Geopolitical Risk and Trade and Capital Flows to India

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In an era of intensifying global tensions, understanding the economic implications of geopolitical risk (GPR) is critical. Our estimates of the impact of GPR on the Indian economy using multivariate time series models indicate that it is transmitted through adjustment of terms of trade and the exchange rate, contracting trade and capital flows by 1.0 and 0.3 percentage points, respectively. Given the relative predominance of the trade channel over the financial channel and consequent pressures on the exchange rate, strategic responses are warranted to bolster resilience against GPR shocks.

Introduction

Geopolitical risks have become the preeminent threat to global stability, reshaping the world's economic landscape and international relations.[1] From the war in Ukraine, the conflict in the Middle East, logistics and shipping disruptions to political spillovers from at least 64 countries going to the polls lately, these crises have dislocated energy markets, shattered supply chains, and imperilled food security, fuelling inflation and accentuating global vulnerabilities. Their pervasive and unpredictable nature has shrouded the trajectory of global growth and stability with heightened uncertainty. Thus, understanding the wider economic implications of geopolitical risk (GPR) assumes importance in the context of interconnectedness between economies

propagating and amplifying ripple effects from these exogenous and unpredictable shocks.

India has been no exception to the pervasive influence of GPR. Indian CEOs rank geopolitical factors among the most significant threats to business growth over the next three years (KPMG, 2023). The complexity of policy formulation because of geopolitical factors has also been highlighted (Das, 2023).[2] Yet, interest in India-specific implications of GPR has been sparse, with a broad preference for considering India within a broader panel focusing on BRICS economies and Asian emerging markets economies, often with a specific emphasis on stock market performance (Balcilar *et al.*, 2018; Kannadhasan and Das, 2020; and Hoque and Zaidi, 2020).[3]

Our study aims to bridge this gap in the literature by drawing new evidence on the dynamic effects of shocks to the Geopolitical Risk Index (GPRI) on trade and capital flows in respect of the Indian economy[4] by using various multivariate time series models. The estimation results show that the propagation of the shocks to GPRI for India and the world are dissimilar, both qualitatively and quantitatively, depending on whether the shock to GPRI operates through the trade channel or the financial channel. A one standard deviation shock to the GPRI for India causes a decline in the trade to GDP ratio by 0.9 percentage points and net capital flows by 0.2 percentage points whereas a similar shock to the GPRI for the world contracts trade and capital flows by 1.0 percentage points and 0.3 percentage points, respectively, with a marked difference in the timing of the peak effects.

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^ The authors are from the Reserve Bank of India (RBI). The views expressed in this article are those of the authors and do not represent the views of the RBI.

[1] IMF Global Financial Stability Report, April 2023.

[2] "Geopolitical conflicts, geo-economic fragmentations, volatile commodity prices, uncertainty in trajectory of monetary policies and their macro-financial implications, increasing frequency and ferocity of climate shocks, all these prevailing together, present a very complicated or should I say, deadly mix of challenges."

[3] To the best of our knowledge, Kumar and Rao (2024) is among the very few attempts to offer India-specific analysis addressing the financial sector implications of GPR.

[4] We rely on the GPRI developed by Caldara and Iacoviello (2022), a widely recognised tool in research and practice, as evidenced by its extensive citations, cited 2876 times by January 14, 2025.

In Section 2, we present stylised facts that motivate the analysis. Section 3 provides the details of data and sources, model properties and shock identifications. In Section 4, we discuss the results of our analysis, Section 5 concludes the article with some policy perspectives.

II. Stylised Facts

Geopolitics implies a broad realm in international relations, encompassing political instability, tensions and military conflicts between countries, terrorist threats and/or geographical events that can have regional or global impacts (Caldara and Iacoviello 2022). GPR impacts through two channels: the real economy channel, and the financial channel (Gupta *et al.*, 2019; Soltani *et al.*, 2021; Hou *et al.*, 2024; Dieckelmann *et al.*, 2024; and Hodula et al., 2024). The real economy channel includes disruptions to trade, investment, and consumption, often exacerbated by supply chain interruptions while the financial channel operates through heightened uncertainty and increasing risk aversion, causing shifts in investment portfolios and

cross-border capital flows exemplifying a "flight home" effect (Feng *et al.*, 2023) and a shift toward safer assets, or "flight to quality" (Agoraki *et al.*, 2024).

The GPRI captures global risks by analysing geopolitical-related content in 10 major newspapers[5] from automated text-search results of electronic archives. This media-based approach ensures that the GPR index remains exogenous to the model and captures all the major geopolitical events (Caldara and Iacoviello, 2022) (Chart 1a). Additionally, the dataset includes country-specific indices, representing the percentage of articles meeting the search criteria for 43 economies. For this study, we utilise the GPR Index specific to India and the global benchmark GPR index.

The GPRI registered its first notable surge during the Iraq invasion of Kuwait and the Gulf War, followed by a sharp rise in early 1993 amidst escalating tensions between the United States and Iraq (Chart 1a). After a period of decline, it spiked again in the wake of the 9/11 attacks and the 2003 Iraq invasion. Subsequent peaks are observed during the 2011

Chart 1: Geopolitical Risk and It's Components

a. Geopolitical Risk Indices

b. Categories of Geopolitical Risks
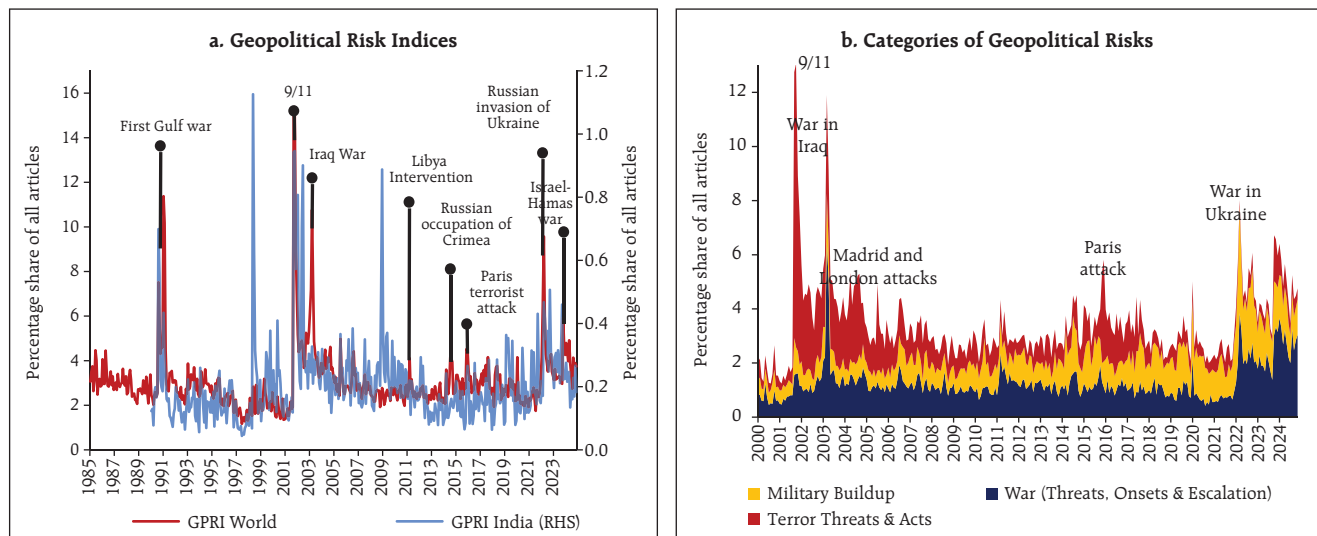
Source: Caldara and Iacoviello (2022).

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[5] These newspapers include Chicago Tribune, the Daily Telegraph, Financial Times, The Globe and Mail, The Guardian, the Los Angeles Times, The New York Times, USA Today, The Wall Street Journal, and The Washington Post. The index is calculated using a dictionary-based method by counting the number of articles related to adverse geopolitical events in each newspaper for each month (as a share of the total number of news articles).

military intervention in Libya, the 2014 annexation of Crimea by Russia, the 2015 Paris terrorist attacks, the 2017–2018 North Korean crisis, and the onset of the US-China trade war in 2018. More recently, the GPR index has soared following Russia's invasion of Ukraine and the intensification of conflict in the Middle East with the Israel-Hamas war.

The India-specific GPRI spiked independently of the global GPRI with notable instances including 1990 when the insurgency in Kashmir escalated tensions with Pakistan; in 1999 during the Kargil War between India and Pakistan; in 2002 with communal violence in Gujarat; and in 2008 during the devastating Mumbai terrorist attacks. Since 2014, however, co-movement between India's GPR and global GPR has increased, reflecting India's deeper integration into global geopolitics and the amplified interplay between domestic and international factors.
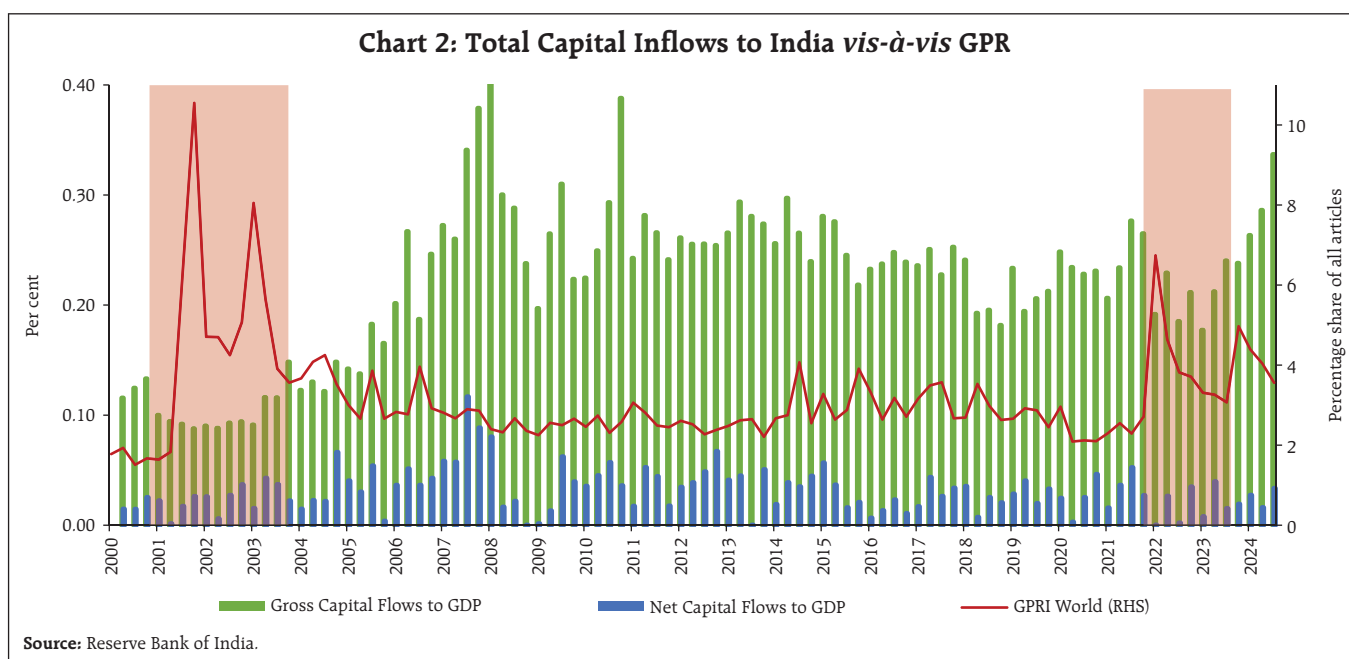
Analysing various components of the GPRI that are consolidated into three overarching categories - military buildups; war (encompassing threats, onsets, and escalations); and terror-related threats and acts (Gopinath, 2024) – shows that the recent surge in the

GPRI can be attributed primarily to war, with a nearly equal contribution from military buildups (Chart 1b).
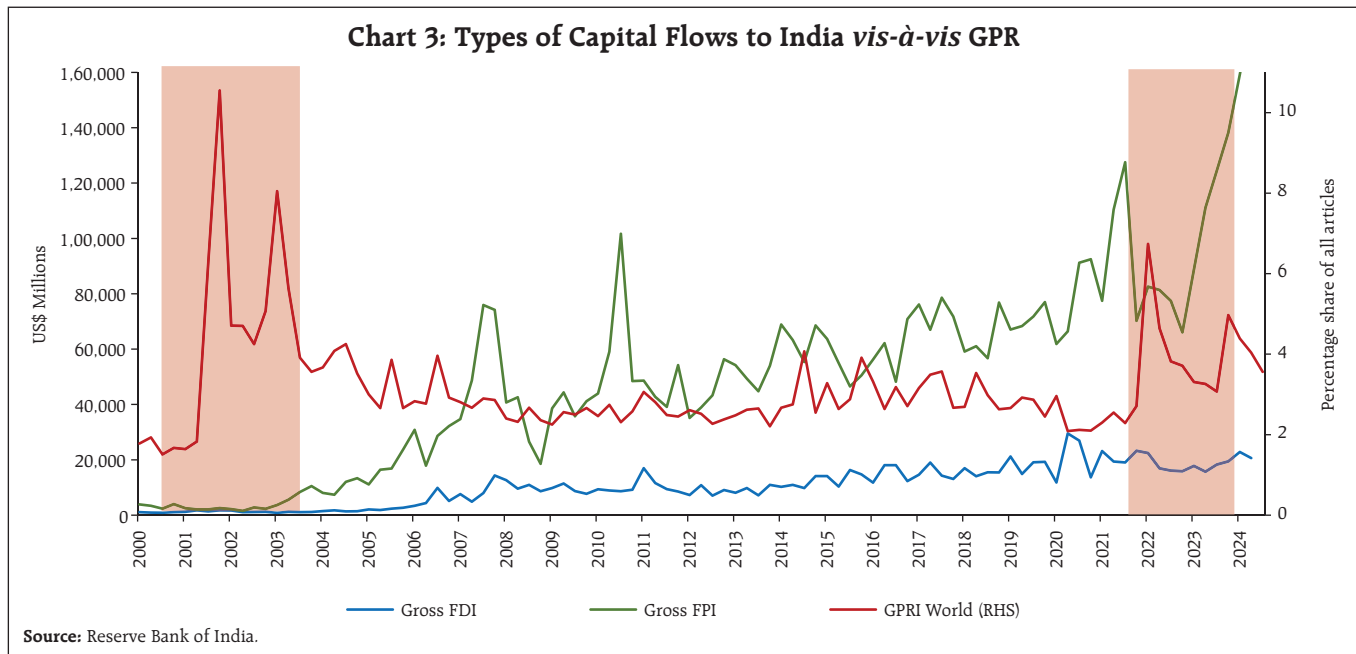
During episodes of heightened geopolitical risk (shaded in red in Chart 2), total capital inflows to India, whether gross or net, decrease relative to the trend, pointing to flight home effects (*a la* Feng *et al.*, 2023).[6] Moreover, shocks to the GPRI may trigger a flight to quality in which investors shift toward safer assets, including US equities and bonds, during heightened uncertainty (Wang *et al.*, 2023; Agoraki *et al.*, 2024).

Different types of capital flows to India exhibit varying sensitivities to global GPRI, with foreign portfolio investment (FPI) generally more volatile than foreign direct investment (FDI) (Chart 3). This characteristic aligns with flight to safety effects.

To examine the relationship between trade and GPR, we plot their trends. This reveals a decline in India's trade-to-GDP ratio during periods associated with GPR spikes (Chart 4a). GPR significantly contributes to rising trade costs (Hou *et al.*, 2024), as evidenced by the sharp increases in all major shipping cost indicators—the Global Supply Chain Pressure

Chart 2: Total Capital Inflows to India *vis-à-vis* GPR

Legend: Gross Capital Flows to GDP · Net Capital Flows to GDP · GPRI World (RHS)

Source: Reserve Bank of India.

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[6] Portes et al., (2001) and Giannetti and Laeven (2012) also provide similar insights.

Chart 3: Types of Capital Flows to India *vis-à-vis* GPR

Source: Reserve Bank of India.

Index (GSCPI), the Baltic Dry Index, and the Drewry World Container Index—in 2022 (Chart 4b). This surge aligns with the onset of the Russia-Ukraine war, as indicated by the shaded red region.

Based on simple correlation analysis for the period 2004Q1 to 2024Q2, several relationships emerge (Table 1). The India-specific GPRI shows a negative correlation with the net capital flow-to-GDP ratio, indicating that higher domestic geopolitical risks may discourage foreign capital inflows due to increased risk aversion. The global GPRI also exhibits a negative correlation with the net capital flow-to-GDP ratio, suggesting that global geopolitical tensions could lead to capital outflows from India as a broader global risk-off sentiment takes hold. A positive and significant relationship between the global GPRI and

Chart 4: Interplay of Trade and Geopolitical Risk

a. Trade to GDP ratio of India *vis-à-vis* GPR

Source: CEIC.

b. Shipping Cost *vis-à-vis* GPR

Sources: CEIC and Bloomberg.
Note: * For GSCPI the axis refers to standard deviation from average value and for Drewry index, the axis refers to US$ per 40 feet container.
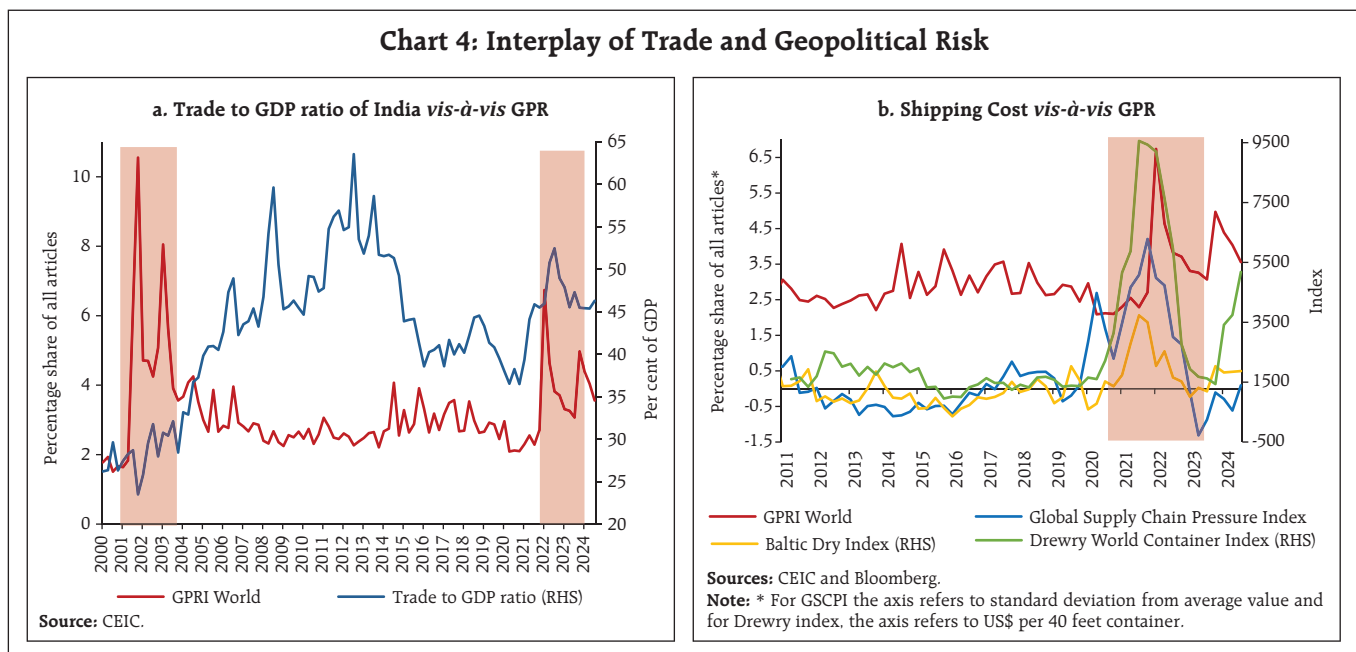
Table 1: Key Cross-correlations

Variables	Trade to GDP ratio	Net Capital Flow to GDP ratio	Exchange rate	Terms of Trade	GPRI India	GPRI World
Trade to GDP ratio	1.00					
Net Capital Flow to GDP ratio	0.06	1.00				
Exchange rate	0.39***	-0.49***	1.00			
Terms of Trade	0.06	0.05	-0.03	1.00		
GPRI India	0.05	-0.22*	0.16	-0.01	1.00	
GPRI World	-0.15	-0.20*	-0.16	0.23**	0.29***	1.00

Note: The symbols '*', '**', and '***' indicate the statistical significance of correlation coefficients at the level of 10 per cent, 5 per cent and 1 per cent, respectively.
Source: Authors' estimates.

terms of trade (TOT) highlights how global supply chain disruptions stemming from geopolitical events can affect India's trade dynamics. Additionally, the significant correlation between global GPR and India-specific GPR emphasises the interconnectedness of geopolitical risks, where international events often reverberate within India.

The exchange rate shows an intriguing offsetting relationship with the trade-to-GDP ratio and the net capital flow-to-GDP ratio. Its positive relationship with the trade-to-GDP ratio suggests that higher imports as compared to exports results in a rise in the trade to GDP ratio which leads to currency depreciation while rise in capital inflows could result in appreciation. Building on the insights gained from this correlation analysis, we proceed to more robust statistical methods to identify how shocks to the GPRI impacts its relationships with key economic variables.

III. Methodology

As stated in the introductory section, we use a suite of multivariate time series models to identify the shocks to GPRI for India and the world - an unrestricted Vector Autoregression (VAR) model; a structural VAR (SVAR) model with short-run restrictions; and a structural VAR model with sign-restrictions (SRVAR). In the system of equations, each variable is considered to be driven by its own lagged values, the lagged values of all other variables in the system, and an error term. All the models capture the dynamic relationships

among multiple variables and their responsiveness to exogenous shocks from the GPRI.

The data matrix includes six variables: (i) seasonally adjusted trade volume (*i.e.* sum of exports and imports of goods and services to GDP ratio) (*TGR_D11*), (ii) seasonally adjusted net capital flows to GDP ratio (*NCFGR_D11*), (iii) year on year (y-o-y) changes in the nominal exchange rate (*DELTA_NER_YOY*),[7] (iv) y-o-y change in terms of trade (*TOT_YOY*),[8] (v) standardised series of GPRI for India (*GPR_INDIA_SD*) and (vi) standardised series of GPRI for the world (*GPR_WORLD_SD*). First, we consider a positive shock to the GPRI for India and its impact on the rest of the variables *i.e.,* the case of the country-specific shock. Next, we evaluate the shock to the global GPRI. Impulse response functions (IRFs) — play a central role for analysing the impact of GPR shocks. All the model specifications include that three quarter lags best capture temporal variations in the responsiveness of the relevant variables and satisfy the stability condition.[9] The properties of the IRFs are examined in alternative models and identification schemes which are premised on the methods of generalised impulse responses, short-run identification restrictions and sign-restricted structural identification. Alternative

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[7] Nominal Exchange Rate (NER) is defined as the Indian Rupees per US dollar.

[8] Terms of trade is defined as the ratio of the import price to export price of goods and services.

[9] Lag length is selected on the basis of sequential modified LR test criteria.

specifications and identification schemes provide a battery of tests for the IRFs of the shocks of our interest.

The starting point is an unrestricted VAR with generalised IRFs which is an ordering-invariant approach (Pesaran and Shin, 1998; Koop *et al.*, 1996).[10] The SVAR model has short-run restrictions in the recursive factorisation. In the SRVAR model, we impose a positive sign restriction on the impulse response of the relevant GPRI for one quarter to identify a rise in geopolitical risks. In this method, we follow the penalty function approach (Uhlig, 2005).[11]

IV. Results

In this section, we analyse the results of the qualitative features of the IRFs and the quantitative impact of the shocks (Chart 5 and 6).

Effects of a Rise in GPRI for India:

The qualitative patterns of the IRFs in response to the positive shock to the GPRI indicate the presence of trade and financial channels and their interplay. A shock to the GPRI for India causes (i) a rise in the index itself and in the global GPRI; (ii) a decline in India's terms of trade; (iii) depreciation of the Indian rupee (INR) on impact; (iv) a drop in capital flows; and (v) contraction in trade flows. Intuitively, a rise in the GPRI increases trading costs with a rise in prices of exports. Trade restrictions such as sanctions or tariffs can reduce export opportunities for India, force the exporters to reroute their trade, cause inefficiency in resource allocation and increase costs of exporting. The INR also depreciates as foreign investors shift their funds from INR-denominated investments to foreign currency-denominated investments (*i.e.* USD)

Chart 5: Effects of a Positive Shock to India GPRI

a: Response to Generalised One S.D. Innovations
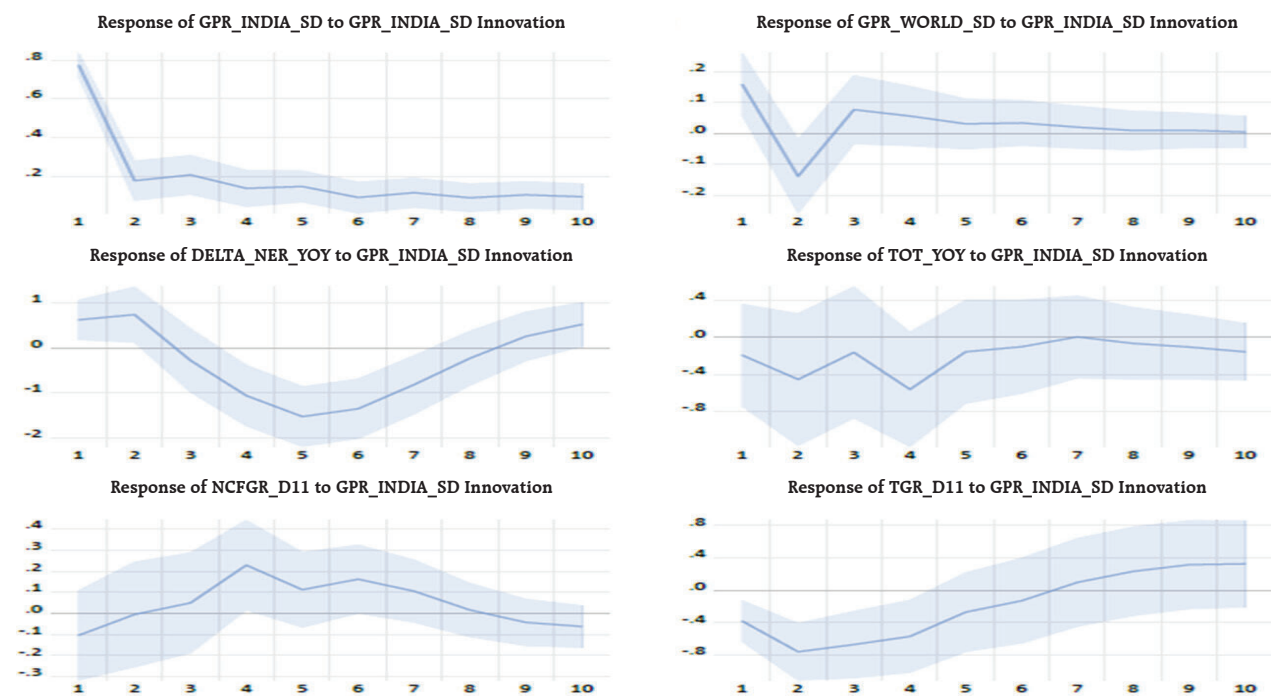
Note: Shaded region of the IRFs indicate 68 per cent confidence interval using analytic asymptotic standard errors.
Source: Authors' Estimates.

[10] The generalised IRF is used in many studies, such as Boyd et al. (2001), Cheung et al. (2004), and Huang et al. (2008).
[11] Applications of sign-restricted VAR methodology are available in Dedola and Neri (2007), Pappa (2009), Mountford and Uhlig (2009), and Cantelmo and Melina (2018).

b: Response to Structural VAR Innovations

Response of GPR_INDIA_SD to GPR_INDIA_SD Innovation

Response of GPR_WORLD_SD to GPR_INDIA_SD Innovation

Response of DELTA_NER_YOY to GPR_INDIA_SD Innovation

Response of TOT_YOY to GPR_INDIA_SD Innovation

Response of NCFGR_D11 to GPR_INDIA_SD Innovation

Response of TGR_D11 to GPR_INDIA_SD Innovation

Note: Shaded region of the IRFs indicate 68 per cent confidence interval using analytic asymptotic standard errors.
Source: Authors' Estimates.

c: Response to Sign-restricted Structural VAR Innovations

Impulse response of GPR_INDIA_SD to GPR_INDIA_SD Innovation

Impulse Response of GPR_WORLD_SD to GPR_INDIA_SD Innovation

Impulse Response of DELTA_NER_YOY to GPR_INDIA_SD Innovation

Impulse Response of TOT_YOY to GPR_INDIA_SD Innovation

Impulse Response of NCFGR_D11 to GPR_INDIA_SD Innovation

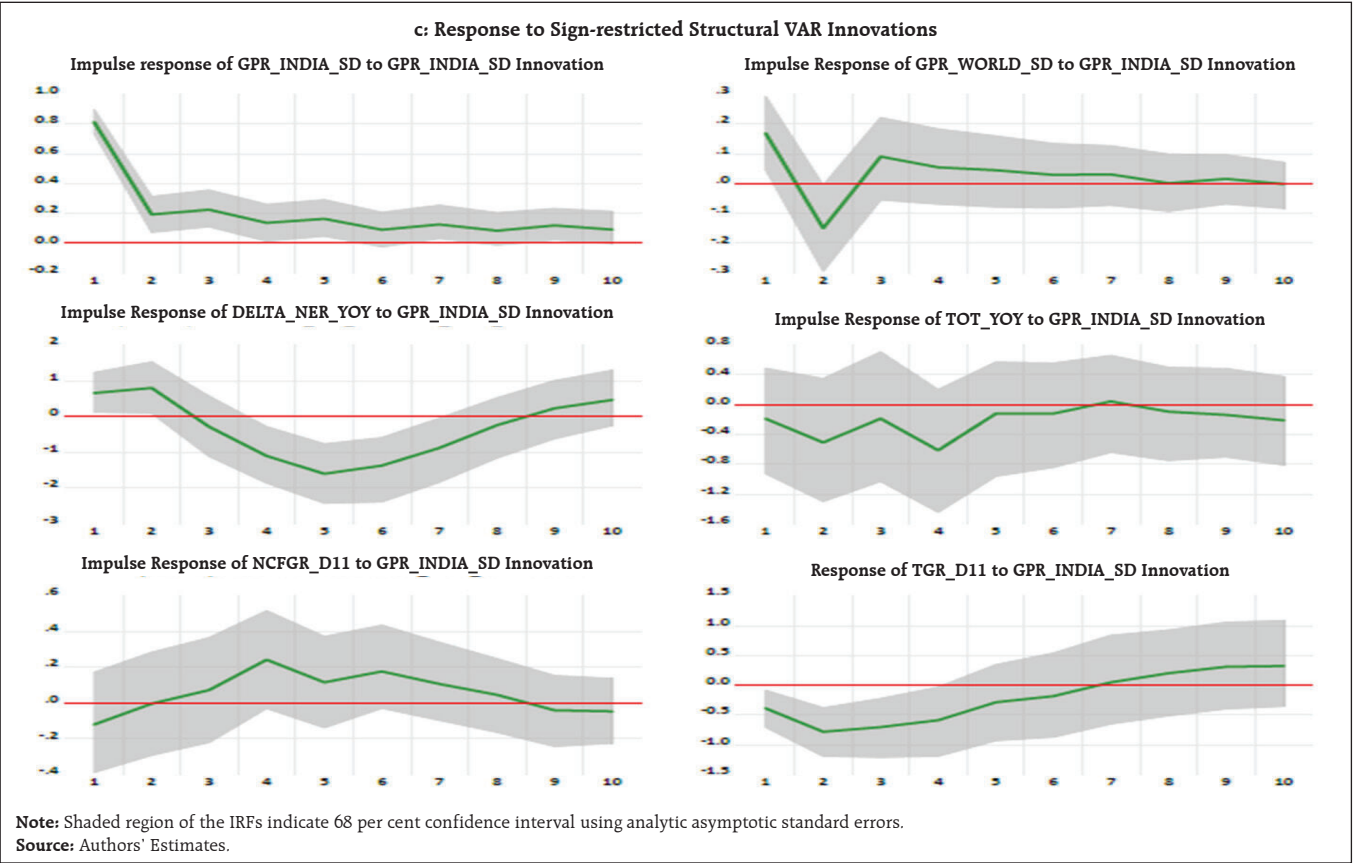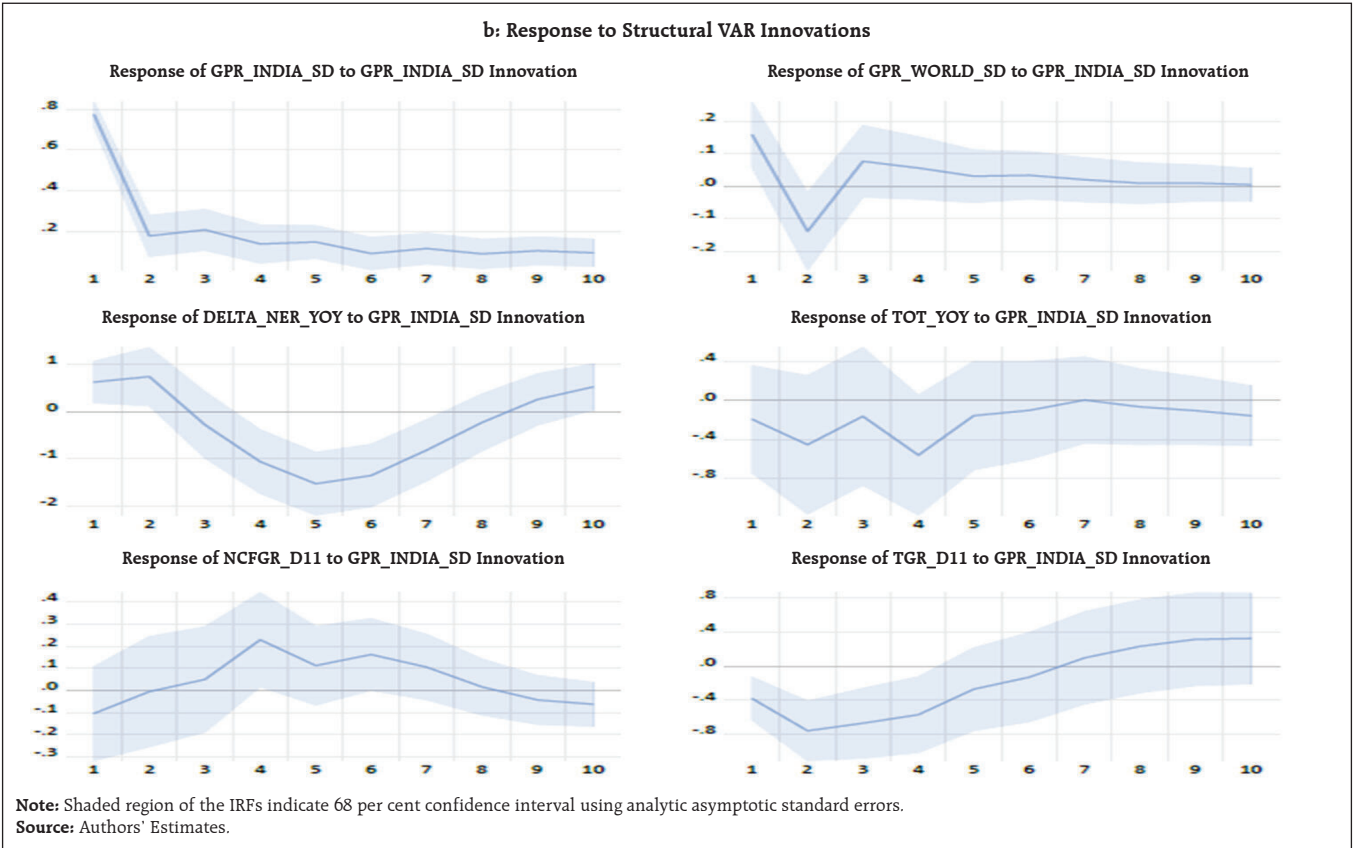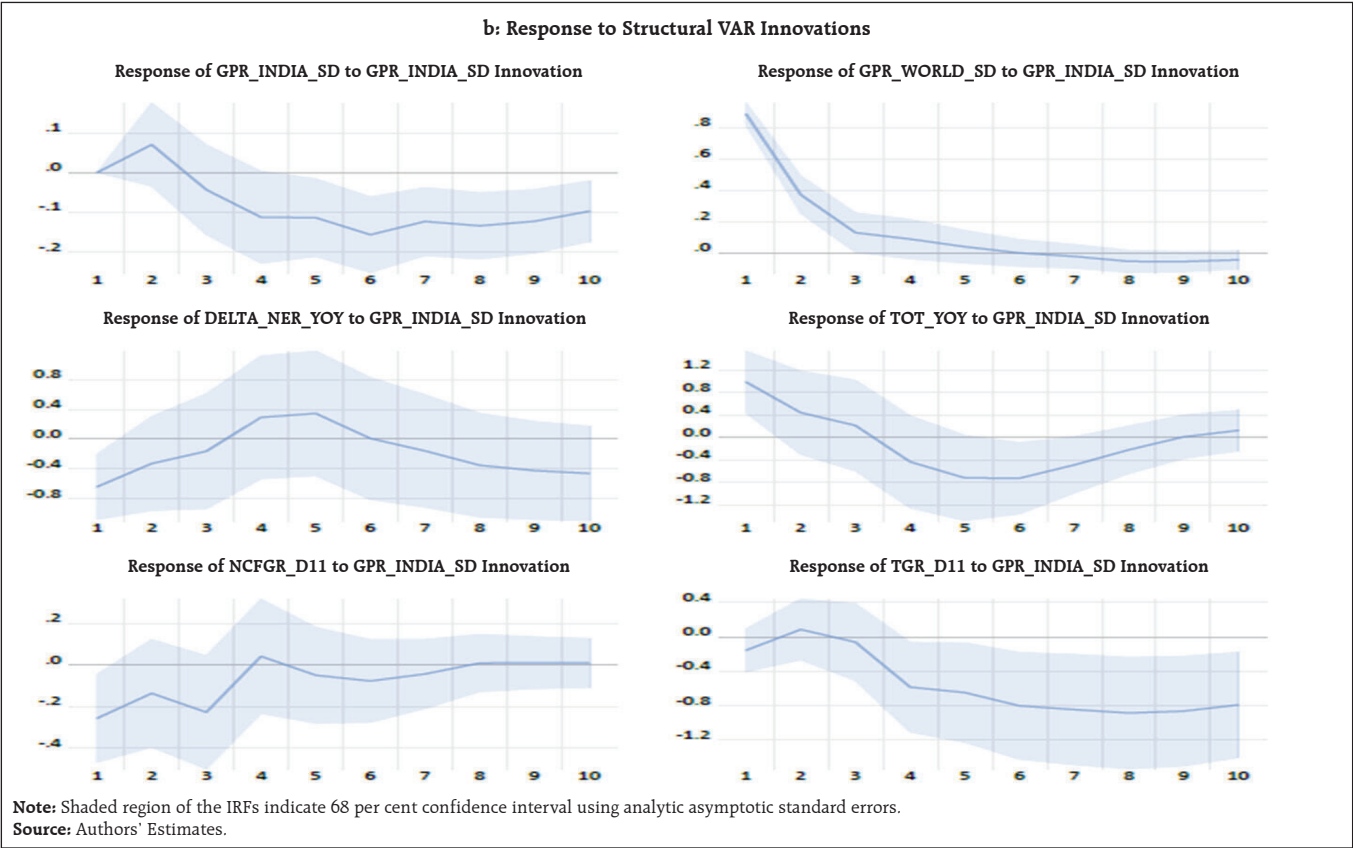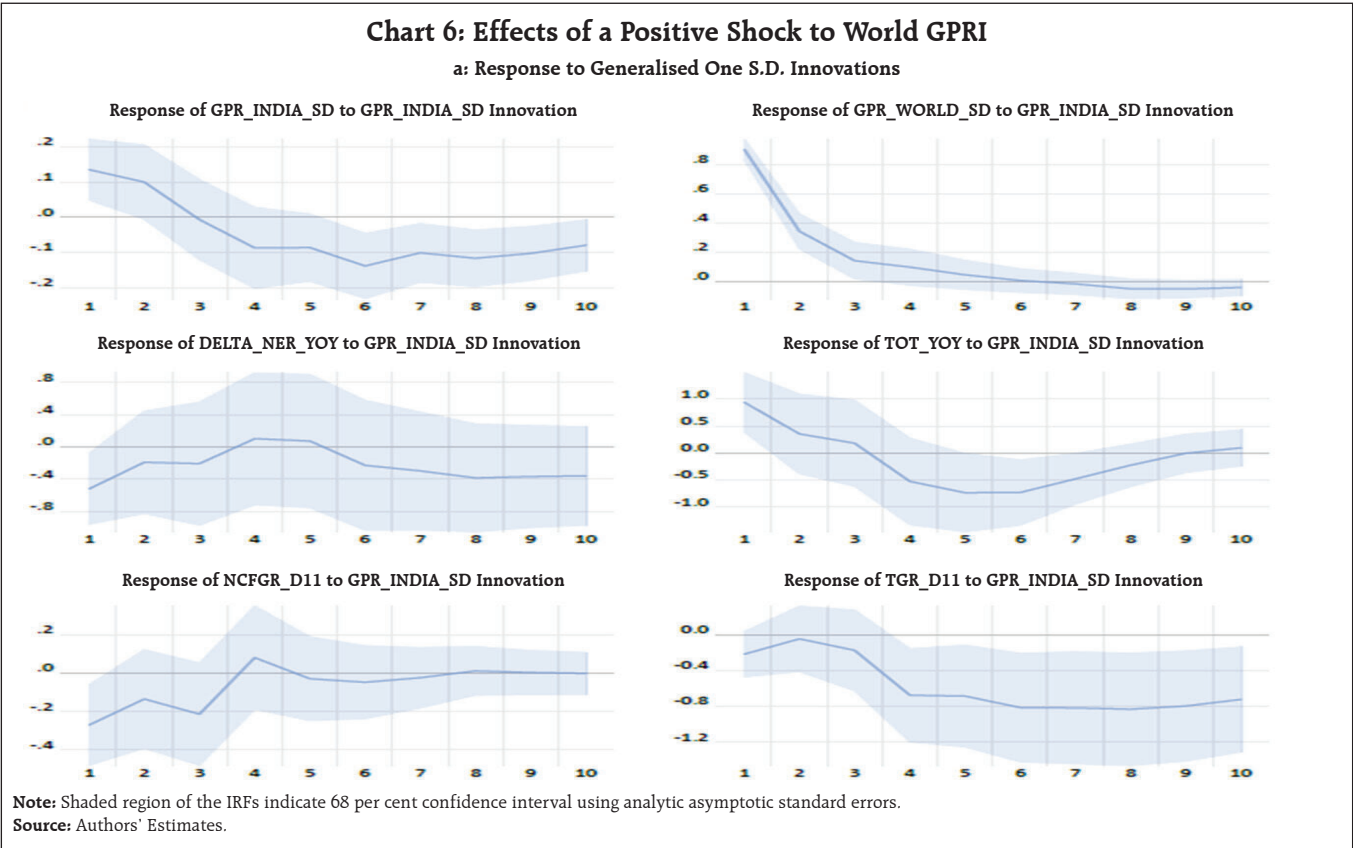### Response of TGR_D11 to GPR_INDIA_SD Innovation

Note: Shaded region of the IRFs indicate 68 per cent confidence interval using analytic asymptotic standard errors.
Source: Authors' Estimates.

Chart 6: Effects of a Positive Shock to World GPRI

a: Response to Generalised One S.D. Innovations

Response of GPR_INDIA_SD to GPR_INDIA_SD Innovation

Response of GPR_WORLD_SD to GPR_INDIA_SD Innovation

Response of DELTA_NER_YOY to GPR_INDIA_SD Innovation

Response of TOT_YOY to GPR_INDIA_SD Innovation

Response of NCFGR_D11 to GPR_INDIA_SD Innovation

Response of TGR_D11 to GPR_INDIA_SD Innovation

Note: Shaded region of the IRFs indicate 68 per cent confidence interval using analytic asymptotic standard errors.
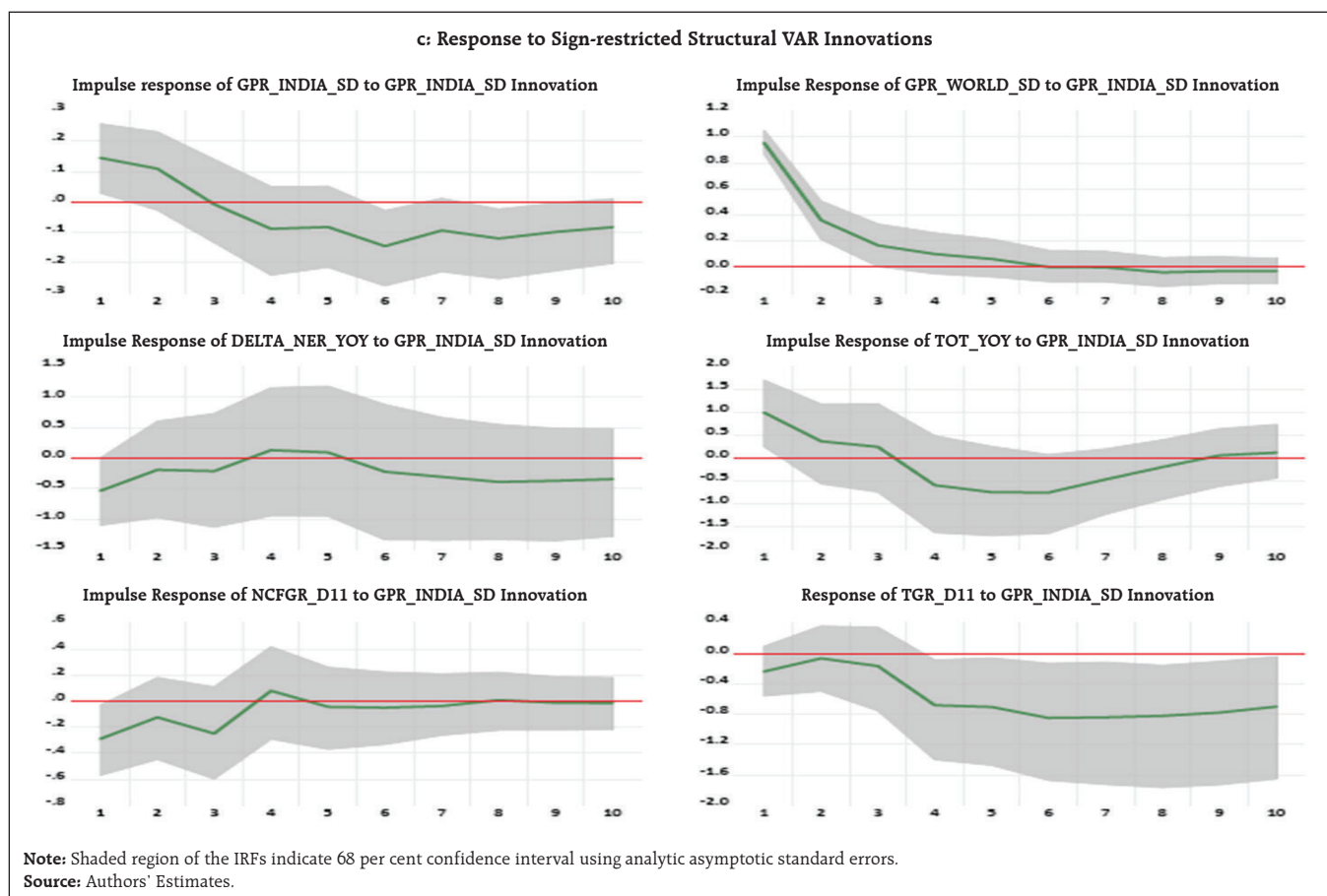**Source:** Authors' Estimates.

b: Response to Structural VAR Innovations

Response of GPR_INDIA_SD to GPR_INDIA_SD Innovation

Response of GPR_WORLD_SD to GPR_INDIA_SD Innovation

Response of DELTA_NER_YOY to GPR_INDIA_SD Innovation

Response of TOT_YOY to GPR_INDIA_SD Innovation

Response of NCFGR_D11 to GPR_INDIA_SD Innovation

Response of TGR_D11 to GPR_INDIA_SD Innovation

Note: Shaded region of the IRFs indicate 68 per cent confidence interval using analytic asymptotic standard errors.
Source: Authors' Estimates.

c: Response to Sign-restricted Structural VAR Innovations

Impulse response of GPR_INDIA_SD to GPR_INDIA_SD Innovation

Impulse Response of GPR_WORLD_SD to GPR_INDIA_SD Innovation

Impulse Response of DELTA_NER_YOY to GPR_INDIA_SD Innovation

Impulse Response of TOT_YOY to GPR_INDIA_SD Innovation

Impulse Response of NCFGR_D11 to GPR_INDIA_SD Innovation

Response of TGR_D11 to GPR_INDIA_SD Innovation

Note: Shaded region of the IRFs indicate 68 per cent confidence interval using analytic asymptotic standard errors.
Source: Authors' Estimates.

to reduce country risk and/or currency risk in their investment portfolio.[12] The effects of the financial channel via the exchange rate, however, is transient and may not influence capital flows lastingly.[13]

The IRFs obtained from the shock to the GPRI for India show that the trade channel is more predominant relative to the financial channel. Capital flows respond sharply, while trade flows contract gradually and recover over a period of 6-7 quarters. These qualitative features remain robust across the alternative identification methods. Considering the mean impulse responses from all three models, it is found that at the peak, a one standard deviation shock to the GPRI for India causes a decline in trade volume by 0.9 percentage points and capital flows by 0.2 percentage points. The peak effect of contraction appears on impact for the shock to the financial channel, and with a lag of 2 quarters for the trade channel. The timing of contraction is robust irrespective of the models and shock identification strategies.

Effects of a Rise in GPRI for the World

The estimated IRFs obtained from the positive shock to GPRI for the world also indicate the presence of trade and financial channel along with offsetting effects on the exchange rate across modelling strategies. The role of the financial channel turns out to be prominent in the shocks resulting from the GPRI of the world. Comparing peak effects, it is observed

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[12] According to Wang *et al.* (2023), the mechanisms contributing to the "flight home" effect includes the erosion of net financial wealth, liquidity evaporation, and the increase in risk premia. Using the local projection method of Jordà (2005), he demonstrates that GPR results in exchange rate depreciation, increases risk premia, and decreases the value of traded stocks as a percentage of GDP.

[13] Będowska-Sójka et al. (2022) document a pathway to hedge geopolitical risk by using different asset classes surrounding the Russian invasion of Ukraine.

that the shock to global GPRI has more pronounced effects than its Indian counterpart.

A positive shock to GPRI at the global level entails (i) spillovers to India; (ii) worsens the terms of trade; (iii) capital outflows and sluggish but prolonged contraction in trade flows. At the peak, a one standard deviation shock leads to contraction of trade volume and capital flows of the magnitudes of 1.0 percentage points and 0.3 percentage points, respectively. The peak effects of the contraction appear with a 6 to 8 quarters lag for the trade to GDP ratio, and on impact for capital flows.

V. Conclusion

Shocks to geopolitical risk are distinct from ordinary shocks, as they are neither transient nor inherently mean-reverting. Instead, they are exogenous in nature, marked by strong persistence and a pronounced hysteretic effects. Moreover, they exert differentiated impacts across nations, contingent on factors such as geographical proximity to the epicentre of the event, political configurations, and economic dependencies. Consequently, each country must prepare differently, tailoring its policy responses to its specific vulnerabilities rather than relying exclusively on multinational strategies and/or multilateral agencies.

Our results show that geopolitical risk is playing an increasingly pervasive role in shaping India's trade and financial dynamics. Distinguishing between India-specific and global GPR shocks, the analysis provides a nuanced understanding of the transmission mechanisms. The results show that the propagation of the shocks to GPRI for India and GPRI for the world are different, both qualitatively and quantitatively, on account of the relative roles of the trade and financial channels. While domestic shocks primarily travel through disruptions in supply chains and export competitiveness, global shocks are propagated through both trade and capital flows, reflecting heightened global risk aversion, trade

restrictions and capital reallocation. Comparing peak effects, it is observed that the shock to global GPRI has more pronounced effects than its Indian counterpart.

Given the relative predominance of the trade channel over the financial channel and their countervailing pressures on the exchange rate, policymakers can envisage strategic responses with a suite of targeted interventions to neutralise these shocks than relying on broad-brush instruments like policy rate adjustments. On the trade front, measures could include diversifying trade sources and participating in larger trade agreements, such as free trade areas (FTAs) and global trade blocs, to bolster resilience. Investments in infrastructure, particularly in enhancing port logistics and connectivity, would position India as an international shipping hub. From the financial channel perspective, building strategic buffers, forging bilateral swap agreements, and engaging with multilateral institutions to bring GPR mitigation strategies are imperative to resolve GPR-induced disruptions. These strategies, combined with a robust safety net, can equip the Indian economy to navigate the complexities of persistent geopolitical risks effectively.

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