklerin payı azaltılmalıdır.

Anahtar Kelimeler: Küresel finansal riskler, Makroekonomik dalgalanmalar, Kamu borcu, Türkiye, VAR
Jel Sınıflaması: E62, H63, G10

"The world is still a closed economy, but its regions and countries are becoming increasingly open… The international economic climate has changed in the direction of financial integration, and this has important implications for economic policy.

—Robert Mundell, 1963[1]"

1. Introduction

A sudden global shock causes uncertainty and raises concerns about the sustainability of government debt. According to Köse et al. (2021), financial crises are frequently brought on by shocks that massively raise investor risk aversion, risk premiums, or borrowing rates. These shocks are then followed by a sudden stop in capital inflow and protracted recessions.

A large part of literature pointed out that the risk premiums of emerging market economies are related to international factors, especially to the worldwide measures of the risk appetite of investors (Akıncı, 2013, p. 360). A spike in borrowing costs of emerging market economies cause country spreads and country risk premiums increase. The increase in the country risk premium causes a negative effect on expectations. Investors in periods of high global who risk turning to safe and liquid assets (safe heaven) accelerate this process. Higher borrowing costs widen budget deficits and amplify the effects of contraction in economic activities. Large debt accumulations can lead to a crowding out effect, an increase in distortive taxes and a decrease in public investment to repay debt, thereby resulting in a reduction in economic activity (Yared, 2019, p. 116). An economic downturn causes an increase in the probability of a crisis. As the crisis approaches, the government debt increases (Reinhart & Rogoff 2011, p. 1682) especially in emerging economies with high foreign currency debt, and a rapid debt buildup which may lead to more destructive results. The probability of default on government debt might increase.

The deterioration in global risk appetite causes economic agents to change their liquidity preferences. In addition, with increased currency volatility, a decline in a sovereign's credibility eventually results in a decline in its currency. (Bekkour et al., 2015, p.68). The abrupt shift in liquidity preferences accompanied by the demand for an exchange rate with a rapid flight to quality[2] triggers the domestic currency pressures in emerging market economies. The rapid increase in country risk will bring about investors who sell securities

[1] This sentence is quoted from Gregory Mankiw (2019, p. 416).

[2] Investors shift their portfolios away from riskier securities and toward more liquid ones during economic downturns, particularly in fixed-income markets. This is known as a flight-to-quality and a flight-to-liquidity, respectively (Beber, Brandt & Kavajecz 2009, p. 925).

and send the funds back to their countries; thus, it creates downward pressure on domestic currency and increases its volatility (Hui & Fong 2015, p. 174)[3]. In a small open economy, with excessive depreciation in domestic currency and rising inflation, budget revenues and expenditures depreciate in real terms and the costs of rollover are likely to reach high levels. Hence, the rise in exchange rate and upward pressures on inflation as a result of a shock in global financial risks trigger a sharp increase in government debt. High debt is risky, especially for emerging economies since it renders them more exposed to external shocks. Therefore, policymakers in the developing world must be aware that the demand for their country's debt can suddenly decline due to a variety of factors, such as worries about sustainability, shocks to the global interest rate, and changes in risk appetite (Rogoff, 2022, p. 147).

Additionally, when rollover needs are greater, the composition of government debt shifts from domestic currency denominated debt to foreign currency denominated debt in emerging economies. In particular, fixed-rate government bonds are replaced by government debt securities indexed to inflation, foreign currency or gold denominated to provide more returns to investors. High government debt, particularly debt denominated in foreign currency, can amplify the impact of negative short-term shocks. These shocks tend to raise risk premiums and, thus, borrowing costs, which can lead to insolvency and a self-fulfilling crisis (Blanchard, Dell'Ariccia & Mauro 2013, p. 12; Lian, Presbitero & Wiriadinata 2020, p. 2). As IMF (2021) pointed out, financing constraints could worsen for emerging market economies, particularly for those with large financing needs or debt denominated in foreign currency. This is because fiscal authorities may be limited in their efforts to implement traditional countercyclical stabilization policies as well as their position as lender of last resort during a financial crisis. Succinctly, high levels of government debt can constrain essential government functions (Cecchetti, Mohanty & Zampolli 2011, p. 4). This demonstrates the importance of fiscal space. For instance, according to Blanchard, Dell'Ariccia & Mauro (2010), low-indebted emerging countries were able to deploy fiscal policy instruments aggressively during the 2008 global crisis. On the other hand, high-indebted emerging countries had to cut spending and raise taxes.

The motivation of the study is based on the risks faced by emerging countries. According to the IMF (2022), emerging countries face many risks arising from uncertainty in the global economic outlook; high inflation, increase in monetary tightening, strengthening of the US dollar, and high external borrowing costs. Due to high inflation and monetary tightening

[3] Similarly, Eichengreen et al. (1995), Frankel & Rose (1996) and Kumar, Moorthy & Perraudin (2003) showed that there are factors such as political instability, budget, current account deficit and rapid growth of money and price level before an exchange rate crises.

policies of central banks (such as the Federal Reserve, the European Central Bank), the negative impact of global financial conditions is more evident in emerging countries. It is well known, that in order to exit the economic slump following the 2008 global crisis and pandemic, central banks engaged in massive quantitative easing. However, the rise in inflation after 2020 has forced central banks to alter their current strategies. In order to slow the rate of increase in inflation and prevent deterioration in expectations, central banks have switched to restrictive monetary policies. Because of the monetary tightening investors' risk appetite decreases and they shift liquidity from emerging countries to advanced countries and safer assets. Succinctly, the above-mentioned risks lead to deteriorating global financial conditions. Another motivation for the study is related to the fact that the government debt structure of emerging countries becomes more sensitive to market risks. The increase in the amount of foreign currency denominated debt of emerging countries causes global shocks to increase market risks on government debt. Market risk shows the sensitivity of government debt to inflation, exchange rate, and interest rate variables. The increase in foreign currency denominated government debt also increases the sensitivity to market risks. Because an increase in exchange rates increases government debt and causes uncertainty about debt rollover.

This study investigated the role of global financial risk shocks on macroeconomic fluctuations and government debt between the period January 2003 to December 2020 with a vector autoregressive (VAR) model in Türkiye. Since Türkiye as an emerging country faces the above-mentioned risks and the government debt structure becomes more sensitive to market risks, the analysis of the effects of global financial conditions on government debt is important. This sample contains different global conditions. The period begins in January 2003, when global financial conditions were calmer, and ends in December 2020, when the COVID-19 pandemic wreaked havoc on global financial conditions. The main questions addressed in this paper are: 1) What is the role of global financial risk shocks on the Turkish economy? 2) How does an increase in global financial risks affect government debt in Türkiye? 3) How does a shock in macroeconomic variables change government debt? The main findings of this study are: 1) The global financial risk shocks had a protracted and lasting effect on the Turkish economy 2) a positive shock in global financial risks increased government debt. 3) While a positive shock in industrial production and real effective exchange rate decreased government debt, a positive shock in interest rate and inflation increased government debt. The sensitivity of the Turkish economy to global financial risks causes government debt to be affected. Accordingly, dependence on high financing needs brings a heavy debt burden together with high borrowing costs as a result of the decrease in the global risk appetite. The vulnerability of the country to external shocks might increase the probability of a government debt crisis.

So far, little is known about the impact of global financial conditions on government debt, and it is not clear in the literature what factors have an impact on it. In addition, no research has been found that investigated the role of global financial risks on government debt for Türkiye. Therefore, this study provided a distinctive chance to expand our understanding of how macroeconomic factors and global financial risks affect government debt in Türkiye. Therefore, the study's findings are expected to add theoretical contributions to the literature.

The overall organization of the study is divided into three components, one of which is this introduction chapter. The second component is devoted to literature. The third component describes the variables, model, and empirical findings. Finally, the conclusion provides a brief review of the findings, as well as a critique of the findings and policy recommendations.

2. Literature

The impact of current global financial conditions on emerging market economies has drawn more attention in recent years. The consequences of global financial circumstances have been extensively researched since increased global financial risks have a negative impact on the economic activity of emerging market economies. When the literature was reviewed, country spreads are used to assess the impact of global financial shocks on economies. Studies specifically showed how country spreads in emerging economies are impacted by shocks in global interest rates. According to the literature, rising borrowing spreads are frequently linked to times of increased global financial risk for emerging economies. Furthermore, a number of studies found a link between low borrowing spreads on international markets and economic growth.

In order to comprehend the macroeconomic impacts of interest rate movements in emerging countries, Uribe & Yue (2006) focused on the importance of global interest rates. The authors' primary goal was to examine how country spreads and global interest rates affected overall activity in emerging economies. The real GDP, real investment, the ratio of the trade balance to output, the real US interest rate, and the real country interest rates were all used in the research. Uribe & Yue (2006) examined the correlation between business cycle fluctuations, country spreads, and global interest rates for seven emerging market economies between 1994 and 2001. The authors found that a shock in the US interest rate explained about 20% of the movement in the emerging market economies, and this shock particularly affected domestic variables through the effects on country spreads.

García-Herrero & Ortíz (2006) aimed to analyze the determinants of sovereign spreads of countries in Latin America. The authors emphasized the importance of the impact of

global investors' risk appetite on emerging countries. The authors focused specifically on the external determinants of sovereign spreads. García-Herrero & Ortíz (2006) examined the effects of change in global risk aversion on Latin American country spreads for the period from 1994 to 2005. The results of the study showed that the deterioration in the global risk appetite has a positive and statistically significant effect on country spreads. All their results showed that an increase in global risk aversion increased sovereign spreads. The global risk appetite was the main factor in explaining the change in country spreads and capital flows. Additionally, they found that the deterioration in the global risk appetite diminished the portfolio flows for all Latin American countries. The authors concluded that conditions in the US economy affected Latin American countries.

Agénor, Aizenman & Hoffmaister (2008) modeled the transmission process of external shocks to the Argentine economy. The authors noted that countries with weak fundamentals may experience high borrowing spreads subject to a change in market sentiment or an increase in risk aversion. In contrast to existing studies, the authors focused on the role of domestic interest rates in the impact of external shocks on production. According to the impulse-response functions, a positive shock in external interest rate spreads caused higher domestic spreads and reduced production. External shocks in the aftermath of the Mexican peso crisis had a major influence on output and domestic spreads, according to their historical decomposition analysis.

Ciarlone, Piselli & Trebeschi (2009) analyzed how much of emerging countries' spreads can be attributed to specific factors linked to global liquidity conditions and agents' risk aversion. The authors used factor analysis to find a common force that kept the spreads of emerging countries moving together. Therefore, they thought that a single common variable could be used instead of more than one variable. Ciarlone et al., (2009) analyzed the determinants of emerging countries' spreads for the period 1998-2006 using the factor analysis technique. Based on the results of empirical analysis, the authors found that country fundamentals supported the improvement in yield differentials. However, the authors showed that emerging countries remained vulnerable under the global risk aversion behavior of economic agents and in the sudden changes in market volatility.

Özatay, Özmen & Şahinbeyoğlu (2009) analyzed the impact of global financial conditions, U.S. macroeconomic news, and domestic fundamentals on EMBI spreads for 18 emerging countries. The authors' findings showed that EMBI spreads depended on global financial conditions. According to the authors, the contributions of domestic and external (global) factors in the evolution of EMBI spreads had important policy implications. Because the determination of EMBI spreads by domestic factors was interpreted as good news for emerging countries that implemented strong macroeconomic policies. But when EMBI

spreads are determined by global factors, emerging countries are vulnerable to external shocks even if they implement the right policies. Additionally, the authors emphasized the importance of domestic fundamentals, even when spreads are determined by external shocks.

Hilscher & Nosbusch (2010) investigated the extent in which macroeconomic fundamentals explain the volatility of sovereign yield spreads. The explanatory power of the fundamentals' volatility received particular attention. According to the authors, a country with more volatile fundamentals was more likely to see a sharp decline in its fundamentals, which could result in a default. As a result, the bond's yield spread increased. The writers also highlighted the significance of a country's trade in their analysis. In fact, a country's ability to obtain dollars and to settle its external debt in dollars depended on the magnitude of its exports. So, it's crucial to consider how the volatility of terms of trade affects the explanation of output variability. Hilscher & Nosbusch (2010) analyzed the impact of 31 emerging market economies-specific fundamentals and global factors on pricing of sovereign debt from 1994 to 2007. The authors investigated the impact of macroeconomic factors on the probability of default in the same research from 1970 to 2007. They investigated how countries were affected by global factors. The authors concluded that global factors, especially the VIX index, had a significant and positive effect on spreads and CDS.

Akıncı (2013) investigated the effects of global financial risks on cyclical fluctuations and country spreads. The author claimed that there was a strong correlation between global financial risk and the borrowing costs for emerging markets on international markets. High borrowing spreads are related to times of high global financial risk for emerging economies. According to the author, the fact that country spreads systematically reacted to changes in this variable accounts for a significant part in how global financial risk contributed to cyclical fluctuations in emerging markets. The country spreads are significant. One important mechanism for transmitting financial shocks from advanced economies to emerging economies is the link between economic activity and country spread. Akıncı (2013) carried out a study on how the economies of Argentina, Brazil, Mexico, Peru, South Africa and Türkiye were affected by the shock in global financial risks for a period in 1994: Q1-2011: Q3. The author concluded that an increase in global financial risks had a large effect for emerging market economies. An increase in global financial risks not only affected production and investment negatively, but it also increased the country spread. Global financial risk shocks account for roughly 20% of both country spread and aggregate activity changes in emerging economies.

Yıldırım (2016) stated that the increase in global risk appetite from the beginning of the global financial crisis to May 2013 strengthened the currencies of emerging countries and

supported the purchase of equities and bonds, emphasizing that emerging countries were sensitive to global risks. He stated that fluctuations in the global financial markets and the change in sentiment in the markets affected the markets in emerging countries. According to the author, global financial risk shocks affected countries' asset markets. Yıldırım (2016) studied the effects of global financial conditions on the asset markets of emerging economies. The author demonstrated that disturbances in global financial conditions resulted in the deterioration of government bond yields, equity prices, CDS spreads, and exchange rates in emerging economies. This effect varies according to the specific macroeconomic fundamentals of the countries.

According to Lian et al., (2020), current debt levels after the pandemic were at historic highs and economic growth rates were very low, and further fiscal expansion could lead to major risks. The authors noted that even in normal times, high government debt tends to correlate with higher public borrowing costs and might cause crowding out effects. Additionally, the high level of government debt denominated in foreign currency could increase the effects of short-term shocks. These shocks could lead to insolvency problems and trigger self-fulfilling crises. The worsening global conditions caused high and permanent increases in long-term interest rates in countries with high government debt. The authors also discovered that interest rates rose more in countries with a high share of foreign currency debt.

Lodge & Manu (2022) suggested that global risk behavior, or the global outlook, was influenced not only by U.S. monetary policy actions but by other global shocks. The global macroeconomic news was likely to affect the trade and growth prospects of emerging countries, and thus their financial assets. In this context, the authors used the 2006-2017 daily data to investigate whether global shocks affected emerging economies and whether domestic financial conditions affected financial markets. The results showed that global risks affected emerging economies. They found that stocks and sovereign spreads were more adversely affected than interest rates and currencies.

Some studies focused on the impact of global risk shocks on CDS premiums rather than the impact on country spreads or on country economies because the CDS premium is one of the important indicators affecting government borrowing costs. For instance, Pan & Singleton (2008) focused on the determinants of change in CDS premiums in three emerging countries. An important conclusion from the study was that a significant part of the movement in the maturity structure of sovereign spreads between countries was due to changes in investors' appetite for credit risk at the global level. Pan & Singleton (2008) investigated the contribution of various variables to risk premiums (CDS premium) in their study for Türkiye, Mexico, and Korea. The authors pointed out that the VIX index had a

significant explanatory power in terms of risk premiums. Wang, Yang, & Yang (2013) attempted to investigate the factors that determine CDS premiums in Latin American economies. The authors concluded that country financial variables such as currency rates and loan spreads, as well as global financial variables such as 10-year Treasury yields, VIX, and TED spreads, were key indicators of future sovereign CDS price movements in Latin American economies. Gürel (2021) investigated the macroeconomic and global financial conditions that determine Türkiye's CDS premiums for the period in 2011:1-2020:9. The author showed that the nominal exchange rate played an important role in determining the CDS premium, but the VIX index, which is a representative variable of global financial conditions, did not play an important role for CDS premiums.

These studies examined the effects of global financial risk shocks in different countries on cyclical fluctuations and country borrowing costs. However, there was no study in the literature that focused directly on the impact of global financial risk shocks on government debt. This indicated a need to understand the various effects of global financial risk shocks on government debt. This is the focus of this paper. It analyzes the impact of global financial shocks on macroeconomic fluctuations. Therefore, the study contributes to the literature in two different ways. The first is the impact of global financial shocks on the Turkish economy. The second is the impact of global financial shocks on government debt.

3. Data, model and empirical results

3.1. Data

This study analyzed the impact of global financial shocks and macroeconomic shocks on government debt in the period 2003:1-2020:12 for Türkiye. Monthly data was used instead of quarterly data because the researcher wanted to examine more closely the dynamic interactions between variables. As Horvath & Zhong (2019, p. 33) pointed out, some of the large fluctuations may not be smoothed out when quarterly data is used. In the present paper, the Volatility Index (VIX) is used as an indicator of global financial conditions. VIX (Chicago Board Options Exchange Volatility Index) measures the implied volatility of options contracts in the S&P 500 index. The index is viewed as a leading signal of global risk aversion. The VIX is also commonly regarded as a measure of event risk in credit markets, as well as a key component of investors' willingness for exposure to the high-yield bond loan class (Wang et al., 2013, p. 590). Additionally, industrial production index (PRO), inflation rate (INF), real effective exchange rate index (REER), short-term market interest rate (INT), central government debt stock (D) and five years sovereign CDS premium (CDS) data were used. VIX, PRO, INF and INT data from the FRED (Federal Reserve Database), real effective exchange rate index from The Central Bank of the Republic of Türkiye

Electronic Data Delivery System (CBRT-EDDS), central government debt stock data from the Republic of Türkiye Ministry of Treasury and Finance, five years sovereign CDS premium were obtained from the Bloomberg and DataStream database. The logarithmic annual percentage change of the variables is used in the analysis to avoid the unit root problem. All information about the variables is given in the appendix. Figure 1 shows the level values (raw data) of the variables.

Figure 1. Raw Data

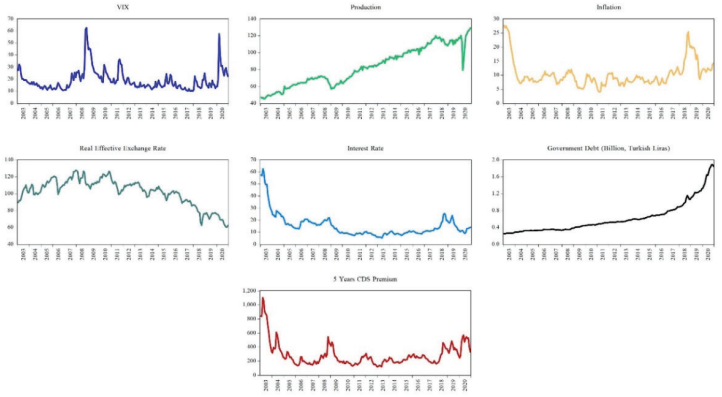
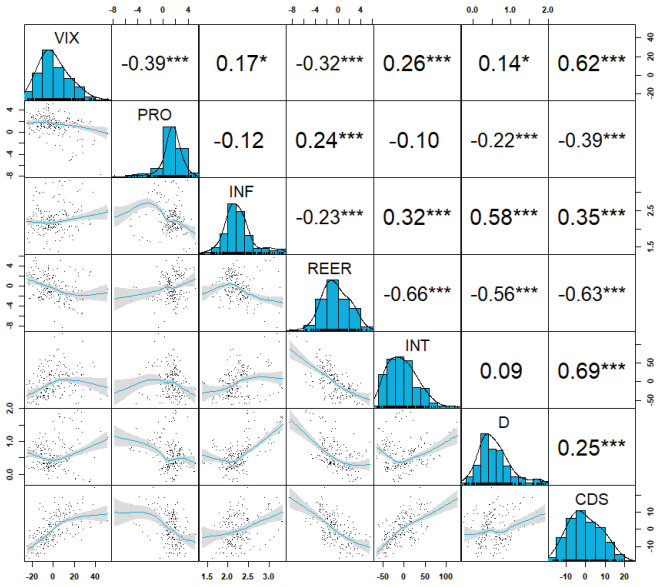


Figure 2. The Relationship Between the Variables



Note: The blue line shows the linear relationship between variables, and the gray area shows the 95% confidence interval. ***, ** and * represent 1%, 5% and 10% significance levels, respectively.

Figure 2 shows the histogram, the scatterplot and the correlation coefficients of the variables. It is apparent from this table that there is a moderate relationship (-0.39, -0.32, 0.26) between the VIX, PRO, REER and INT variables at the 1% significance level. There is a positive relationship between the VIX and D variables at the 10% significance level. The correlation is 0.14. There are strong correlations between the REER-INT, REER-D, REER-CDS, INT-CDS, CDS-VIX, and INF-D variables (-0.66, -0.56, -0.63, 0.69, 0.62 and 0.58, respectively). The correlation results are supported by a scatter plot showing the linear relationship between the variables at the 95 percent confidence interval. Nonetheless, these findings must be backed up with an econometric study for stronger evidence.

3.2. Model

A seven-variable VAR model using monthly data was built to examine the dynamic effects of global financial shocks on the Turkish economy and government debt. In the literature, the effects of global shocks were generally analyzed within the framework of the VAR model (Uribe & Yue 2006; Akıncı, 2013; Yıldırım, 2016; Lodge & Manu 2022). Because the VAR approach is widely available, and was used in many investigational studies, it allowed us to analyze the effects of global shocks on the economy and government debt. The empirical model takes the form of a second-order VAR system as following[4]:

$$\begin{bmatrix} \mathrm{VIX_t} \\ \mathrm{PRO_t} \\ \mathrm{INF_t} \\ \mathrm{REER_t} \\ \mathrm{INT_t} \\ \mathrm{D_t} \\ \mathrm{CDS_t} \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \\ c_4 \\ c_5 \\ c_6 \\ c_7 \end{bmatrix} + \sum_{k=2}^{p} \begin{bmatrix} A_{11}^{(j)} & A_{12}^{(j)} & A_{13}^{(j)} & A_{14}^{(j)} & A_{15}^{(j)} & A_{16}^{(j)} & A_{17}^{(j)} \\ A_{21}^{(j)} & A_{22}^{(j)} & A_{23}^{(j)} & A_{24}^{(j)} & A_{25}^{(j)} & A_{26}^{(j)} & A_{27}^{(j)} \\ A_{31}^{(j)} & A_{32}^{(j)} & A_{33}^{(j)} & A_{34}^{(j)} & A_{35}^{(j)} & A_{36}^{(j)} & A_{37}^{(j)} \\ A_{41}^{(j)} & A_{42}^{(j)} & A_{43}^{(j)} & A_{44}^{(j)} & A_{45}^{(j)} & A_{46}^{(j)} & A_{47}^{(j)} \\ A_{51}^{(j)} & A_{52}^{(j)} & A_{53}^{(j)} & A_{54}^{(j)} & A_{55}^{(j)} & A_{56}^{(j)} & A_{57}^{(j)} \\ A_{61}^{(j)} & A_{62}^{(j)} & A_{63}^{(j)} & A_{64}^{(j)} & A_{65}^{(j)} & A_{66}^{(j)} & A_{67}^{(j)} \\ A_{71}^{(j)} & A_{72}^{(j)} & A_{73}^{(j)} & A_{74}^{(j)} & A_{75}^{(j)} & A_{76}^{(j)} & A_{77}^{(j)} \end{bmatrix} \begin{bmatrix} \mathrm{VIX_{t-k}} \\ \mathrm{PRO_{t-k}} \\ \mathrm{INF_{t-k}} \\ \mathrm{REER_{t-k}} \\ \mathrm{INT_{t-k}} \\ \mathrm{D_{t-k}} \\ \mathrm{CDS_{t-k}} \end{bmatrix} + \begin{bmatrix} \varepsilon_t^{\mathrm{VIX}} \\ \varepsilon_t^{\mathrm{PRO}} \\ \varepsilon_t^{\mathrm{INF}} \\ \varepsilon_t^{\mathrm{REER}} \\ \varepsilon_t^{\mathrm{INT}} \\ \varepsilon_t^{\mathrm{D}} \\ \varepsilon_t^{\mathrm{CDS}} \end{bmatrix} \quad (1)$$

where ε_t^i is the structural shocks of the variables.

The vector of seven endogenous variables, $y_t = (\mathrm{VIX_t}, \mathrm{PRO_t}, \mathrm{INF_t}, \mathrm{REER_t}, \mathrm{INT_t}, \mathrm{D_t}, \mathrm{CDS_t})$ are used to analyze the dynamic effects of global shocks. As mentioned in the literature section, VIX, TED, and the U.S BAA corporate bond yield variables are used as an indicators of global financial risk shocks. The choice of these shocks is because they are crucial shocks that affect emerging economies. To put it more clearly, the main reason for the selection of variables is that investors' risk appetite and capital inflows to emerging countries depend on

[4] The AIC and FPE information criterion were considered for determining the lag length. The Appendix contains the specification test results for the estimated second-order VAR system.

US monetary conditions and financial markets (Yıldırım, 2016, p. 211). To guarantee the stationary of the variables, the VAR model contains a logarithm of the annual percentage changes of the variables. As the dynamic effects of global shocks on both the economy and government debt was investigated using the VAR model, a standard Cholesky decomposition was used to identify the shocks. The ordering is as follows:

$$\mathrm{VIX_t} \rightarrow \mathrm{PRO_t} \rightarrow \mathrm{INF_t} \rightarrow \mathrm{REER_t} \rightarrow \mathrm{INT_t} \rightarrow \mathrm{D_t} \rightarrow \mathrm{CDS_t} \quad (2)$$

In the second-order VAR system in Equation (1), the variables are ordered from the most exogenous to the most endogenous. VIX is used as the most exogenous variable representing global financial conditions. Because Türkiye has such a small open economy, VIX shocks are swiftly propagated to macroeconomic variables, while macroeconomic factors have little impact on VIX (Gürel, 2021, p. 552). Since the global financial conditions are exogenous, it imposed restriction $A_{12}^{(j)} = A_{13}^{(j)} = A_{14}^{(j)} = A_{15}^{(j)} = A_{16}^{(j)} = A_{17}^{(j)} = 0$. Then, the second-order VAR system takes the form as follows:

$$\begin{bmatrix} \mathrm{VIX_t} \\ \mathrm{PRO_t} \\ \mathrm{INF_t} \\ \mathrm{REER_t} \\ \mathrm{INT_t} \\ \mathrm{D_t} \\ \mathrm{CDS_t} \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \\ c_4 \\ c_5 \\ c_6 \\ c_7 \end{bmatrix} + \sum_{k=2}^{p} \begin{bmatrix} A_{11}^{(j)} & 0 & 0 & 0 & 0 & 0 & 0 \\ A_{21}^{(j)} & A_{22}^{(j)} & A_{23}^{(j)} & A_{24}^{(j)} & A_{25}^{(j)} & A_{26}^{(j)} & A_{27}^{(j)} \\ A_{31}^{(j)} & A_{32}^{(j)} & A_{33}^{(j)} & A_{34}^{(j)} & A_{35}^{(j)} & A_{36}^{(j)} & A_{37}^{(j)} \\ A_{41}^{(j)} & A_{42}^{(j)} & A_{43}^{(j)} & A_{44}^{(j)} & A_{45}^{(j)} & A_{46}^{(j)} & A_{47}^{(j)} \\ A_{51}^{(j)} & A_{52}^{(j)} & A_{53}^{(j)} & A_{54}^{(j)} & A_{55}^{(j)} & A_{56}^{(j)} & A_{57}^{(j)} \\ A_{61}^{(j)} & A_{62}^{(j)} & A_{63}^{(j)} & A_{64}^{(j)} & A_{65}^{(j)} & A_{66}^{(j)} & A_{67}^{(j)} \\ A_{71}^{(j)} & A_{72}^{(j)} & A_{73}^{(j)} & A_{74}^{(j)} & A_{75}^{(j)} & A_{76}^{(j)} & A_{77}^{(j)} \end{bmatrix} \begin{bmatrix} \mathrm{VIX_{t-k}} \\ \mathrm{PRO_{t-k}} \\ \mathrm{INF_{t-k}} \\ \mathrm{REER_{t-k}} \\ \mathrm{INT_{t-k}} \\ \mathrm{D_{t-k}} \\ \mathrm{CDS_{t-k}} \end{bmatrix} + \begin{bmatrix} \varepsilon_t^{\mathrm{VIX}} \\ \varepsilon_t^{\mathrm{PRO}} \\ \varepsilon_t^{\mathrm{INF}} \\ \varepsilon_t^{\mathrm{REER}} \\ \varepsilon_t^{\mathrm{INT}} \\ \varepsilon_t^{\mathrm{D}} \\ \varepsilon_t^{\mathrm{CDS}} \end{bmatrix} \quad (3)$$

The CDS premium takes last place in the system. In other words, the country risk premium[5] reacts simultaneously and rapidly to changes in other variables. Indeed, financial markets are likely to respond swiftly to news regarding cyclical fluctuations in emerging market economies. (Uribe & Yue 2006; Akıncı, 2013). Similarly, the government debt is ordered before the CDS premium after other variables in the system. Government debt is affected by internal and external shocks contemporaneously, but it affects macroeconomic variables with a lag due to the lagged effect of fiscal policy. Therefore, this identification strategy seems reasonable to assume because fiscal policy has response lag.

3.3. Empirical results

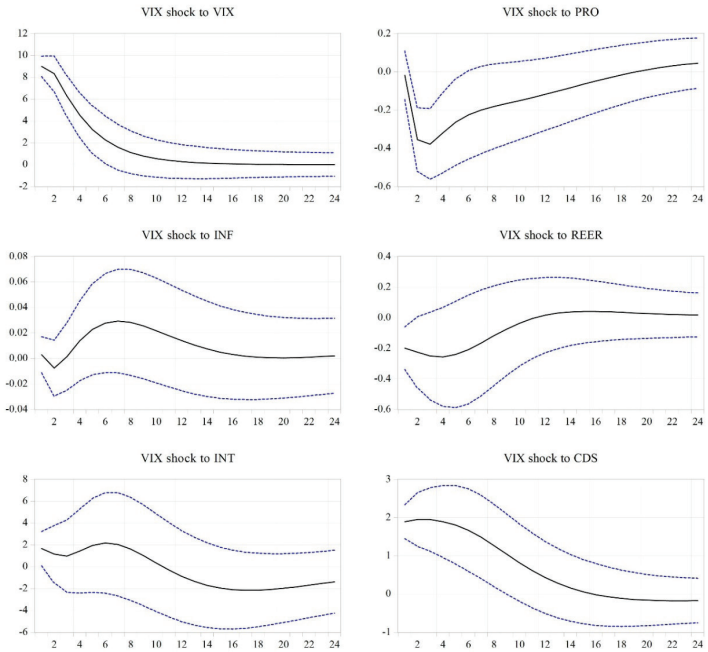
In this section, the impact of an increase in global risks is investigated on the Turkish economy and government debt. Additionally, the variance decomposition of the variables is presented.

[5] A market-based real-time gauge of sovereign credit quality and default risk is provided by sovereign CDS (Aizenman, Hutchison, & Jinjarak, 2013, p. 39)

3.3.1. Impulse responses

First, it is important to see the impact of an increase in global risks on the Turkish economy. This effect is shown in Figure 3. The blue lines show Monte Carlo confidence bands estimated based on 1000 repetitions. The black lines show point estimates of impulse responses. Figure 3 presents the effect of a positive shock ε_t^{VIX} on macroeconomic variables.

Figure 3. The Responses of Macroeconomic Variables to ε_t^{VIX} Shock in the Second-Order VAR System

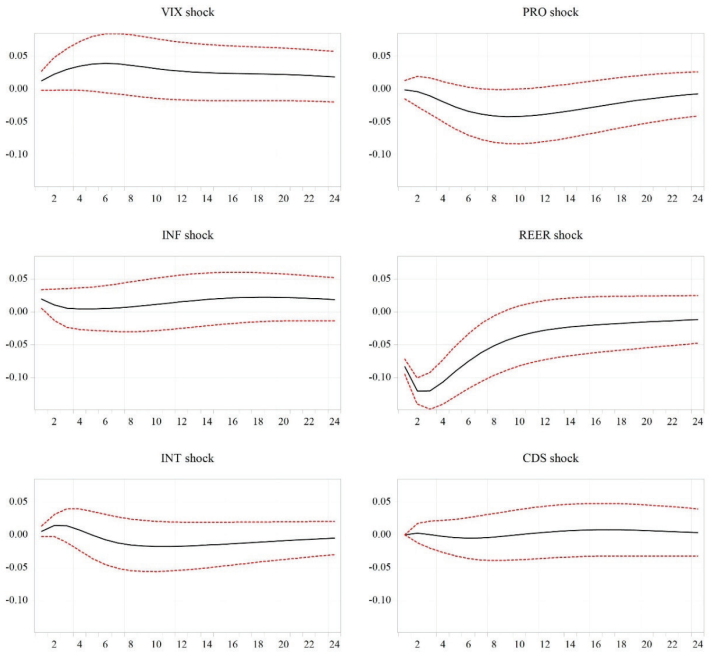


As shown in Figure 3, a positive increase in global risks affects the Turkish economy negatively within expectations. These results match those observed in earlier studies. Global financial conditions have strong and long-lasting effects, especially on production and the real effective exchange rate index. The peak response in production is reached after three months. Then, its response falls toward a steady-state level. As can be seen from the graph above that the VIX index has a positive and crucial effect on the CDS premium. This result is consistent with the studies of Pan & Singleton (2008) and Hilscher & Nosbusch (2010). The results are also consistent with studies in the literature that prove the negative effects of global risk shocks on emerging countries. These results are closely related to investors' risk appetite. As Choi (2018) concluded, when financial risks increase, international investors withdraw their money from emerging countries, borrowing cost increases, and the domestic

credit market contracts. The high borrowing cost and the decline in the domestic credit market led to a decline in output and investment. The Turkish economy is very sensitive to global conditions.

Figure 4 shows the effects of a positive shock (The shock vector is $\varepsilon_t = \varepsilon_t^{VIX}, \varepsilon_t^{PRO}, \varepsilon_t^{INF}, \varepsilon_t^{REER}, \varepsilon_t^{INT}, \varepsilon_t^{CDS}$) on the government debt in the second-order VAR system. The red lines show Monte Carlo confidence bands estimated based on 1000 repetitions. The black lines show point estimates of impulse responses. Figure 4 shows that a positive shock in the variables affects government debt negatively. The disturbances in global conditions peaks government debt at the end of the fifth month and moves towards the steady state level after the shock. These results demonstrate that the impact of global conditions on government debt lasts a long time.

Figure 4. The Response of the Government Debt to $\varepsilon_t^{VIX}, \varepsilon_t^{PRO}, \varepsilon_t^{INF}, \varepsilon_t^{REER}, \varepsilon_t^{INT}, \varepsilon_t^{CDS}$ in the Second-Order VAR System



The impact of macroeconomic variables on government debt is in line with expectations. A positive shock, ε_t^{PRO}, has a reducing effect on government debt. Indeed, the positive effect on the budget due to the increase in tax revenues in high growth periods reduces the debt rollover. One of the macroeconomic variables that has the highest impact on government debt is the real effective exchange rate. Figure 4 displays that a positive shock (the appreciation of the Turkish lira) in the real effective exchange rate falls the government debt. Additionally, the major

contributor to government debt is from the real effective exchange rate as one would expect. The real effective exchange rate has the largest effect on the government debt. This is because approximately 66% of the government debt stock in Türkiye (as of January 2022) consists of foreign currency denominated debt. The impact of the real effective exchange rate on government debt stems from the appreciation effect of a reduction in global risks on the Turkish lira. When global liquidity is abundant and risk appetite is high, the demand of international investors for the assets of emerging market economies such as Türkiye causes the domestic currency to be appreciated and interest rates to decrease with portfolio inflows to the country. Additionally, an increase in government debt leads to an increase in the CDS premium. However, the half-life of the CDS response is about one month and then it is not significant.

3.3.2. Variance decomposition

Table 1 shows the variance decomposition results for government debt at the 1st, 6th, 12th, and 24th periods.

Table 1: Variance Decomposition Results for Debt, %

	VIX	*PRO*	*INF*	*REER*	*INT*	*D*	*CDS*
1st	*1.47%*	*0.01%*	*3.51%*	*63.38%*	*0.25%*	*31.38%*	*0.00%*
6th	*6.58%*	*2.74%*	*0.68%*	*69.32%*	*0.58%*	*19.99%*	*0.06%*
12th	*9.64%*	*9.61%*	*1.06%*	*57.10%*	*1.67%*	*20.8%*	*0.09%*
24th	*12.00%*	*11.86%*	*4.23%*	*49.74%*	*2.38%*	*19.38%*	*0.38%*

According to Table 1, global financial conditions explain approximately 12% of movements in government debt at the end of the horizon (2 years). PRO, INF, REER, INT account for 11.86%, 4.23%, 49.74%, 2.38% of movements in government debt at the end of the horizon, respectively. The biggest contribution to the movements in government debt is from the VIX after the real effective exchange rate and government debt. The CDS premium has relatively less effect on government debt. According to the results of variance decomposition, the decrease in global risks has a reducing effect on government debt. These findings suggest that global financial shocks are a considerable source of fluctuations in Türkiye's government debt.

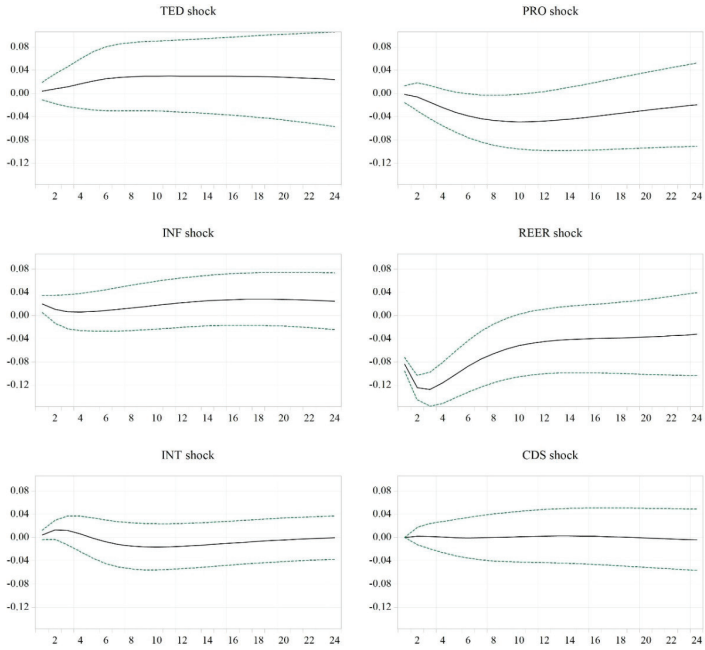
3.3.3. Robustness

This section discusses the robustness of the alternative specifications. The above results show Türkiye's sensitivity to global risk shocks as an emerging country. But more evidence is needed to support these conclusions. In this section, the robustness of the results are measured by using a different global financial conditions indicator and alternative government debt indicator. Additionally, and lastly, the results were checked based on the assumption of alternative identification and based on the post-crisis period.

3.3.3.1. Alternative measures of global financial conditions

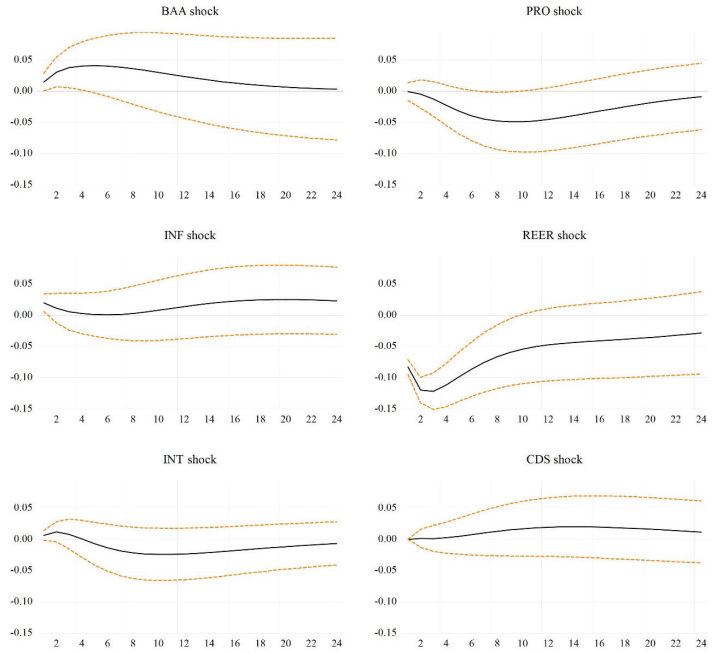
First, the baseline model was estimated by using the TED and Moody's Seasoned Baa Corporate Bond Yield (the U.S BAA) variables to see if the findings above are robust for an alternative measure of global financial risk. Figure 5 and 6 present the effect of positive shocks on government debt.

Figure 5. The Response of the Government Debt to in the Second-Order VAR System



In Figure 5, the green lines show Monte Carlo bootstrap confidence bands estimated based on 1000 repetitions. The black line shows point estimates of impulse responses. Additionally, the U.S BAA corporate bond yield was used as an indicator for global risk. The findings are very similar to those shown in Figure 4 and Figure 5.

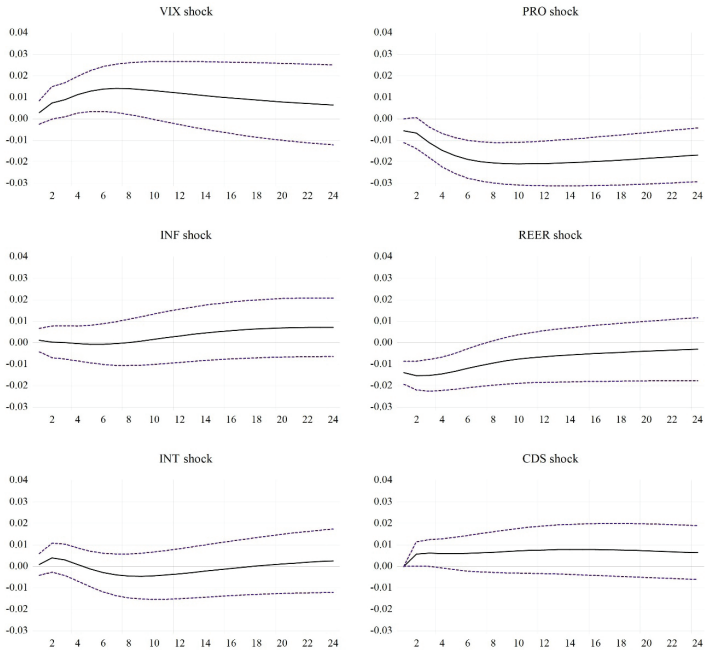
Figure 6. The Response of the Government Debt to in the Second-Order VAR System



3.3.3.2. Alternative debt indicator

The logarithm of the debt-to-GDP ratio was also used as an indicator of government debt burden in the second-order VAR system. (Total government debt stock/GDP). The level values of the variables were used in the VAR model. The results supported that the impulse responses are identical to the previous findings. Figure 7 presents the effect of positive shocks on government debt.

Figure 7. Impulse Responses to Shocks in the Second-Order VAR System



3.3.3.3. Alternative identification assumptions

Alternative identification assumptions were also checked to see whether the results changed. First, the government debt ordered last in the second order-VAR system. Second, the CDS premium was ordered after the global financial conditions (VIX). As a result, the findings of the paper are supported by this alternative identification assumption.

3.3.3.4. Post-crisis period

Additionally, and finally, the baseline second-order VAR system re-estimated for the post-crisis period (2008 global financial crisis) between 2010:1-2020:12. Global financial conditions continue to be a significant factor. Succinctly, these results are extremely robust[6].

Conclusion and policy recommendations

In recent years, the importance of global financial conditions for emerging economies has grown. The possibility of the end of unconventional monetary policies, in particular,

[6] All results are available upon request.

reduces risk appetite for emerging economy assets. As a result, capital flows to these countries are decreasing. These conditions have a negative impact on the emerging economies such as Türkiye that rely heavily on external borrowing. The borrowing need also reaches to a high-cost level and the government debt increases.

This study analyzed the role of global financial risk shocks on macroeconomic fluctuations and government debt between the period 2003:1-2020:12 with a VAR model. In the present paper, first, the effect of an increase in global financial risk on macroeconomic variables was investigated. According to the findings, the rise in global financial shocks has a detrimental impact on the Turkish economy. Second, the effects of a standard deviation shock in global financial risks and macroeconomic variables on government debt were investigated separately. The results showed that the increase in global risks increases the government debt. The findings of the current study demonstrated that the increase in industrial production and the real effective exchange rate reduces government debt.

The policy implications of these results for Türkiye are clear. First, the policymakers in Türkiye should closely monitor and follow the global financial conditions. The possibility of a sudden stop might increase due to elevated global financial risks. As IMF (2021) indicated that investor appetite can quickly fade due to large borrowing needs, foreign currency denomination, and short maturity in highly indebted markets and emerging economies. Second, Türkiye has to reduce its government debt and dependence on external borrowing. Because a rapid increase of debt buildup might lead to financial crises. Third, the share of foreign currency liabilities in government debt needs to be reduced in order not to raise concerns about sustainability. Lastly, fiscal policies which support the production should be implemented to reduce government debt in Türkiye. This might increase the budget revenues in the long run and reduce the need for government borrowing. Consequently, as Köse et al. (2022) pointed out that the combination of possible policies, such as orthodox and heterodox approaches, should determine by the characteristics of the country and the type of debt.

Acknowledgement: All paper-related materials are available upon request.

Peer-review: Externally peer-reviewed.
Conflict of Interest: The author has no conflict of interest to declare.
Grant Support: The author declared that this study has received no financial support.

Hakem Değerlendirmesi: Dış bağımsız.
Çıkar Çatışması: Yazar çıkar çatışması beyan etmemişlerdir.
Finansal Destek: Yazar finansal destek beyan etmemişlerdir.

References/Kaynakça

Agénor, P.-R., Aizenman, J., & Hoffmaister, A. W. (2008). External shocks, bank lending spreads, and output fluctuations. *Review of International Economics*, *16*(1), 1–20. https://doi.org/10.1111/j.1467-9396.2007.00658.x

Aizenman, J., Hutchison, M., & Jinjarak, Y. (2013). What is the risk of European sovereign debt defaults? Fiscal space, CDS spreads and market pricing of risk. *Journal of International Money and Finance*, *34*, 37–59. https://doi.org/10.1016/j.jimonfin.2012.11.011

Akıncı, Ö. (2013). Global financial conditions, country spreads and macroeconomic fluctuations in emerging countries. *Journal of International Economics*, *91*(2), 358–371. https://doi.org/10.1016/j.jinteco.2013.07.005

Beber, A., Brandt M., W., & Kavajecz K. A. (2009). Flight-to-quality or flight-to-liquidity? Evidence from the Euro-Area bond market. *The Review of Financial Studies*, *22* (3), 925–957. http://www.jstor.org/stable/30225681

Bekkour, L., Jin, X., Lehnert T., Rasmouki, F., Wolff, C. (2015). Euro at risk: The impact of member countries' credit risk on the stability of the common currency. *Journal of Empirical Finance*, *33*, 67–83. https://doi.org/10.1016/j.jempfin.2015.06.004

Blanchard O., Dell'Ariccia, G., & Mauro, P. (2010). Rethinking macroeconomic policy. IMF Staff Position Note SPN/10/03, International Money Fund.

Blanchard O., Dell'Ariccia, G, & Mauro, P. (2013). Rethinking macroeconomic policy II: Getting granular. IMF Staff Discussion Note SDN/13/03, International Money Fund.

Cecchetti, S. G., Mohanty, M. S., & Zampolli, F. (2011). The real effects of debt. BIS Working Paper 352, Bank for International Settlements, Basel.

Choi, S. (2018). The impact of US financial uncertainty shocks on emerging market economies: An international credit channel. *Open Econ Rev*, *29*, 89–118. https://doi.org/10.1007/s11079-017-9471-y

Ciarlone, A., Piselli, P., & Trebeschi, G. (2009). Emerging markets' spreads and global financial conditions. *Int. Fin. Markets, Inst. and Money*, *19*(2009), 222-239. https://doi.org/10.1016/j.intfin.2007.11.003

Eichengreen, B., Rose, A. K., & Wyplosz, C. (1995). Exchange market mayhem: the antecedents and aftermath of speculative attacks. *Economic policy*, *10*(21), 249-312. https://doi.org/10.2307/1344591

Frankel, J. A., & Rose, A. K. (1996). Currency crashes in emerging markets: An empirical treatment. *Journal of International Economics*, *41*(3–4), 351–366. https://doi.org/10.1016/S0022-1996(96)01441-9

García-Herrero A., & Ortíz, A. (2006). The role of global risk aversion in explaining sovereign spreads. *Brookings Institution Press*, *7*(1), 125–155. https://www.jstor.org/stable/20065508

Gürel, S. P. (2021). How the macroeconomic conditions and the global risk factors affect sovereign CDS spreads? New evidence from Turkey. *Business & Management Studies: An International Journal*, *9*(2), 547–560. https://doi.org/10.15295/bmij.v9i2.1800

Hilscher, J., & Nosbusch, Y. (2010). Determinants of sovereign risk: Macroeconomic fundamentals and the pricing of sovereign debt. *Review of Finance*, *14*(2), 235–262. https://doi.org/10.1093/rof/rfq005

Horvath, J., & Zhong, J. (2019). Unemployment dynamics in emerging countries: Monetary policy and external shocks. *Economic Modelling*, *76* (January), 31-49. https://doi.org/10.1016/j.econmod.2018.07.017

Hui, C. H., & Fong, T. P. W. (2015). Price cointegration between sovereign CDS and currency option markets in the financial crises of 2007-2013. *International Review of Economics and Finance, 40*(April 2010), 174–190. https://doi.org/10.1016/j.iref.2015.02.011

IMF (2021). Fiscal monitor, April 2021. International Money Fund. Retrieved from IMF website: https://www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021

IMF (2022). Global financial stability report navigating the high-inflation environment. Oct 2022. International Money Fund. Retrieved from IMF website: https://www.imf.org/en/Publications/GFSR/Issues/2022/10/11/global-financial-stability-report-october-2022

Köse. M., A., Nagle, P., Ohnsorge, F., & Sugawara, N. (2021). *Global waves of debt: Causes and consequences*. Washington, DC: World Bank.

Köse, M. A., Ohnsorge, F. L., Reinhart, C. M., & Rogoff, K. S. (2022). The aftermath of debt surges. *Annual Review of Economics*, *14*, 637-663. https://doi.org/10.1146/annurev-economics-051420-015343

Kumar, M., Moorthy, U., & Perraudin, W. (2003). Predicting emerging market currency crashes. *Journal of Empirical Finance*, *10*(4), 427–454. https://doi.org/10.1016/S0927-5398(02)00068-3

Lian, W., Presbitero, F. A., & Wiriadinata, U. (2020). Public debt and r-g at risk. IMF Working Paper WP/20/137, International Money Fund.

Lodge, M., & Manu, A. (2022). EME financial conditions: Which global shocks matter? *Journal of International Money and Finance*. *120* (February), 1-17. https://doi.org/10.1016/j.jimonfin.2021.102479

Mankiw, G. (2019). *Macroeconomics*. Macmillan Higher Education (10th): New York.

Özatay, F., Özmen, E., & Şahinbeyoğlu, G. (2009). Emerging market sovereign spreads, global financial conditions and U.S. macroeconomic news, *Economic Modelling*, *26*(2), 526-531. https://doi.org/10.1016/j.econmod.2008.10.008

Pan, J., & Singleton, K. J. (2008). Default and recovery implicit in the term structure of sovereign CDS spreads. *Journal of Finance*, *63*(5), 2345–2384. https://doi.org/10.1111/j.1540-6261.2008.01399.x

Reinhart, C. M., & Rogoff, K. (2011). From financial crash to debt crisis. *American Economic Review*, *101* (5): 1676-1706. https://doi.org/10.1257/aer.101.5.1676

Rogoff, K. (2022). Emerging market sovereign debt in the aftermath of the pandemic. *Journal of Economic Perspectives*, *36* (4), 147-66. https://doi.org/10.1257/jep.36.4.147

Uribe, M., & Yue, V. Z. (2006). Country spreads and emerging countries: Who drives whom? *Journal of International Economics*, *69*(1 SPEC. ISS.), 6–36. https://doi.org/10.1016/j.jinteco.2005.04.003

Wang, A. T., Yang, S. Y., & Yang, N. T. (2013). Information transmission between sovereign debt CDS and other financial factors: The case of Latin America. *North American Journal of Economics and Finance*, *26*, 586–601. https://doi.org/10.1016/j.najef.2013.02.023

Yared, P. (2019). Rising government debt: Causes and solutions for a decades-old trend. *Journal of Economic Perspectives*, *33* (2): 115-40. https://doi.org/10.1257/jep.33.2.115

Yıldırım, Z. (2016). Global financial conditions and asset markets: Evidence from fragile emerging economies. *Economic Modelling*, *57*, 208–220. https://doi.org/10.1016/j.econmod.2016.04.018

Appendix

Table Appendix-I All Data

Variables	Definition	Source-Codes
Volatility Index (VIX)	The logarithmic annual percentage change in the Chicago Board Options Exchange Market Volatility Index	FRED (VIXCLS)
TED Spread (TED)	The logarithmic annual percentage change in the TED spread (Treasury-Eurodollar spread)	FRED (TEDRATE)
US BAA Corporate Bond Yield	The logarithmic annual percentage change in the Moody's seasoned BAA corporate bond yield	FRED (DBAA)
5 years Credit Default Swap (CDS)	The logarithmic annual percentage change in 5 years CDS premium	BLOOMBERG AND DATASTREAM
Industrial Production Index (PRO)	The logarithmic annual percentage change (seasonally adjusted) in the total industrial production index	FRED (TURPROINDMISMEI)
Inflation (INF)	The logarithmic annual percentage change in CPI rate (seasonally adjusted)	FRED (TURCPIALLMINMEI)
Real Effective Exchange Rate (REER)	The logarithmic annual percentage change in the real effective exchange rate index	CBRT-EDDS (TP.RK.T1.Y)
Interest Rate (INT)	The annual percentage change short-term market interest rate	FRED (TURLOCOSTORSTM)
Government Debt Stock (D)	The logarithmic annual percentage change in the total government debt stock (in Turkish liras)	REPUBLIC OF TÜRKIYE MINISTRY OF TREASURY AND FINANCE
Government Debt Stock/GDP	The logarithmic of total government debt stock divided by gross domestic product (GDP is level GDP by expenditure approach in current prices)	CBRT-EDDS (TP.GSYIH26.HY.CF FOR GDP)

Table Appendix-II. Unit Root Test Results of the Variables in Second-Order VAR System

	ADF
	Constant Model
VIX	*-4.795***(0)*
CDS	*-3.723***(1)*
PRO	*-4.243***(0)*
INF	*-3.677***(1)*
REER	*-4.090***(2)*
INT	*-4.00***(1)*
D	*-3.229**(1)*

Maximum 8 lag lengths were considered in the calculation of the ADF unit root test and Schwarz information criterion was used. Table critical values for the ADF unit root test at 1%, 5% and 10% significance levels are -3.461, -2.874, -2.573. (…) indicates the lag length. ***, ** and * represent 1%, 5% and 10% significance levels, respectively.

Table Appendix-III. Lag Length Selection

Lag	*LR*	*FPE*	*AIC*	*SIC*	*HQ*
1	*2402.811*	*0.862331*	*19.71674*	*20.62760**	*20.08520**
2	*133.9618*	*0.687332**	*19.48834**	*21.19620*	*20.17920*
3	*58.00767*	*0.811204*	*19.65001*	*22.15486*	*20.66327*
4	*76.63166*	*0.852944*	*19.69251*	*22.99436*	*21.02817*
5	*75.52072*	*0.890802*	*19.72337*	*23.82222*	*21.38143*
6	*66.28124*	*0.972238*	*19.79208*	*24.68793*	*21.77254*
7	*72.10246*	*1.010486*	*19.80427*	*25.49713*	*22.10713*
8	*66.73153*	*1.075106*	*19.83071*	*26.32056*	*22.45597*
9	*64.85143*	*1.145672*	*19.84788*	*27.13473*	*22.79554*
10	*75.63064*	*1.112803*	*19.75962*	*27.84347*	*23.02968*
11	*86.09655**	*0.978239*	*19.55670*	*28.43755*	*23.14917*
12	*63.64091*	*1.015059*	*19.50230*	*29.18015*	*23.41716*