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RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

External and Domestic Shocks, Exchange Rate, Country Risk Premia and Macroeconomic Conditions in Turkey

Dış ve İç Şoklar, Döviz Kuru, Ülke Risk Primi ve Türkiye'de Makroekonomik Koşullar

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ABSTRACT

The Turkish financial markets have been in turmoil due to the adverse shocks that have originated from both global financial conditions and its domestic political environment. These shocks — especially those caused by the recent political tension in August 2018 — have resulted in a large depreciation in the Turkish lira and a significant increase in Turkey's country risk premium. This study empirically investigates the macroeconomic consequences of the recent shocks, i.e., the effects of the August depreciation and the recent jump in the risk premium, by estimating a vector autoregression model with monthly data from January 1997 to October 2018. We find that the recent adverse shocks — exchange rate, country risk premium, political risk, and external financial shocks — bring serious macroeconomic consequences, such as a recession and high inflation. To mitigate these adverse effects, policy makers should take immediate measures to restore the investors' confidence. These measures, in turn, can help to decrease Turkey's country risk premium and stabilize the Turkish lira.

Keywords: Exchange rate, Country risk premium, External financial conditions, Political risk, VAR
JEL Classification: C32, F31

ÖZ

Türk finansal piyasaları son yıllarda sert bir şekilde dalgalanmaktadır. Küresel finansal koşullardan ve ülkenin politik koşullarından kaynaklanan olumsuz şoklar bu dalgalanmaları tetiklemektedir. Bu şoklar, özellikle Ağustos 2018'de yaşanan politik tansiyonun yol açtığı olumsuz koşullar, Türk lirasında aşırı değer kaybına ve ülke risk priminde sert artışa yol açmıştır. Bu çalışma olumsuz şokların makroekonomik sonuçlarını ampirik olarak incelemektedir. Başka bir ifadeyle, ilgili çalışma TL'nin

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Ağustos 2018'deki sert değer kaybının ve aynı dönemde ülke risk primindeki sıçramanın etkilerini analiz etmektedir. Söz konusu etkiler 1997-2018 dönemini kapsayan aylık makroekonomik verilerle VAR modeli tahmin edilerek incelenmiştir. Bu çalışmada ulaşılan bulgular, olumsuz şokların — global finansal şoklar, ülke risk primi şoku, kur şoku, politik risk şoku — resesyon ve yüksek enflasyon gibi ciddi makroekonomik sonuçlarının olacağını ortaya koymaktadır. Bu olumsuz etkilerin azaltılması için, politika yapıcılar finansal piyasa yatırımcılarının güvenin tekrardan kazanılmasına yönelik tedbirlere odaklanmalıdır. Bu önlemler ülke risk priminin azalmasına ve döviz kurunun stabilize olmasına yardımcı olabilir.

Anahtar kelimeler: Döviz kuru, Ülke risk primi, Global finansal koşullar, Politik risk, VAR
JEL Sınıflaması: C32, F31

1. Introduction

Over the last decade, Turkey has experienced adverse external financial shocks — such as those triggered by the Fed's tapering talk[1] beginning May 2013 and by uncertainties about the path of the Fed's rate hike cycle — and dramatic changes in its domestic political conditions, such as the failed coup attempt on July 2016 and the heightened political tensions between Turkey and US during August 2018. These shocks have considerably affected both the value of the Turkish lira and Turkey's country risk premium[2]. Identifying these periods, Figure 1 indicates the behaviour of the bilateral exchange rate against the US dollar (defined as the number of Turkish lira per US dollar) and the country's default risk premia — proxied by both Turkey's sovereign CDS premium and J.P. Morgan's Emerging Markets Bond Index Global (the EMBIG) spread for Turkey.

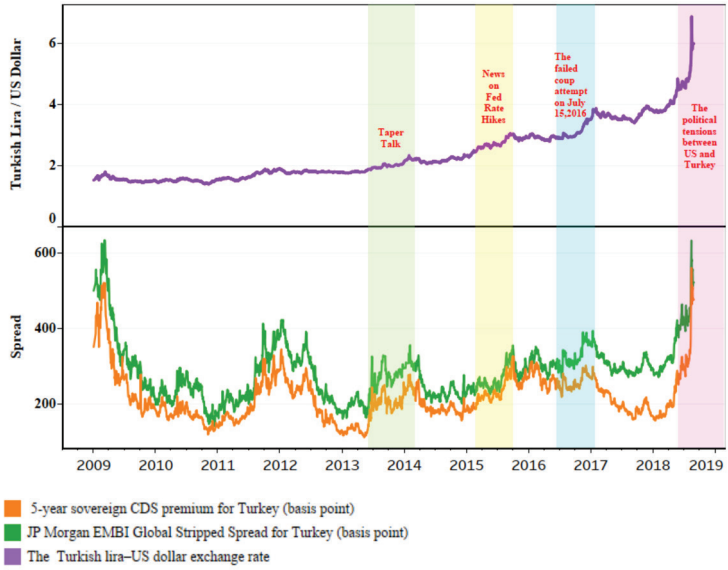
The figure highlights four stylized facts[3], describing how the Turkish financial markets are severely affected by these shocks. First, during the taper tantrum of 2013, the Turkish lira depreciated by approximately 30% against the US dollar, and the risk premium increased sharply, i.e., the spreads (CDS and EMBIG) widened. Second, in early 2015, the uncertainties about the future path of US monetary policy exerted similar effects on the Turkish financial markets, i.e., a large currency depreciation (approximately 24%), along with a significant increase in the default risk, occurred.

[1] See Sahay et al. (2014) for the Fed's tapering talk and its effect on Turkey and other emerging markets.

[2] During this period, along with these shocks, domestic macroeconomic imbalances have deepened. The independence of the CBRT was substantially reduced over the episode (Demiralp & Demiralp, 2019). Furthermore, Turkey's current account deficits have sharply widened until 2018, reaching $ 33.1 billion in 2016, $ 47.3 billion in 2017. Country's gross external debt (private and public) has dramatically increased and reached $ 445 billion at the end of 2018, although its FX reserves have remained insufficient. All these imbalances have also contributed to severe turbulences in the Turkish financial markets, notably to the latest happened in August 2018. In sum, the macroeconomic problems, namely high foreign debt stock, huge current account deficit and insufficient FX reserves, and declining central bank independence made the effects of shocks on Turkish financial markets more severe.

[3] Figure 1 also indicates the effects of Euro area debt crisis on the Turkish financial markets between the last quarter of 2011 and the first quarter of 2012. During this period, Turkey's country risk premium increased, but the value of the Turkish lira remained largely stable. In other words, the euro area debt crisis had limited effect on the lira, but significant impact on the default risk.

Figure 1. Dynamics of the Turkish Lira and Turkey's Default Risk Premia



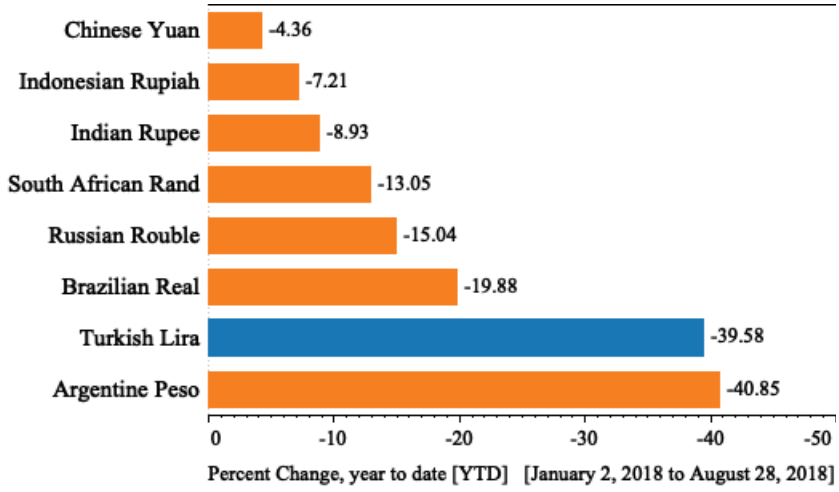
Source: DataStream.

Third, during the failed coup attempt (between July 15 and December 31, 2016), Turkey experienced a pattern of financial turmoil similar to that which it experienced during May 2013: the lira sharply weakened against the US dollar, and the CDS and EMBIG spreads increased. Fourth, the heightened tensions between Turkey and the US in August 2018 also generated severe turbulence in Turkish financial markets by eroding investors' confidence[4]. Following the US economic sanctions on two Turkish cabinet ministers, the demand for Turkish lira sharply decreased, and its value fell dramatically. This depreciation significantly raised the value of Turkey's private-sector foreign currency debt in terms of the lira. Thus, it created great concern about (private) external debt sustainability and thereby caused a further depreciation in the lira. Consequently, this process resulted in a large currency depreciation and higher default risk: The Turkish lira lost approximately 25% of its value against the US dollar, and the EMBIG (the CDS)

[4] See Nelson (2018), Erbil and Ozlale (2018), Akcay and Güngen (2019) for reasons and potential consequences of the August 2018 financial turmoil, Kriwoluzky and Rieth (2018) for policy responses to this turmoil, and Arbaa and Varon (2019) for the international financial spillover effects from the turmoil.

spreads increased to a peak of 632 (558) basis points within the first two weeks of August. With this depreciation, the loss in the lira reached a critical level — approximately 40% — from the start of 2018 to August 2018 (see Figure 2). According to the year-to-date (YTD) performance analysis of major emerging market (EM) currencies presented in Figure 2, the Turkish lira became the second worst-performing major emerging currency in 2018.

Figure 2. Major EM Currencies Performance from January 2018 to August 2018



Source: DataStream.

In sum, Turkey has suffered from a dangerous combination of a sharp depreciation in the lira and a significant rise in its default risk premium. Currently, different parts of Turkish society, such as ordinary citizens, policy makers, investors, and financial market participants, have been considerably worried about the macroeconomic consequences of this combination. From the theoretical point of view (Section 2), it may bring severe consequences to the real economy. For instance, the new open-economy macroeconomics models — considering the effects of exchange rate on the domestic balance sheets — predict that in an emerging market economy (EME) with dollarized liabilities such as Turkey, a large currency depreciation (or a steep jump in the risk premia) will cause a long-lasting recession and high inflation via the financial channel. Moreover, they highlight that

a powerful feedback between the exchange rate and the default risk causes an insolvency/depreciation spiral, potentially triggering a wave of bankruptcies, endangering financial stability, and ultimately resulting in a currency crisis. However, despite the theoretical predictions and stylized facts, there is no empirical work looking at the macroeconomic consequences of the recent shocks that have hit the Turkish financial markets. In light of these developments and concerns, this study aims to fill this gap. To the best our knowledge, the current paper is unique in that it empirically examines the recent financial turmoil and its consequences on the Turkish economy, with a special focus on the financial channel of the exchange rate, which is explained in Section 2.

This paper proceeds as follows. Section 2 explains the underlying theoretical perspective. Section 3 describes the data and methodology, explains empirical findings, and summarizes the results of our robustness experiments. Finally, Section 4 concludes.

2. Theoretical Framework

The transmission channels of external and domestic shocks to economic activity in a typical EM are presented in Figure 3. This figure shows that global financial and domestic political conditions influence the real macroeconomy by simultaneously affecting the exchange rate and the country risk premium through several channels. For instance, unfavourable external financial conditions depreciate local currency and simultaneously raise the country risk premium through the flight-to-quality mechanism[5]. According to this mechanism, an adverse shift in external financial conditions forces international investors to adjust their portfolios by purchasing safe bonds, such as US treasury bills, and selling risky EM bonds. This portfolio adjustment induces capital outflows from EMEs, generating a sudden and sharp currency depreciation. Moreover, these adverse conditions also cause a higher country risk premium in EMEs by lowering the investors' appetite for risk and thereby leading them to demand an additional

[5] See Choi (2018) and Chudik and Fratzscher (2011) for the flight-to-quality phenomenon.

premium for shifts in this appetite. Political instability also causes a large currency depreciation and a simultaneous rise in the default risk because it not only triggers a sudden stop of capital flows (or a rush for the exit) by eroding investor confidence, but due to political risk, by raising the perceived riskiness of assets, it also forces market participants to require an additional default premium. Here, we explain the theoretical channels through which a large currency depreciation and a sudden jump in the risk premium influence the real economy.

Figure 3. Transmission Mechanisms of External and Domestic Shocks to Economic Activity

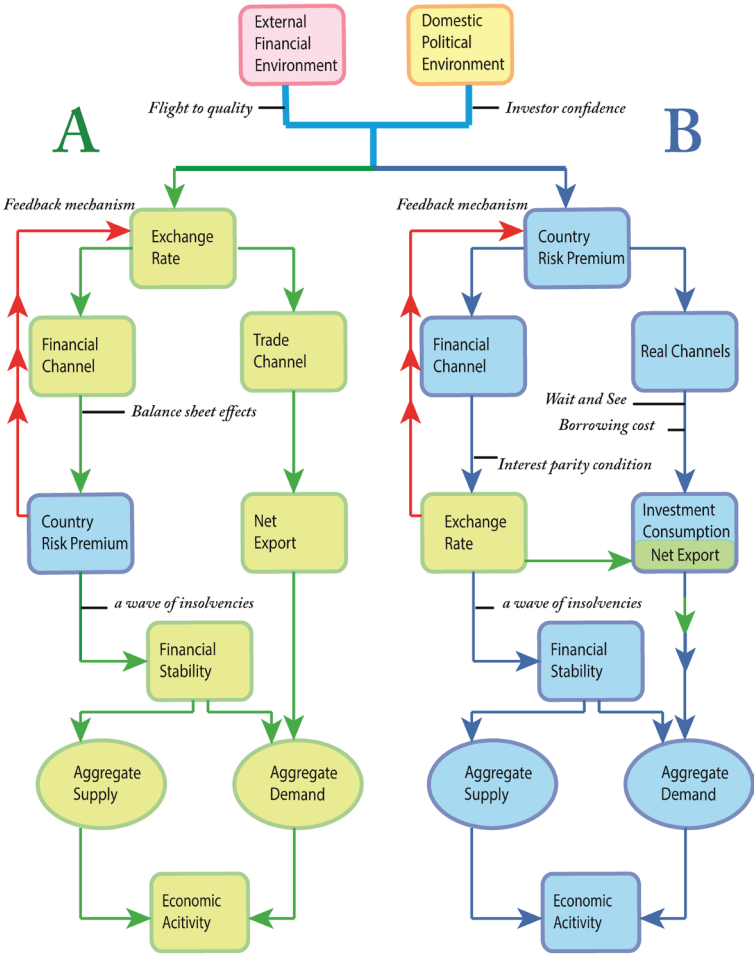


Figure 3, Panel A, suggests that a currency depreciation influences the real macroeconomy via two fundamental channels: trade and financial channels[6,7]. These channels work in different directions because they focus on different aspects of the economy. The trade channel considers trade balance, while the financial channel focuses on the external balance sheet.

The trade channel, also known as the expenditure-switching channel, is a typical textbook view based on the Marshall-Lerner condition and standard in traditional open-economy macro models, suggesting a currency depreciation increases exports and reduces imports, thereby boosting net exports, aggregate demand, and economic activity (Panel A). This view addresses only the effects on trade flows, but it ignores the valuation effects on the borrowers' (banks, firms, etc.) balance sheets, their net worth, the country risk premium and on financial stability.

The financial channel of a currency depreciation[8] — also called the balance sheet channel or risk-taking channel — is relatively new and gaining importance with the ongoing process of financial globalization (Georgiadis & Mehl, 2016). The financial globalization process allows EM corporations to borrow abroad in foreign currency to extend local currency activities and alters the currency composition of their balance sheets — notably, the liability side — from local currency to US dollars. This process consequently brings new structural problems, namely, liability dollarization and currency mismatch. These problems make the corporations' balance sheets and thereby the default risk more vulnerable to large

[6] See Yildirim and Ivrendi (2016) for other theoretical channels through which a currency depreciation influences macroeconomic variables, such as inflation, the money supply, interest rates, investment, and consumption.

[7] Anaya and Hasenclever (2018) provide an extensive discussion regarding these two channels. Kearns and Patel (2016) empirically investigate the relative strength of the channels in emerging markets and advanced economies by using a trade-weighted exchange rate (the nominal effective exchange rate) for the trade channel and by calculating a debt-weighted exchange rate for the financial channel. These authors reveal the financial channel offsets the trade channel for EMEs but that the trade channel dominates in advanced economies. Their findings also indicate the strength of the financial channel is stronger in EMEs with larger foreign currency debt. Furthermore, Hofmann, Shim, and Shin (2016) report empirical evidence on the importance of the financial channel of exchange rates in EMEs.

[8] A growing number of studies (Bordo, Meissner, & Weidenmier, 2009; Bruno & Shin, 2018; Berganza, Chang, & Herrero, 2004; and Hofmann et al., 2016) provide empirical support for the importance of this channel by emphasizing the balance sheet effects.

exchange rate swings. As a result, financial globalization significantly intensifies the financial channel by establishing a causal nexus from exchange rate to the risk premium. Currently, the value of a local currency against the US dollar and the country default risk premium (CDS or EMBI spreads) dance to the same tune in a typical emerging market with dollarized liabilities such as Turkey[9] (Figure 1).

The financial channel works as follows. In the presence of liability dollarization, a currency depreciation wrecks the balance sheets of domestic corporations, declines their net worth, and thereby generates great concern about their ability to repay foreign currency debt. This deterioration in the investors' risk perceptions leads to a significant increase in the country's default risk premium, triggering a further currency depreciation. Thus, this channel implies that an unexpected currency depreciation may itself induce investors to demand a higher risk premium, and it suggests a strong feedback mechanism between the exchange rate and the risk premium, producing a vicious cycle and then a severe combination of currency collapse and a higher risk premium[10]. This mechanism (or combination) has a potential to trigger a wave of bankruptcies, a currency crisis, and a downturn in economic activity by disturbing financial stability and thereby dampening aggregate demand and supply. Overall, the financial channel of the exchange rate suggests that through a vicious cycle between deprecation and country default risk premium, a large currency depreciation may bring a financial crisis in a vulnerable economy with heavily dollarized liabilities.

[9] See Hofmann et al. (2016) and Özmen and Yılmaz (2017) for further evidence about this fact.

[10] In the new open-economy macroeconomics literature, several authors model the feedback mechanism to indicate the disruptive balance sheet effects of exchange rates. For instance, Céspedes, Chang, and Velasco (2004) develop a model that assumes a small open-economy with dollarized liabilities where the country risk premium is endogenously determined by domestic net worth. Choi and Cook (2004) also build a model by considering liability dollarization in the domestic banking sector of an EME with a floating exchange rate system where local banks borrow from financial markets in US dollars to extend local currency loans; thus, they encounter currency mismatches on their balance sheets, making their creditworthiness more vulnerable to exchange rate movements. In their setup, the country's default risk premium hence is purely determined by the creditworthiness of domestic banks. This creates a feedback loop between the exchange rate and the country risk premium. Recently, a growing number of studies (Banerjee, Devereux, & Lombardo, 2016) use a similar theoretical modelling approach to explain the spillovers from US monetary policy to EMEs. Overall, the literature suggests that currency depreciation raises the risk premium by negatively affecting the liability side of domestic balance sheets and thereby generating debt-service difficulties in a typical EME with higher foreign currency debt.

Panel B of Figure 3 describes how country risk premium affects economic activity through both financial and real channels. The financial channel of the country risk premium suggests a risk premium increase is transmitted to the real macroeconomy through capital outflows and currency depreciations, directly linking it with the conventional Mundell-Fleming model and the new open-economy models through the trade and balance sheet channels of the exchange rate, respectively. The traditional model reveals a puzzling prediction that an unexpected rise in the risk premium stimulates economic activity since it generates a currency depreciation through the interest parity condition, increasing net exports and aggregate demand via the trade channel. However, the new (small) open-economy macroeconomic models — the exchange rate and the currency crisis models — offer a more realistic prediction. These models maintain that due to the balance sheet effects of a currency depreciation, a sudden jump in the risk premium may spark a currency crisis with a powerful feedback loop between the risk premium and depreciation[11]. Accordingly, it initially depreciates local currency via the interest parity condition[12]. With the negative balance sheet effects, this depreciation then leads to a further increase in the risk premia, placing more deprecation pressure on the local currency. This feedback loop[13] produces a vicious cycle between depreciation and default risk, resulting in a qualitatively large depreciation and increase in the country's default risk premium. Consequently, this combination may distort financial stability through a wave of defaults and trigger a financial crisis and a steep fall in economic activity.

Figure 3, Panel B, indicates that country risk premium negatively affects domestic economic activity through real channels, such as wait-and-see mechanism and the borrowing cost. When uncertainty in the domestic financial markets —

[11] See Nakatani (2016), Nakatani (2017b) and Aghion, Bacchetta, and Banerjee (2001) for the theoretical models that suggest a rise in the country risk premium may trigger a currency crisis and Nakatani (2018) for an empirical support.

[12] Nakatani (2017a) addresses different type of shocks — country risk premium and productivity shocks — taking into account a model of currency crises developed by Aghion et al. (2001) and analyses empirically the effects of these shocks on the exchange rate. His findings indicate that a one percent point rise in the risk premium leads to a 0,2 percentage point depreciation in the local currency.

[13] See also Brei and Buzaushina (2015) for the feedback mechanism between the exchange rate and the country risk premium.

stemming from a sudden jump in the default risk premium — penetrates into the real sector, a wait-and-see mechanism begins to work, i.e., firms and consumers prefer to wait and see and postpone their decisions on investment and purchases for durable goods in an uncertain economic environment. This mechanism hence implies that the higher uncertainty (risk) dampens economic activity by causing aggregate expenditure to decrease (Bloom, 2014). On the other hand, the latter channel — the borrowing cost — maintains that because of the higher borrowing costs, a rise in the country's default risk premium leads to a contraction in economic activity by leading firms to decrease their investment.

3. VAR Analysis

In this section, we initially introduce data that we use in the empirical analysis. Then, we construct the VAR model. We adopt a two-stage procedure to simulate the shocks Turkey has recently experienced. First, we examine the impact of an exogenous exchange rate (depreciation) and country risk premium shocks. Second, we extend the VAR model with a measure of external financial conditions and an index for domestic political conditions. Using the extended VAR model, we look at the effect of two shocks, namely, an adverse external financial shock and a political risk shock. Finally, we check the robustness of our main findings.

Table 1: Data Definition and Sources

Variables	Definition	Sources
Domestic political conditions	Turkey's geopolitical risk index	Caldara, Iacoviello, and Markiewitz (2017)
Exchange rate	Bilateral US dollar exchange rate	DataStream
Country risk premium	J.P. Morgan's EMBI Global stripped spread for Turkey	DataStream
Economic activity	Industrial production index	DataStream
External financial conditions	US financial conditions index (NFCI)	The St. Louis Fed FRED database

3.1. Data and Variable Selection

Our choice of variables is mainly motivated by the theoretical arguments emphasized in Section 2 (Figure 3) and the stylized facts discussed in Section 1 (Figure 1). Accordingly, domestic political instability or/and adverse global financial conditions affect two crucial financial variables — the exchange rate and the country's risk premium — immediately and strongly. Through their effects on these variables, they may cause a severe macroeconomic adjustment process characterized by a long-lasting recession and high inflation. To capture external financial and domestic political conditions, we incorporate two variables into the VAR model. The former is represented by a measure of US financial conditions, while the latter is represented by a measure of the geopolitical risk for Turkey. We add the bilateral US dollar exchange rate and a measure of the country's sovereign default risk to quantify the immediate response of the economy. We also include two domestic macroeconomic aggregates, namely, a measure of economic activity and inflation, to capture the subsequent macroeconomic adjustment process. Overall, our dataset includes five domestic variables and a foreign variable. Table 1 presents details of the data.

The domestic variables are as follows: pr_t denotes a measure of domestic political conditions; s_t denotes the bilateral US dollar exchange rate[14] (the number of Turkish lira per US dollar[15]); ρ_t denotes a measure of the country risk premium; y_t denotes a measure of economic activity[16], proxied by industrial production index, and π_t denotes the (annualized) CPI inflation. The domestic political conditions are measured by Turkey's geopolitical risk index (GPR), an index

[14] We adopt the bilateral exchange rate (the BER) instead of trade-weighted exchange rates (i.e. nominal effective exchange rate, the NEER). The reason is that the current paper primarily focuses on the financial channel of the exchange rate. In other words, we attempt to capture empirically the interaction between the exchange rate and the country risk premium documented in the theoretical literature. As emphasized in Hofmann et al. (2016), the BER is more appropriate for the financial channel than is the NEER.

[15] This definition implies that a positive change in the exchange rate denotes a depreciation of the Turkish lira.

[16] Gross domestic product (GDP) is the most commonly used measure of economic activity. However, GDP is not readily available in monthly frequency. Therefore, many monthly VAR studies use industrial production index as a proxy for GDP. In this paper, we estimate a VAR model with monthly data. Therefore, following these studies, we employ industrial production as a measure of economic activity.

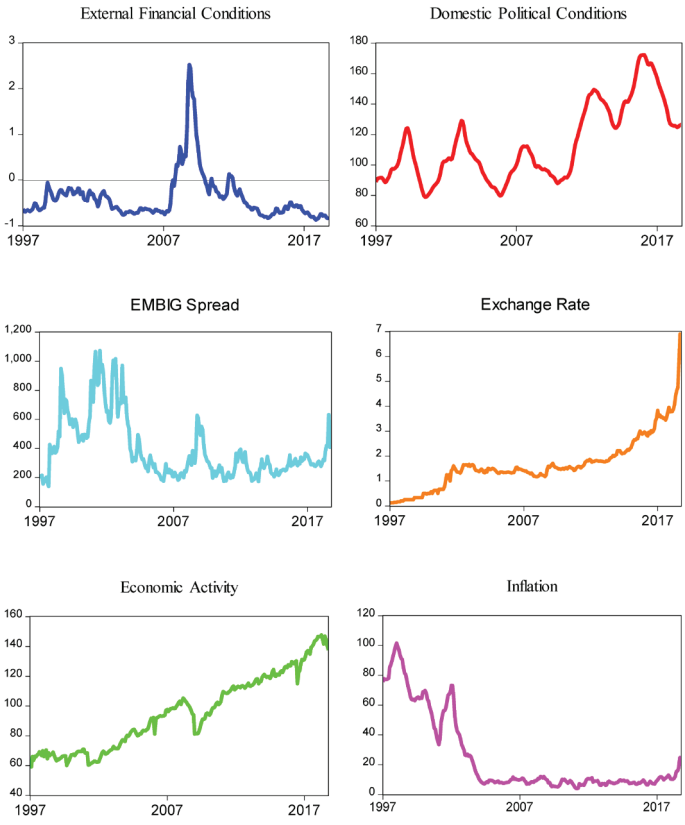
developed by Caldara and Iacoviello (2018) and Caldara et al. (2017). Caldara and Iacoviello (2018) construct a monthly index of geopolitical risk counting the presence of words — wars, terrorist events, and political tensions such as a coup attempt — regarding geopolitical tensions and that are collected from automated text-searches in leading global newspapers. Caldara et al. (2017) provide the country-specific index[17] for 18 EMEs by adding the name of the specific country, for instance, Turkey, in their automated text search. Thus, the index includes country-specific events and measures the geopolitical conditions for the specific country. For instance, the GPR index for Turkey captures the failed coup attempt on July 2016. An increase in the GPR index marks a deterioration in the political conditions. We will evaluate the effects of political instability by tracing the impulse responses to a positive one standard deviation shock to this index in the VAR setup. On the other hand, in the empirical model, Turkey's default risk is measured by J. P. Morgan's EMBI Global stripped spread for Turkey[18]. The spread — the difference between the yield on a US dollar denominated bond issued by the Turkish government and a corresponding government bond issued by the United States Treasury — measures the dollar-denominated sovereign debt's premium above the US Treasury securities and reflects the overall market perceptions about sovereign default risk. Its higher (lower) value implies markets perceive a high (low) probability that a country may default on its debt, resulting in a higher (lower) default risk premium. We interpret an unexpected increase in the EMBIG spread as a country risk premium shock[19].

[17] See Bouras, Christou, Gupta, and Suleman (2018) for the effects of country specific geopolitical risk on the stock return and volatility in 18 EMEs.

[18] Another potential measure of sovereign default risk is the sovereign CDS spread for Turkey. It also represents the markets' assessment of default risk. However, the data is not available for our sample period.

[19] A shock to the EMBI spread has been also interpreted as a country spread shock in the empirical literature (Uribe & Yue, 2006; and Akıncı, 2013).

Figure 4. The Plots of External Financial Conditions, Domestic Political Conditions, the EMBIG Spread, the Exchange Rate, Economic Activity, and Inflation



The foreign variable (f_t^*) represents a measure of external financial conditions, proxied by a financial conditions index for the United States, namely, the National Financial Condition Index (NFCI). We use the US financial conditions index (NFCI[20]) to capture the external financial conditions in the empirical model. It measures the overall financial conditions in the US. A rise in the index means a deterioration in the US financial conditions. This index is a good proxy for the external financial conditions, as these conditions are increasingly driven by the US financial markets, which triggered the global financial crisis of 2008 and have shaped the recent

[20] See Fink and Schüler (2015) for further information about the NFCI.

developments in the international financial markets through the Fed's unconventional monetary policy measures[21]. We interpret a sudden and unexpected rise in the NFCI as an adverse external financial shock in the VAR model.

We employ monthly macroeconomic data for the period of January 1997 to October 2018. The start date of the period is purely determined by the start of the dataset on country risk premiums measured by J.P. Morgan's EMBI global stripped spread for Turkey. The EMBI global data are available from January 1997. Our main data source is the DataStream. The bilateral exchange rate, the industrial production index, CPI inflation and the EMBIG spread for Turkey are all obtained from DataStream. The US financial conditions index (NFCI) is from the FRED database (https://fred.stlouisfed.org/series/NFCI). The data on the GPR index for Turkey are obtained from https://www2.bc.edu/matteo-iacoviello/gpr.htm: the index is based on the studies of Caldara and Iacoviello (2018) and Caldara et al. (2017). Figure 4 indicates how the variables evolve during our sample period.

3.2. Model

Consider the following reduced form VAR (p) model:

$$\begin{pmatrix} y_t \\ \pi_t \\ s_t \\ \rho_t \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \end{pmatrix} + \sum_{j=1}^{p} \begin{pmatrix} \theta_{11}^{(j)} & \theta_{12}^{(j)} & \theta_{13}^{(j)} & \theta_{14}^{(j)} \\ \theta_{21}^{(j)} & \theta_{22}^{(j)} & \theta_{23}^{(j)} & \theta_{24}^{(j)} \\ \theta_{31}^{(j)} & \theta_{32}^{(j)} & \theta_{33}^{(j)} & \theta_{33}^{(j)} \\ \theta_{41}^{(j)} & \theta_{42}^{(j)} & \theta_{43}^{(j)} & \theta_{44}^{(j)} \end{pmatrix} \begin{pmatrix} y_{t-j} \\ \pi_{t-j} \\ s_{t-j} \\ \rho_{t-j} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \\ u_{4t} \end{pmatrix} (1)$$

or a more compact form of Eq. (1):

$$Z_t = \alpha + \sum_{j=1}^{p} \theta(p)\, Z_{t-1} + u_t \,(2)$$

[21] In the recent work, IMF staffs — Arregui, Elekdag, Gelos, Lafarguette, and Seneviratne (2018) — develop an index for global financial conditions. The NFCI is closely correlated with this index.

where $Zt = [y_t, \pi_t, s_t, \rho_t]'$ is a vector of endogenous variables, u_t is a vector of reduced form residuals that satisfies $E(u_t) = 0$ and $E(u_t u_t') = \Sigma u$.

Using the VAR, we look at the dynamic effect of two domestic shocks — a country risk premium shock and an exchange rate shock. These shocks are identified by means of a standard Cholesky decomposition with the ordering $y_t \rightarrow \pi_t \rightarrow s_t \rightarrow \rho_t$. The ordering[22] relies mainly on a widely accepted assumption that macroeconomic aggregates are slow-moving variables since firms cannot respond immediately to the financial environment disturbances that alter their output and prices because these decisions regarding production and pricing require time to plan and execute; however, financial variables are fast-moving variables since market participants can react rapidly to news about the macroeconomic environment. Based on this assumption, the macroeconomic variables, the industrial production index and CPI inflation enter the VAR system before the financial variables, the exchange rate and the EMBIG spread.

More specifically, the recursive ordering, in which the country risk premium is ordered last in the system, implies that the country's default risk can respond immediately to changes in other variables but that a country risk premium shock affects these variables with a one-period lag. Our identification strategy also imposes similar recursive restrictions on the relationship between the exchange rate and macroeconomic aggregates. Accordingly, the exchange rate can react instantaneously to fluctuations in economic activity and inflation; however, it has a delayed effect on these variables, implying a slow exchange rate pass-through to the real economy due to the nominal rigidities.

Last, the exchange rate is ordered before the country risk premium in the VAR model considering the argument, suggesting the exchange rate indirectly influences the risk premium through its effect on the domestic balance sheets, while the country risk premium directly affects the exchange rate. In the robustness

[22] This ordering is in line with the VAR based empirical literature. See Uribe and Yue (2006), Akıncı (2013) and Brei and Buzaushina (2015) for the country risk premium and Bjørnland (2009) for the exchange rate.

section, we alter this ordering such that the exchange rate is ordered last and check our results.

3.3. Specification

The selection of proper model specification is an important early step in the VAR analysis. It requires the determination of the unit root and cointegration properties of variables and lag length. Thus, we firstly use some pre-tests such as unit root and cointegration tests before estimating the model. We use the Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) and Phillips and Perron (1988) tests to detect the order of integration for the variables. Appendix Table 1 reports the results of these tests. The results indicate that all variables are non-stationary in levels. However, their first differences are stationary. In sum, both tests suggest that all variables follow a I (1) process. We also use the Johansen and Juselius (1990) technique to test whether or not a stationary linear combination of the variables exists. The corresponding results are presented in Appendix Table 2. The maximal eigenvalue statistics suggest that a single cointegration vector exists, while the trace statistics indicate evidence of two cointegrating vectors at the %5 level of significance. Considering the maximal eigenvalue test, we report the estimated cointegration vector in Appendix Table 2 (Panel A). The long-run coefficients have the expected sign. A currency depreciation and an increase in inflation will induce an increase in the country's default risk while an increase in the industrial production will lead to a decrease in the default risk.

In light of these results, we determine which VAR specifications to use — VAR in levels, VAR in first differences or cointegrating VAR[23]. Taking into account that our variables are non-stationary but the linear combinations of them are stationary, we decide to use the VAR in levels specification[24]. Thus, we use log

[23] See Hamilton (1994), Lütkepohl (2005), Farzanegan and Markwardt (2009), and Hwang (2017) for discussion about the drawbacks and advantages of different VAR specifications.

[24] Instead of the VAR in levels, the other option is to use a cointegrating VAR specification. We also address this specification. We estimate a cointegrating VAR (for examining the effect of risk premium and exchange rate shocks) and a cointegrating VARX model (for examining the effects of external financial and domestic political risk shocks). The results from these models are similar to those form the VAR in levels. In order to converse space,

levels of all variables to the VAR estimation, except for the NFCI and inflation, which are in level.

Another issue about the VAR specification is lag length selection. Given the monthly nature of the data used, we set the lag length to six[25], although the lag order selection criteria for VAR such as AIC, SBC and HQ (Appendix Table 3) indicate that the optimal lag length is two — a small lag order, possibly leaving serial correlation in the residuals. The impulse response functions are obtained via Monte Carlo integration (Doan, 2010).

3.4. Empirical Results

In this subsection, we summarize the empirical results. At first, we briefly discuss separately the effect of an exogenous currency depreciation and an exogenous increase in the country risk premium. Then, we extend the VAR model and discuss the effects from changes in two variables, i.e., the changes induced by both an adverse external financial shock and a domestic political shock.

3.4.1. The Effects of The Country Risk Premium and Exchange Rate Shocks

Figure 5 presents the effects of a one standard deviation increase in the country risk premium on the Turkish economy. The adverse risk premium shock leads to a large and persistent depreciation of the Turkish lira. In the subsequent period, the real macroeconomy is considerably influenced. This shock results in a deep and long-lasting recession and high inflation. Contractions in economic activity and increases in inflation reach their peak level after eight months. The Turkish economy recovers after twenty months. All these effects are statistically and economically significant and in line with the theoretical arguments presented in Section 2. Furthermore, the results are also consistent with previous studies in

these results are not reported here but available upon request.

[25] We also estimate the VAR model with twelve lags. Our results are robust to lag length specifications. The results with twelve lags are reported in the robustness section.

the empirical literature (Uribe & Yue, 2006; Akıncı, 2013; Varlık, 2017; and Brei and Buzaushina, 2015).

Figure 5. The Response of Variables to a Jump in The Country Risk Premium

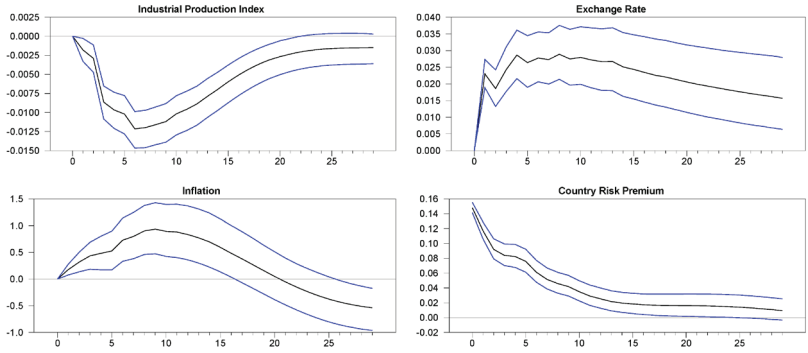
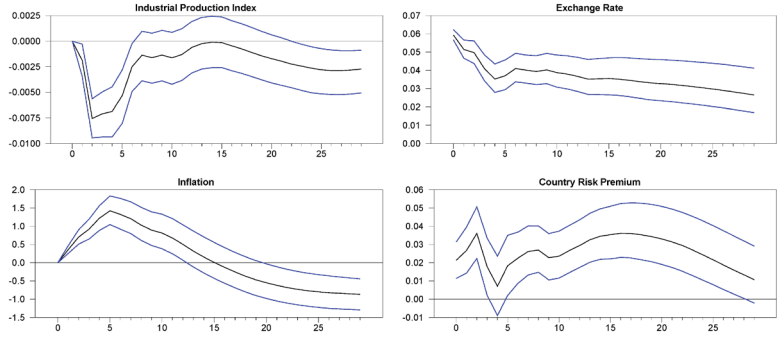


Figure 6. The Responses of Variables to an Exchange Rate Depreciation



The second shock addressed in this paper is the exchange rate shock. Figure 6 presents the corresponding impulse response functions. A currency depreciation shock has an economically and statistically significant impact on the country risk premium, a finding which is consistent with a key characteristic of the Turkish economy — high liability dollarization — and the findings of previous studies (Bordo et al., 2009; Hofmann et al., 2016; Tunc and Kilinc, 2018). In response to this shock, the risk premium rises and gradually goes back to its pre-shock level. The real effects emerge in the following period.

Consistent with the financial channel of the exchange rate (Section 2) and the recent empirical literature, a depreciation shock causes a short-lived recession in economic activity and a rise in inflation[26]. These effects are similar to those of the risk premium shock, but in the case of the exchange rate shock, the economy experiences a different recession/recovery pattern — a short and shallow recession and quick recovery.

Overall, the current paper offers empirical support for the theoretical argument suggesting a feedback loop between the exchange rate and the country risk premium.

3.4.2. The Effects of External Financial and Domestic Political Shocks on the Turkish Economy

To examine the responses of the Turkish lira, Turkey's default risk and its real economy to an adverse external shock, we extend our model with a measure of external financial conditions, proxied by the US financial conditions index, the NFCI. Based on the assumption that Turkey has a small open economy and thus disturbances in its financial and real markets do not affect external financial conditions, the US financial condition index is placed first in the recursive ordering. This assumption suggests an external financial shock influences domestic macroeconomic variables contemporaneously but not vice versa. Furthermore, with this assumption, the reduced form of the extended model has a near-VAR structure:

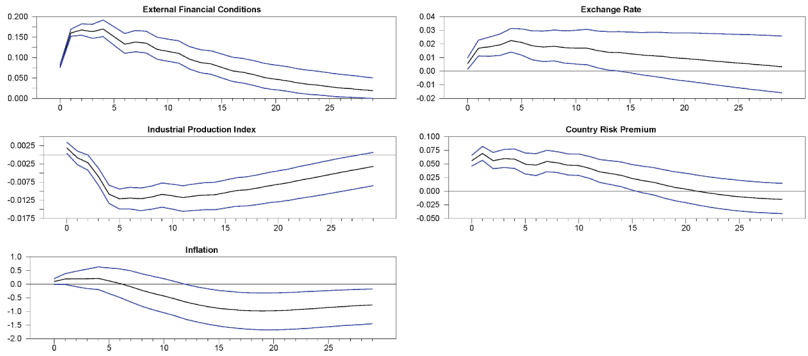
$$\begin{pmatrix} f_t^* \\ y_t \\ \pi_t \\ s_t \\ \rho_t \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{pmatrix} + \sum_{j=1}^{p} \begin{pmatrix} \theta_{11}^{(j)} & 0 & 0 & 0 & 0 \\ \theta_{21}^{(j)} & \theta_{22}^{(j)} & \theta_{23}^{(j)} & \theta_{24}^{(j)} & \theta_{25}^{(j)} \\ \theta_{31}^{(j)} & \theta_{32}^{(j)} & \theta_{33}^{(j)} & \theta_{34}^{(j)} & \theta_{35}^{(j)} \\ \theta_{41}^{(j)} & \theta_{42}^{(j)} & \theta_{43}^{(j)} & \theta_{44}^{(j)} & \theta_{45}^{(j)} \\ \theta_{51}^{(j)} & \theta_{52}^{(j)} & \theta_{53}^{(j)} & \theta_{54}^{(j)} & \theta_{55}^{(j)} \end{pmatrix} \begin{pmatrix} f_{t-j}^* \\ y_{t-j} \\ \pi_{t-j} \\ s_{t-j} \\ \rho_{t-j} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \\ u_{4t} \\ u_{5t} \end{pmatrix} \quad (3)$$

where f_t^* indicates a measure of external financial conditions.

[26] See Yildirim and Ivrendi (2016), Çalışkan and Karimova (2017), Tunc and Kilinc (2018).

The small open economy assumption technically implies that the reduced form equations of the domestic variables have lags of the domestic and foreign variables but that the foreign variable equation does not contain lags of the domestic variables, i.e. $\theta_{1i}^{(j)}$ for all j and i= 2,3,4,5 (Equation 3). Thus, we estimate the reduced form of the extended model (Eq.3) by using seemingly unrelated regressions (SUR) technique[27]. As in the benchmark VAR model estimation, we use the log levels of variables and set the lag length to six. Furthermore, we combine SUR estimation and Gibbs sampling to obtain the impulse response functions with the confidence bands, as in Raduzzi and Ribba (2017).

Figure 7. The Responses of Domestic Variables to an Adverse External Financial Shock



In Figure 7, we examine the responses to an external financial shock. An adverse external financial shock statistically significantly affects the exchange rate, the country risk premium, and economic activity, although its effects on inflation are not statistically significant, especially during the first year following the shock. In response to this shock, the Turkish lira depreciates, and the risk premium rises quickly and simultaneously. The co-response of the exchange rate and the risk

[27] We also perform the cointegration test before estimating the extended model. The corresponding results are reported in Appendix Table 2 (Panel B and C). The results clearly show that there is a long-run relationship between variables. The long-run parameters are consistent with the theoretical consideration. For instance, a deterioration in the external financial conditions will lead to an increase in the country's default risk. Considering these results, we also estimate a cointegrating VARX model. This model reveals similar results. The impulse response functions based on the cointegrating VARX are not reported to save space. However, they are available upon request.

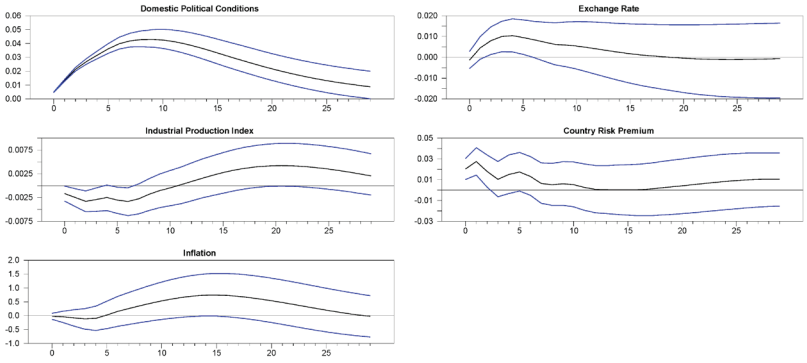
premium — a sharp depreciation in the Turkish lira and a steep rise in Turkey's default risk — may initiate a severe macroeconomic adjustment process and consequently cause a prolonged recession and high inflation. The transmission mechanism can be explained intuitively as follows. An external financial shock induces a rise in the default risk while simultaneously generating a rapid depreciation in the lira not only through its direct effects on the lira but also through its effects on the country risk premium, i.e., a significant increase in the risk premium, placing more pressure on the Turkish lira to depreciate (Figure 5). Thus, the Turkish economy suffers from a dangerous combination of a weaker local currency and higher default risk, potentially jeopardizing financial stability and starting a financial crisis through a wave of defaults across banks and corporations.

To assess how political instability affects the Turkish economy, the geopolitical risk index for Turkey is replaced with the foreign variable, the NFCI. This replacement allows us to inspect how political environment changes such as the failed coup attempt influence the Turkish lira, Turkey's default risk and its real economy. We assume that there exists a unidirectional causality from political risk to domestic financial and macroeconomic conditions. In other words, we assume it is exogenous to the economy, imposing the block exogeneity restriction on the VAR system. Consistent with this assumption, the geopolitical risk index is placed first in the recursive ordering. In addition, as in the previous model addressing the effect of external financial shocks, the reduced form of the extended model has a near-VAR structure.

$$\begin{pmatrix} pr_t \\ y_t \\ \pi_t \\ s_t \\ \rho_t \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{pmatrix} + \sum_{j=1}^{p} \begin{pmatrix} \theta_{11}^{(j)} & 0 & 0 & 0 & 0 \\ \theta_{21}^{(j)} & \theta_{22}^{(j)} & \theta_{23}^{(j)} & \theta_{24}^{(j)} & \theta_{25}^{(j)} \\ \theta_{31}^{(j)} & \theta_{32}^{(j)} & \theta_{33}^{(j)} & \theta_{34}^{(j)} & \theta_{35}^{(j)} \\ \theta_{41}^{(j)} & \theta_{42}^{(j)} & \theta_{43}^{(j)} & \theta_{44}^{(j)} & \theta_{45}^{(j)} \\ \theta_{51}^{(j)} & \theta_{52}^{(j)} & \theta_{53}^{(j)} & \theta_{54}^{(j)} & \theta_{55}^{(j)} \end{pmatrix} \begin{pmatrix} pr_{t-j} \\ y_{t-j} \\ \pi_{t-j} \\ s_{t-j} \\ \rho_{t-j} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \\ u_{4t} \\ u_{5t} \end{pmatrix} \quad (4)$$

where pr_t is the geopolitical risk index for Turkey.

Figure 8. The Responses of Domestic Variables to a Geopolitical Risk Shock



Finally, Figure 8 indicates the effects of a political risk shock. The political risk shock generates adverse effects similar to those of an external financial shock, but its statistical significance is weak compared to the external shock[28]. A dramatic (adverse) shift in the domestic political conditions results in an immediate rise in the default risk. As the country's risk premium rises, the Turkish lira depreciates, domestic economic activity falls, and inflation rises. Consequently, the political risk shock also leaves the real economy prone to a recession and high inflation.

In summary, through their negative effects on the lira and Turkey's default risk, both an adverse external financial shock and a political risk shock alter macroeconomic conditions dramatically. Once external financial conditions deteriorate or/and domestic political tensions heighten, Turkey's macroeconomic outlook worsens as follows:

(i) the Turkey's EMBI spread raises, strongly;
(ii) the Turkish lira depreciates immediately; and
(iii) the Turkish economy experiences a deep recession with rising inflation.

[28] The effects are only statistically significant during six months after the shock for economic activity, exchange rate and country risk premium, although, for inflation, they are marginally significant.

Thus, our findings imply the shocks to which Turkey has been exposed during recent periods may cause macroeconomic difficulties such as a recession and high inflation. This implication is consistent with the theoretical predictions (Section 2) and the recent developments in the Turkish economy.

3.4.3. Robustness Check

In this section, we perform a battery of robustness checks to examine whether the main results are robust to changes in the model specification and alternative measures of external financial conditions. The benchmark results reveal recent shocks that Turkey experienced, such as an adverse external financial shock and a domestic political risk shock, have considerably disturbed macroeconomic stability. The results are robust to estimating the VAR model with an alternative lag length, a different recursive ordering, a sub-sample of data, and alternative measures of external financial conditions.

We consider the following robustness checks. First, we re-estimate the VARs by using 12 lags that consider the monthly nature of the data. Second, we address an alternative recursive ordering: the exchange rate is ordered last in the system instead of the country risk premium. Through this ordering, we endogenize the exchange rate. We re-estimate the benchmark and extended VARs with the following orderings — $y_t \rightarrow \pi_t \rightarrow \rho_t \rightarrow s_t$; $f_t^*(pr_t) \rightarrow y_t \rightarrow \pi_t \rightarrow \rho_t \rightarrow s_t$. Third, to check whether our results are driven by the 2008-2009 global financial crisis, we look at the effects for the pre-crisis period, as in Akıncı (2013) and Choi (2018). In other words, we re-estimate the model for the period between January 1997 and December 2007. Appendix Figure 1,2,3,4,5 and 6 present the results for these robustness checks. The figures clearly indicate our main results are not sensitive to changes in the specification.

Last, we use three alternative measures of external financial conditions. As in the baseline model, these measures —the St. Louis Fed Financial Stress Index (STLFSI), the BofA Merrill Lynch US High Yield Option-Adjusted Spread, and the CBOE Volatility Index (VIX)—are from the US financial system. Each of

them measures overall financial conditions in the US. We re-estimate the VAR model by using these measures and compare the results with them based on the benchmark model. Appendix Figure 7 depicts the corresponding results. The results indicate that an adverse external financial shock negatively affects the domestic financial markets and the real economy in Turkey. This implies our main results are robust to alternative measures of external financial conditions.

4. Conclusion

Turkish financial markets have been substantially shaken by a series of adverse shocks, the largest of which happened on August 2018. These shocks caused a severe depreciation in the lira and a substantial rise in the default risk, raising considerable concerns about macroeconomic and exchange rate instability. The open-economy macroeconomic literature suggests these concerns are reasonable. The literature argues the recent depreciation of the lira, along with the higher default risk, may trigger a currency crisis through a wave of bankruptcies and financial instability.

This study addresses the effects of adverse domestic and external shocks on the Turkish economy. The results indicate that both an adverse external financial shock and a political risk shock alter financial and macroeconomic conditions dramatically. In particular, two shocks generate a financial turmoil, characterized by a steep rise in the country risk and a sharp depreciation in the Turkish lira, and thereby cause a recession and high inflation. These results highlight that the Turkish economy is sensitive to adverse domestic and external shocks. This main result of the study naturally raises the question: How can this sensitivity be reduced? The answer is clear: "domestic macroeconomic fundamentals and policy framework should be strengthened" (Ahmed, Coulibaly, & Zlate, 2017; Bowman, Londono, & Sapriza, 2015; Yildirim, 2016; IMF, 2019). This requires substantial measures to achieve lower short-term external debt and higher domestic savings, reduce high dependence on external finance, strengthen monetary policy credibility. These measures may intensify the resilience of the economy to domestic and external shocks. Specifically, they, in turn, can help to decrease

Turkey's country risk premium, stabilize the Turkish lira, and ultimately mitigate the adverse effects of shocks by restoring the investors' confidence.

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APPENDIX

Table 1: Unit Root Tests

	Level			First Difference	
Variables	**ADF statistic**	**PP statistic**	**Variables**	**ADF statistic**	**PP statistic**
y_t	3,51(0)**	2,28(1)	Δy_t	**19,72(1)***	**19,57(3)***
π_t	1,09(15)	1,15(8)	$\Delta \pi_t$	**6,81(12)***	**8,22(5)***
s_t	3,02(4)	3,21 (8)	Δs_t	**6,93 (4)***	**17,57(5)***
ρ_t	3,38(0)	3,21(3)	$\Delta \rho_t$	**17,57(0)***	**17,58(1)***
f_t^*	2,77(7)	2,52 (6)	Δf_t^*	**5,52(6)***	**9,30(1)***
pr_t	2,58 (15)	2,23(11)	Δpr_t	**4,55(15)***	**4,11(2)***

Note: ** indicates significance at the 5% level while * indicates significance at the 10% level.

Table 2: Cointegration Properties

A. Johansen Cointegration Test (The Baseline Model)							
Hypotheses		**Trace Test**		**Hypotheses**		**Max. Eig. Val. Test**	
H_0	**H_A**	**λ_{trace}**	**C.V. (5%)**	**H_0**	**H_A**	**λ_{max}**	**C.V. (5%)**
r=0	r>1	120,32	58,93	r=0	r=1	59,91	31,00
r≤1	r>2	60,41	39,33	r≤1	r=2	35,15	24,35
r≤2	r>3	25,25	23,80	r≤2	r=3	17,82	18,33
r≤3	r=4	7,42	11,54	r≤3	r=4	7,42	9,75
Variables				**Cointegrating Vector**			
y_t				2,24 (0,856)			
π_t				-0,023 (0,004)			
s_t				-0,656 (0,122)			
ρ_t				1			
B. Johansen Cointegration Test (The Extended Model with external fin. Conditions)							
Hypotheses		**Trace Test**		**Hypotheses**		**Max. Eig. Val. Test**	
H_0	**H_A**	**λ_{trace}**	**C.V. (5%)**	**H_0**	**H_A**	**λ_{max}**	**C.V. (5%)**
r=0	r>1	163,92	82,52	r=0	r=1	80,88	40,08
r≤1	r>2	83,03	54,17	r≤1	r=2	50,73	31,40
r≤2	r>3	32,30	33,85	r≤2	r=3	23,50	24,33
Variables				**Cointegrating Vector**			
y_t				3,82 (1,91)			
π_t				-0,030 (0,007)			
s_t				-0,569 (0,225)			
ρ_t				1			
f_t*				-0,055 (0134)			
C. Johansen Cointegration Test (The Extended Model with geopolitical risk)							
Hypotheses		**Trace Test**		**Hypotheses**		**Max. Eig. Val. Test**	
H_0	**H_A**	**λ_{trace}**	**C.V. (5%)**	**H_0**	**H_A**	**λ_{max}**	**C.V. (5%)**
r=0	r>1	135,90	82,64	r=0	r=1	65,69	39,62
r≤1	r>2	70,20	54,64	r≤1	r=2	39,92	31,91
r≤2	r>3	30,27	33,07	r≤2	r=3	19,80	24,26
Variables				**Cointegrating Vector**			
y_t				2,77 (1,21)			
π_t				-0,029 (0,008)			
s_t				-0,650 (0,185)			
ρ_t				1			
pr_t				0,042 (0134)			

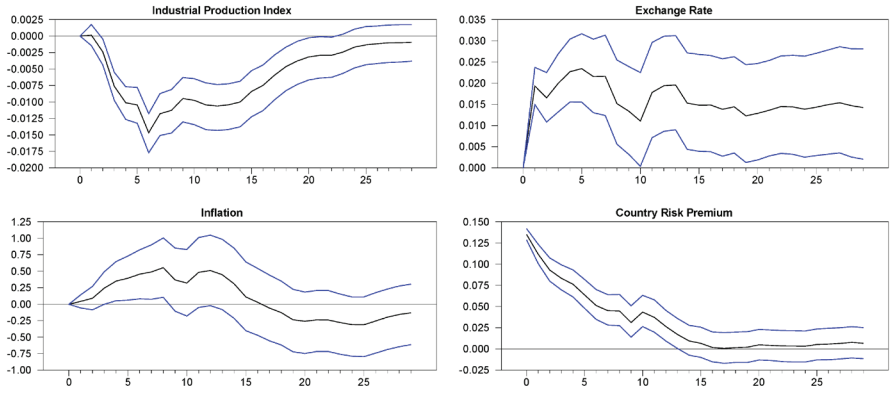
Table 3: VAR Lag Order Selection (Baseline VAR)

p	AIC	SBC	HQ
0	6,035	6,147	6,080
1	-4,133	-3,795	-3,997
2	**-4,671**	**-4,108**	**-4,445**
3	-4,669	-3,880	-4,351
4	-4,623	-3,608	-4,214
5	-4,641	-3,401	-4,142
6	-4,650	-3,186	-4,061
7	-4,609	-2,919	-3,929
8	-4,530	-2,614	-3,759
9	-4,528	-2,387	-3,666
10	-4,492	-2,126	-3,540
11	-4,527	-1,935	-3,484
12	-4,562	-1,745	-3,428

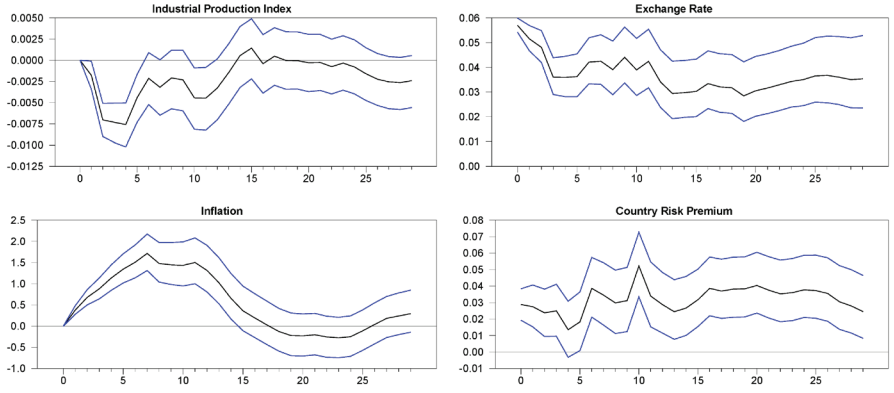
Table 4: VAR Lag Order Selection (Extended VAR)

p	AIC	SBC	HQ
0	5,629	5,798	5,697
1	-4,171	-3,776	-4,012
2	-4,724	**-4,104**	**-4,474**
3	-4,730	-3,885	-4,390
4	-4,683	-3,613	-4,252
5	-4,720	-3,424	-4,198
6	**-4,741**	-3,220	-4,129
7	-4,689	-2,943	-3,986
8	-4,612	-2,640	-3,819
9	-4,617	-2,419	-3,732
10	-4,583	-2,160	-3,608
11	-4,630	-1,981	-3,564
12	-4,648	-1,775	-3,492

Figure 1: Country risk premium and currency depreciation shocks: (VAR with 12 lags)

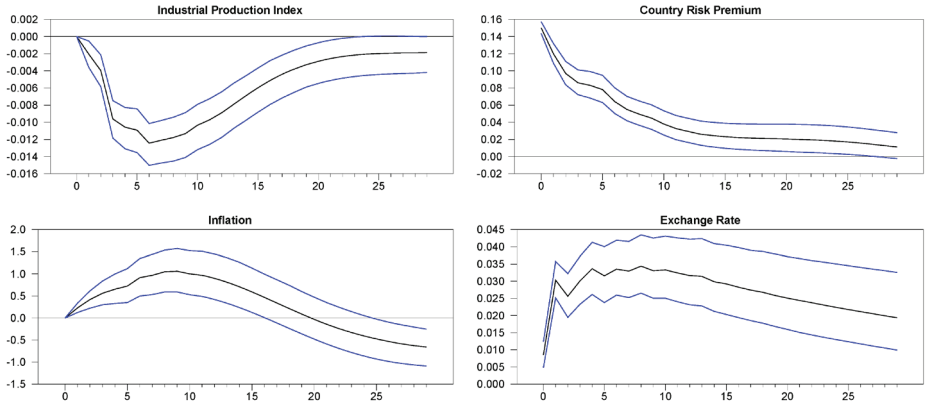


Responses to a country risk premium shock

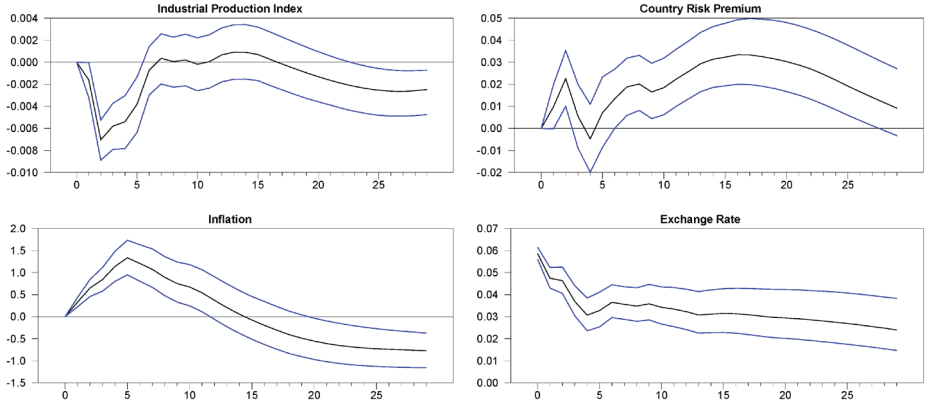


Responses to an exchange rate shock

Figure 2. Country Risk Premium and Currency Depreciation Shocks: (VAR with Different Ordering)

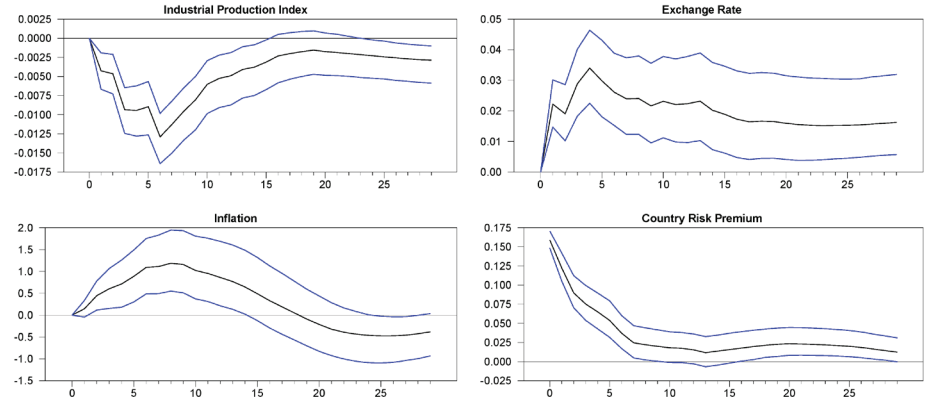


Responses to a country risk premium shock

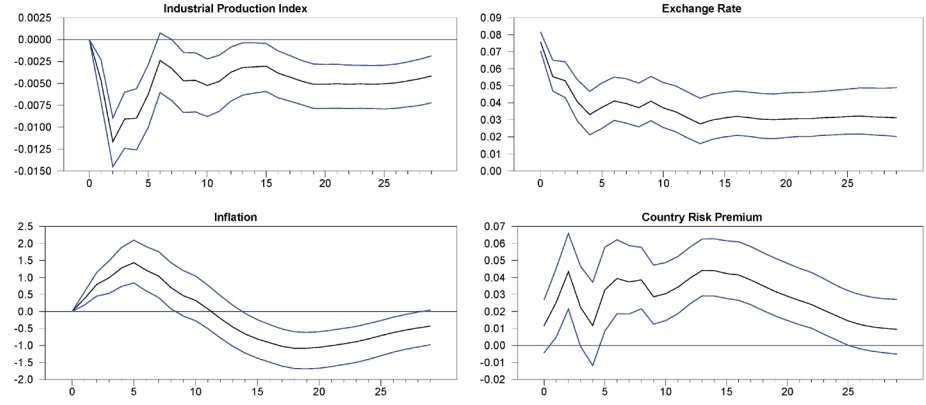


Responses to an exchange rate shock

Figure 3. Country Risk Premium and Currency Depreciation Shocks:
(VAR with Pre-crisis Period)

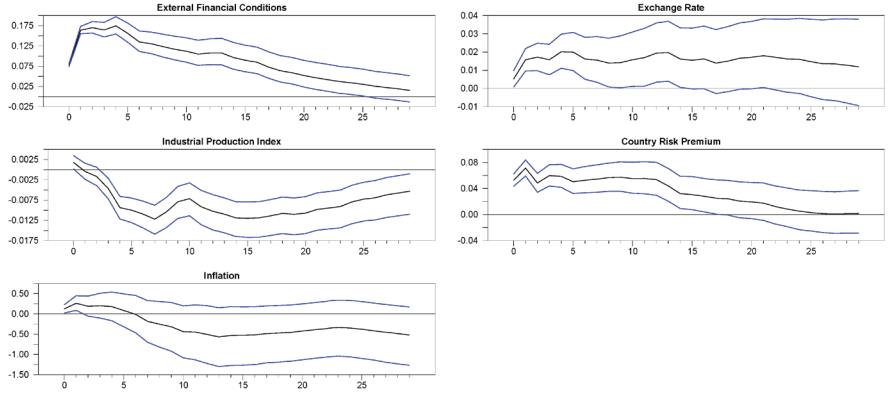


Responses to a country risk premium shock

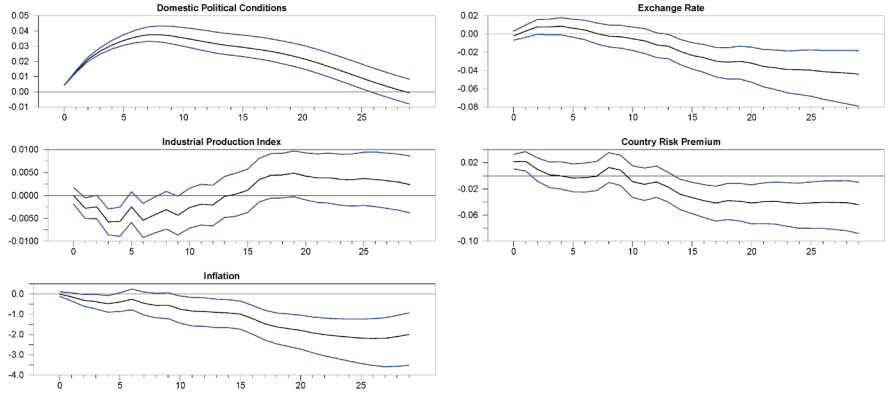


Responses to an exchange rate shock

Figure 4. External Financial and Domestic Political Risk Shocks: (VAR with 12 lags)

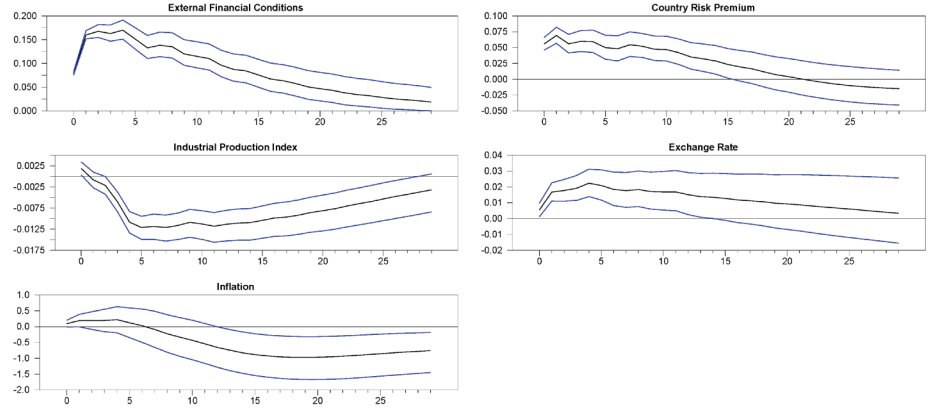


Responses to a adverse external financial shock

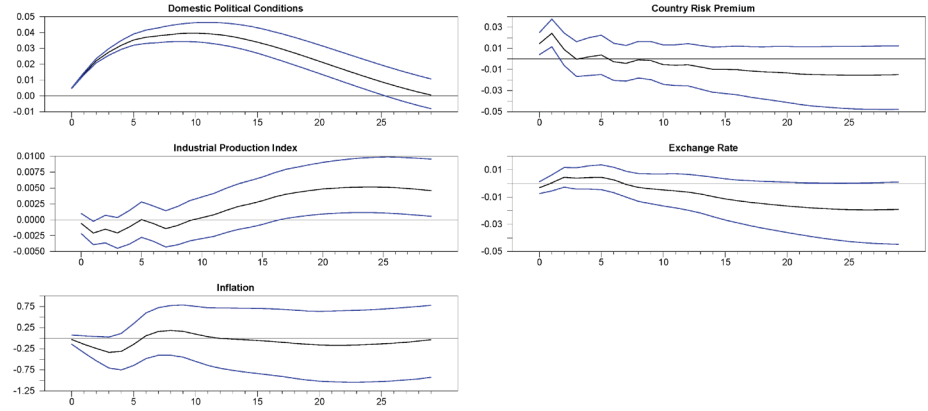


Responses to a political risk shock

Figure 5. External Financial and Domestic Political Risk Shocks: (VAR with Different Ordering)

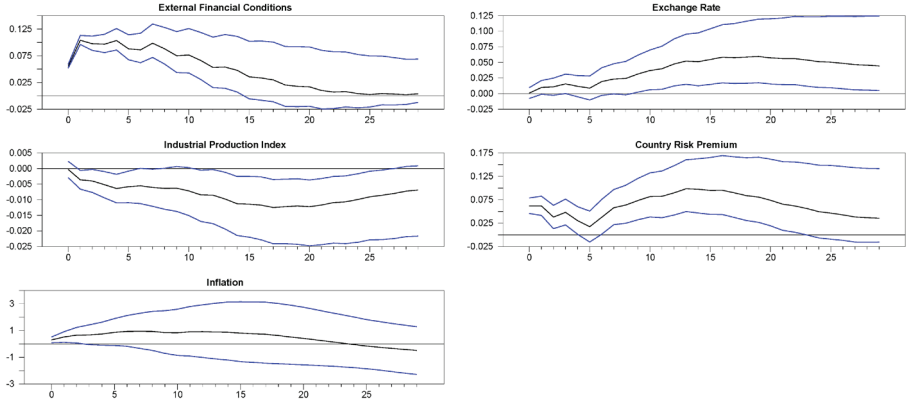


Responses to an adverse external financial shock

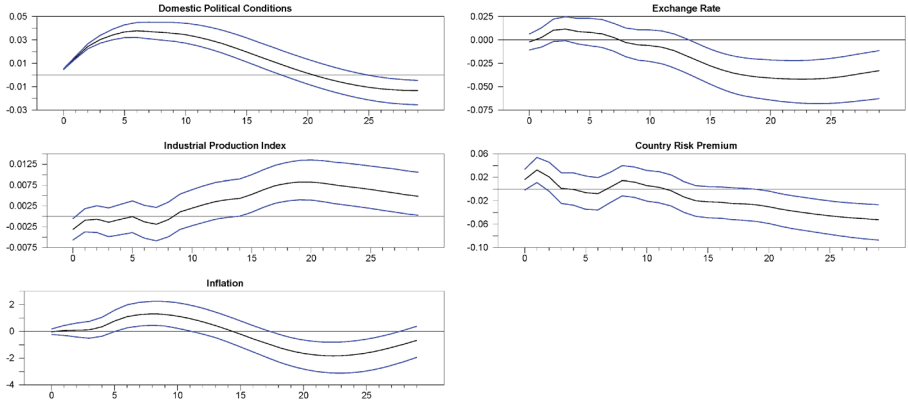


Responses to a political risk shock

Figure 6. External Financial and Domestic Political Risk Shocks:
(VAR with Pre-crisis Period)

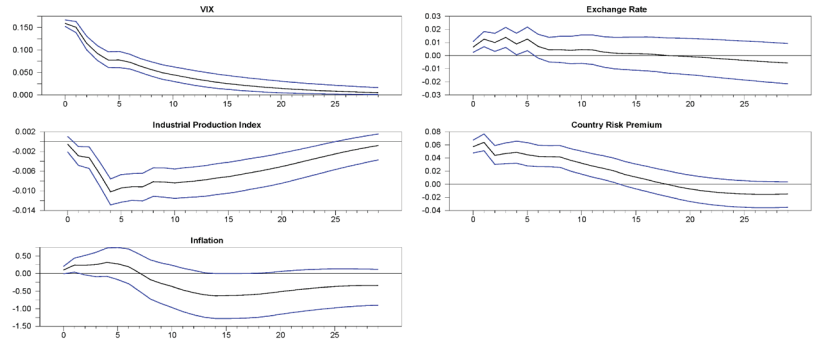


Responses to an adverse external financial shock

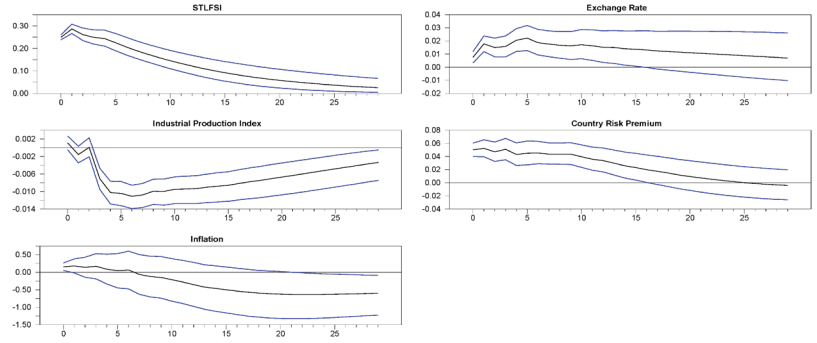


Responses to a political risk shock

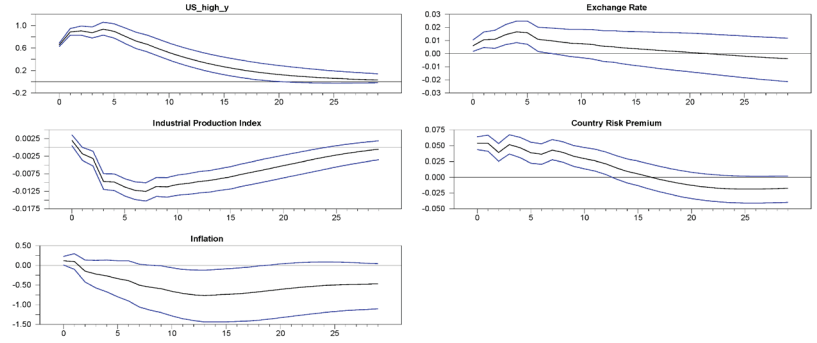
Figure 7. The Responses of Variables to the Different Measure of the US Financial Conditions



Responses to an adverse external financial shock



Responses to an adverse external financial shock



Responses to an adverse external financial shock