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Do Supply Chain Disruptions Matter for Global Economic Conditions?

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ABSTRACT

The COVID-19 pandemic and its aftermath exposed the vulnerabilities of global supply chains, leading to widespread delays and shortages that highlighted the interconnectedness of economies. This paper examines the global impact of supply chain disruptions on economic conditions, drawing on literature related to economic uncertainty, global economic integration, and the global supply chain disruptions. Using a Bayesian vector autoregression (BVAR) model, we analyse the effect of supply chain shocks. The empirical findings reveal that these disruptions significantly influence global economic stability, particularly through their impact on aggregate inflation and the policy responses that accompany them.

JEL Classification: E31, E32, D24

1 | Introduction

> *[I]t has been generally thought that monetary policy should limit its response to, or "look through," supply shocks to the extent that they are temporary and idiosyncratic... Supply shocks that have a persistent effect on potential output could call for restrictive policy to better align aggregate demand with the suppressed level of aggregate supply. The sequence of shocks to global supply chains experienced from 2020 to 2022 suppressed output for a considerable time and may have persistently altered global supply dynamics. Such a sequence calls on policymakers to use policy restraint to limit inflationary effects.*
>
> —U.S. Federal Reserve Chair Jerome H. Powell – November 2023[1]

The COVID-19 pandemic and its aftermath exposed and exacerbated vulnerabilities within the global economy. Among the most critical challenges has been the severe disruption of global supply chains. These disruptions, initially triggered by factory closures, lock-downs, and mobility restrictions, caused considerable delays and shortages in the production and distribution of goods. As economies began to recover, the situation became more complex, with the resurgence in demand quickly outpacing the constrained supply. This imbalance not only highlighted the fragility of global supply networks but also underscored the profound inter-connectedness of modern economies, where disruptions can have cascading effects globally.

In a world where economic activities are increasingly intertwined, disruptions to global supply chains pose significant risks to economic stability. The interdependence of economies means that shocks can rapidly propagate across borders, affecting production, trade, and financial markets worldwide. This phenomenon has been observed during the pandemic,

where disruptions had far-reaching implications, amplifying economic volatility and uncertainty. Understanding these dynamics is crucial for policymakers and informing the general public, as it provides insights into the vulnerabilities of the global economic system and the potential for future shocks to disrupt global stability.

This paper seeks to explore the global dimensions of supply chain disruptions and their implications for economic conditions. Our analysis is grounded in three distinct strands of literature, each of which provides a framework for understanding the complex interactions between supply chain pressures and the broader economy.

The first strand of literature addresses the concept of global economic integration and its implications for business cycle synchronisation. Numerous papers find evidence of a world business cycle (e.g., Kose et al. 2003, Monfort et al. 2003, Ciccarelli and Mojon 2010, Ginn 2023a, 2023b), where economic activities in different countries are increasingly synchronised due to globalisation. The implications of global integration are profound, as it suggests that shocks can have immediate and significant impacts on other regions, further amplifying the effects of global supply chain disruptions.

The second strand of literature focuses on economic uncertainty and its relationship with economic conditions. Recent research has explored the role of oil prices in generating economic uncertainty, particularly through the lens of Economic Policy Uncertainty (EPU), a measure developed by Baker et al. (2016). EPU is negatively correlated with the business cycle (e.g., Bloom 2009; Baker et al. 2016). The broader implications of economic uncertainty are significant, as it affects firm investment (e.g., Kang et al. 2014; Handley and Limao 2015), stock prices (e.g., Kang and Ratti 2013a; Antonakakis et al. 2013; You et al. 2017; Ginn 2023a), bank valuation (He and Niu 2018), and unemployment (e.g., Caggiano et al. 2014, 2017). Ginn (2022) finds that natural disasters, which can be considered exogenous shocks similar to supply chain disruptions, can also lead to increased aggregate uncertainty, underscoring the need to understand how such disruptions can spill over into broader economic instability. Studies of Kang and Ratti (2013b), Antonakakis et al. (2014), Hailemariam et al. (2019) and Dufrénot, Ginn, Pourroy, and Sullivan (2024) examine the transmission mechanisms through which international oil prices can create spillover effects on domestic economies, thereby increasing uncertainty.

The third strand, and the focus of our contribution, relates to global supply chain disruptions. Numerous studies have established a link between these disruptions and diminished financial performance. For instance, Hendricks and Singhal (2003) demonstrate that supply chain disruptions, such as production or shipping delays, can significantly reduce shareholder value. Hendricks and Singhal (2005b) show that such disruptions increase equity risk and lead to a decline in market value, while Hendricks and Singhal (2005a) find that supply chain issues negatively impact a firm's financial health by lowering revenue and operating income, increasing costs, and raising total inventory levels. Notably, affected firms may take up to two years to fully recover from the financial damage. Similarly, Baghersad and Zobel (2021) report that supply chain disruptions are associated with reduced operating income, returns on sales and assets, as well as poor performance in total asset turnover. The global supply chain pressure index (GSCPI) provides a novel, comprehensive measure of global supply chain disruptions (Benigno et al. 2022). Recent studies have identified supply chain pressures as key drivers of inflation, particularly in the Euro area (Ascari et al. 2024), the US (Diaz et al. 2023; Ginn and Saadaoui 2025a), and in relation to geopolitical risks (Asadollah et al. 2024). When supply chains are strained—due to factors such as shipping delays, shortages of key inputs, or rising transportation costs—businesses face heightened uncertainty regarding production schedules, costs, and revenues. This increases economic uncertainty, particularly when disruptions are prolonged. In addition, rising supply chain pressures contribute to higher inflation due to supply shortages and escalating costs. The findings by Mrabet et al. (2025) highlight that supply chains have a significant dynamic impact on consumer prices, especially during economic crises such as the 2008 global financial crisis and the COVID-19 pandemic. As GSCPI increases, central banks may be forced to tighten monetary policy, which introduces uncertainty regarding the future course of inflation control measures. This uncertainty can raise EPU, especially as policymakers react to supply-side challenges. Furthermore, global supply chain pressures often intersect with geopolitical risks, such as trade wars, tensions along key shipping routes, or dependency on goods from politically unstable regions. Consequently, a rise in the GSCPI may signal growing geopolitical tensions, further increasing EPU as governments adapt trade, security, and foreign policies to mitigate these risks. Laumer and Schaffer (2025) find that supply chain shocks amplify the typical effects of monetary policy on output and prices. This amplification occurs due to an intensification of the credit channel: when supply chain pressures are high, the sensitivity of credit costs (excess bond premium) to monetary policy increases.

In this paper, we contribute to the literature on the economic impacts of global supply chain disruptions by estimating a Bayesian vector autoregression (BVAR) model with sign restrictions at the global level, with a particular emphasis on their effects on the world business cycle. Given the global nature of these disruptions, their consequences extend beyond individual countries, having broad implications for the entire global economy. Using monthly data from January 1999 to June 2024 at the global level, we analyse the transmission of global supply chain shocks across interconnected economies.

Unlike previous studies that rely on country-specific models, our global modelling approach offers an empirical framework to estimate how supply chain disruptions propagate across the global economy. In a global context, economies are interconnected through goods, factors, and financial markets. Estimating a BVAR at the global level allows for the consideration of these interconnections that exist. This approach not only helps explain post-pandemic inflation dynamics but also sheds light on the increase in the interest rate reaction, especially during the post-pandemic period, which in turn influences global economic policy uncertainty (GEPU). Utilising a BVAR model, we examine the effects of GSCPI on economic

TABLE 1 | Variable selection.

Item	Symbol	Source	Description
Output	$\ln Y_t$	OECD	Global Production Index
Aggregate CPI	$\ln P_t$	OECD	Global Price Index
Interest rate	R_t	OECD/FRED	Interest rate
Supply chain shock	GSCPI_t	Federal Reserve of NY	GSCPI
Economic uncertainty	$\ln \text{EPU}_t$	FRED	GEPU
Recession dummy	δ_t	FRED	OECD Recession Dates (OECDNMERECM)

conditions during key historical periods, including the great moderation, the global financial crisis, and the COVID-19 pandemic and its aftermath. Our study links supply chain disruptions transmitting as a world disturbance to the global business cycle, contributing to lower output and higher inflation, thereby resulting in higher GEPU, especially during the post-pandemic economic recovery. These findings underscore the growing global risks posed by supply chain disruptions, offering compelling evidence that policymakers must account for the international dimensions of these pressures when designing economic policies aimed at mitigating their adverse effects.

The rest of the paper is structured as follows: Section 2 describes the data. Section 3 discusses the modelling methodology and empirical results. Section 4 provides policy recommendations. Section 5 concludes the paper.

2 | Data

The model is based on monthly data spanning from 1999:JAN to 2024:JUN covering key macroeconomic variable types. The variables included in our analysis include economic uncertainty, output (industrial production), aggregate consumer price (CPI), GSCPI, and (GEPU). The data are summarised in Table 1.

Growth variables are defined as 100 times the log-difference (year-on-year). Six global variables are considered: GEPU, output, aggregate inflation, interest rate, and GSCPI. Each variable is discussed in turn.

2.1 | Global EPU

Building on the EPU index by Baker et al. (2016), Davis (2016) constructs a measure of GEPU. GEPU is considered in the empirical analysis. EPU is negatively correlated with the business cycle (e.g., Bloom 2009; Baker et al. 2016).

2.2 | Construction of GDP Weighted Global Aggregates

Following Dufrénot, Ginn, and Pourroy (2024), and Ginn (2024b), we construct three global economic indicators based on twenty-two sampled economies[2] using a GDP weighted index. The global indicators include output (industrial production) growth[3], output gap[4], aggregate inflation, and the interest rate[5]. The weight of each economy in the index is derived from its economic size (proxied using annual GDP data based on puchasing power parity ("PPP")), which is accordingly re-based (i.e., sums to one for each period) (Figure A1). We then apply the weights to each of the respective global indicators in the respective period, considering that the data is monthly. For consistency, the aggregate price (CPI) is seasonally adjusted via the ARIMA X-12 algorithm from the U.S. Census Bureau.

In the Figure A2: Appendix A plots the period-to-period movements, which are quite stable where the relationship evolves over a longer period of time. The international data for the twenty-two economies and world data index is plotted in the Appendix A (see Figure A2) and are used to represent international economic conditions (henceforth, "WORLD").

2.3 | Global Supply Chains

Global supply chain pressure index (GSCPI_t) is obtained from Benigno et al. (2022).

2.4 | Global Variables

Figure 1 plots the global data which shows that the global dataset captures two major turning points. The top-pane shows a sizable decline in output growth and the output gap, which occurred during the global financial crisis (GFC)[6] and onset of the spread of the COVID-19 virus. There was a noticeable decrease in aggregate inflation and interest rate during these two time periods, albeit aggregate inflation increased almost in parallel with the rise in GSCPI, corresponding with an increase in interest rates.

3 | Methodology and Results

We estimate the dynamic responses of the endogenous variables using a BVAR model with sign restrictions. While the BVAR approach is ideal for analysing the interactions among macroeconomic variables, there remains limited understanding of the direct impact of GSCPI on GEPU. To address this, we first examine how GSCPI affects GEPU, controlling for other key factors,

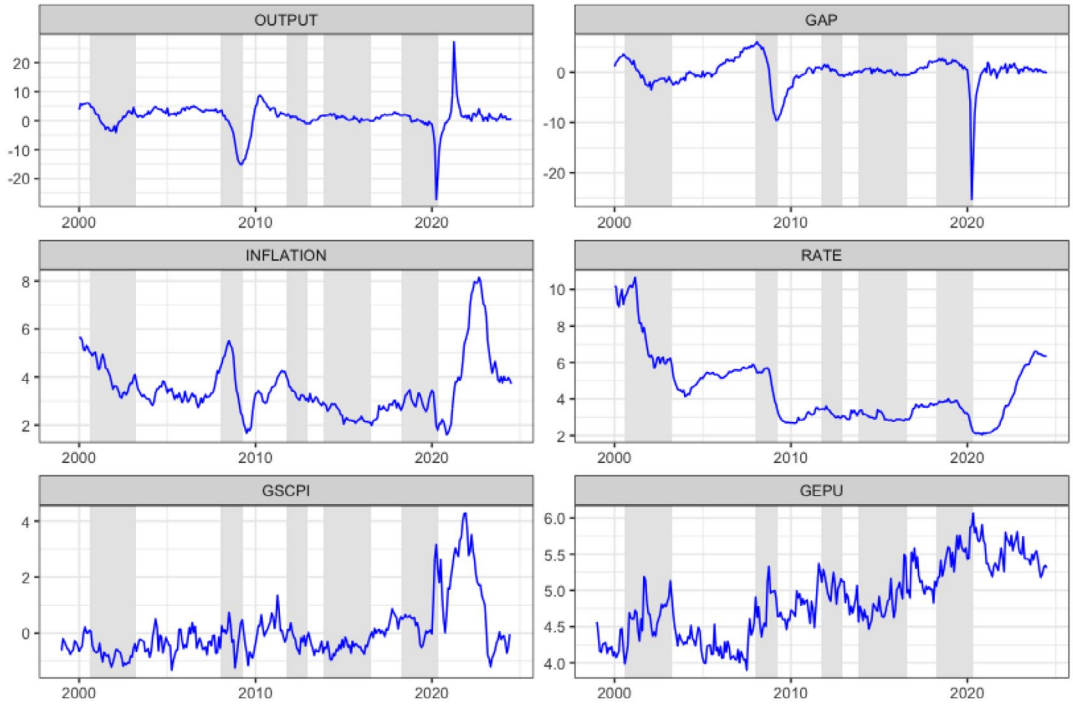

FIGURE 1 | Global economic data. Shaded areas indicate OECD recession dates. [Colour figure can be viewed at wileyonlinelibrary.com]

by employing both generalised method of moments (GMM) and generalised additive models (GAM).

3.1 | Determinants of Global EPU

Given the potential bidirectional causality between GEPU and other macroeconomic conditions, we turn to a GMM and GAM to further explore the specific effect of GSCPI on GEPU.

We incorporate a GMM approach to address potential endogeneity concerns that arise from this bidirectional relationship. Unlike ordinary least squares (OLS), which assumes exogeneity of the explanatory variables, GMM allows for the use of lagged control variables to account for endogeneity, thereby enhancing the reliability of the estimates. By utilising lagged instruments, the GMM framework ensures a more robust treatment of the causal relationships between GSCPI, GEPU, and other economic variables.

Parallelly, we employ a GAM to explore the nonlinear interactions among variables without necessarily imposing restrictive parametric assumptions a priori. This flexibility enables us to capture more complex dynamic relationships, especially when there are nonlinear effects between GSCPI and GEPU.

3.1.1 | GMM

The GMM is formalised as follows:

$$\ln \boldsymbol{EPU_t} = \alpha + \beta^T x_t + B(L)\Theta_t + u_t \tag{1}$$

where x_t is a vector of up to four control variables in the set $x_t = \left[\Delta \ln\left(Y_t\right), \Delta \ln\left(P_t\right), R_t, \mathrm{GSCPI}_t\right]$, which includes output growth, aggregate inflation, interest rate, and GSCPI data.

TABLE 2 | GMM regression.

	M1	M2
α	5.4849***	5.4224***
	(0.1541)	(0.1888)
β_Y	−0.0427***	−0.0403***
	(0.0061)	(0.0039)
β_P	0.2478***	0.1596***
	(0.0086)	(0.0116)
β_R	−0.4474***	−0.3240***
	(0.0340)	(0.0557)
β_{GSCPI}		0.1238***
		(0.0225)
AIC	256.1781	247.6558

Note: *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

Accordingly, we estimate two models, the first is based on output growth, inflation, and interest rate ("M1"). The second model is based on the former and additionally includes GSCPI ("M2"). The model further includes an intercept (α), a vector of lagged control variables (Θ_t), and an error term (u_t). We set the lag operator (i.e., B(L)) of the control variables to 1. Accordingly, we estimate how economic conditions affect GEPU over the sample period. Table 2 demonstrates that GEPU is associated with lower output growth, higher inflation, and lower interest rate consistent with the literature (e.g., Hailemariam et al. 2019; Ginn 2022; Dufrénot, Ginn, and Pourroy 2024; Dufrénot, Ginn, Pourroy, and Sullivan 2024). We further find that GEPU increases in response to higher GSCPI. All coefficients in Table 2 are statistically significant.

The results for M1 and M2 suggest that GEPU is associated with lower output growth, higher inflation, and lower interest rates. M2 demonstrates a positive relationship between GEPU and GSCPI. Table 3 demonstrates that coefficients are statistically significant. The Akaike information criterion (AIC) indicates that M2, which includes GSCPI, provides a better fit than M1.

3.1.2 | GAM

We further explore the joint effect of economic variables on GEPU via GAM. Specifically, we aim to account for potential non-linear interactions without imposing strong parametric assumptions on the functional form. The GAM model is specified as:

$$\ln \mathrm{EPU}_t = \alpha + f_{Y,P,R,\mathrm{GSCPI}}\left(\Delta \ln\left(Y_t\right), \Delta \ln\left(P_t\right), R_t, \mathrm{GSCPI}_t\right) + \epsilon_t \tag{2}$$

The smooth term (i.e., $f_{Y,P,R,\mathrm{GSCPI}}$) jointly models the relationship between the four variables on GEPU, accounting for their possible interactions and non-linear effects.

We further investigate whether there are interaction effects between the explanatory variables. The GAM framework allows us to relax the assumption of a linear response to the input variables.[7] The GAM can be formalised as follows:

We estimate the interaction of a set of control variables as a tensor product (Wood et al. 2013). The GAM model allows for a set of basis functions for each marginal function for the interaction of variable combination $f_{Y,P,R,\mathrm{GSCPI}}\left(\Delta \ln\left(Y_t\right), \Delta \ln\left(P_t\right), R_t, \mathrm{GSCPI}_t\right)$.

TABLE 3 | Empirical results (GAM regression).

Parametric coefficients	**Estimate**	**SE**	***t*-value**	***p***
α	4.843	0.0376	128.9	<0.01
Non-parametric coefficients	**EDF**	**REF.DF**	***F*-value**	***p***
$f_{Y,P,R,\mathrm{GSCPI}}$	104.6	112.6	8.38	<0.01
Adjusted R^2	0.772			

Note: Standard errors and reference degrees of freedom for the estimated terms are provided along with the *t*-value and *F*-value, respectively.

Based on the estimated models, we provide a three-dimensional interaction surface plot of fitted values of $\ln \mathrm{GEPU}_t$ (vertical axis) based on the explanatory variable combination (Breheny and Burchett 2017). Figure 2 plots how the interaction terms influence GEPU. The left-pane indicates that higher GEPU tends to be associated with lower output growth and higher inflation, which can be characterised as a period of "stagflation". The middle-pane indicates that GEPU is higher during periods of low output growth and interest rate. The right-pane shows that GEPU tends to be highest when there is low output growth and high GSCPI.

In both the GMM and GAM analyses, the empirical findings show that GEPU is positively associated with GSCPI.

3.2 | Bayesian Vector Autoregression Model

The model follows the theoretically grounded approach proposed by Giannone et al. (2015), which is commonly used in macroeconometric research (e.g., Cross et al. 2020, Bańbura et al. 2015, Cimadomo et al. 2022, Angelini et al. 2019, Ginn 2024a; Ginn and Saadaoui 2025a, *inter alia*). We estimate a BVAR model with sign restriction based on the BVAR package by Kuschnig and Vashold (2021). The BVAR model is generalised as follows:

$$y_t = \beta_0 + \boldsymbol{A}_1 y_{t-1} + \ldots + \boldsymbol{A}_p y_{t-p} + \epsilon_t, \epsilon_t \sim \mathcal{N}(0, \Sigma), t = \{1, \ldots, T\} \tag{3}$$

where y_t is a column vector of $(q \times 1)$ endogenous variables; β_0 is an intercept vector of $(q \times 1)$ terms; p is the lag length (based on Akaike information criterion of eleven lags); and $\epsilon_{\mathbf{t}}$ is an error term of $(q \times q)$ with mean zero with the variance–covariance matrix Σ. The BVAR is estimated using a normal-inverse-Wishart prior based on 5000 simulations.

The vector of macroeconomic variables includes the following:

$$y_t^T = \left[\mathrm{GSCPI}_t, \ln \mathrm{GEPU}_t, \Delta \ln Y_t, \Delta \ln P_t, R_t\right] \tag{4}$$

where y_t^T represents the transpose of a column vector consisting of GSCPI, GEPU, output growth, aggregate inflation, and interest rate. Identification in the model is based on economic theory and is achieved through sign restrictions, which impose constraints on the contemporaneous relationships between variables. Specifically, GSCPI is ordered first in Equation (4), as GSCPI represents global supply chain disruptions, which are not directly influenced by domestic economic conditions and

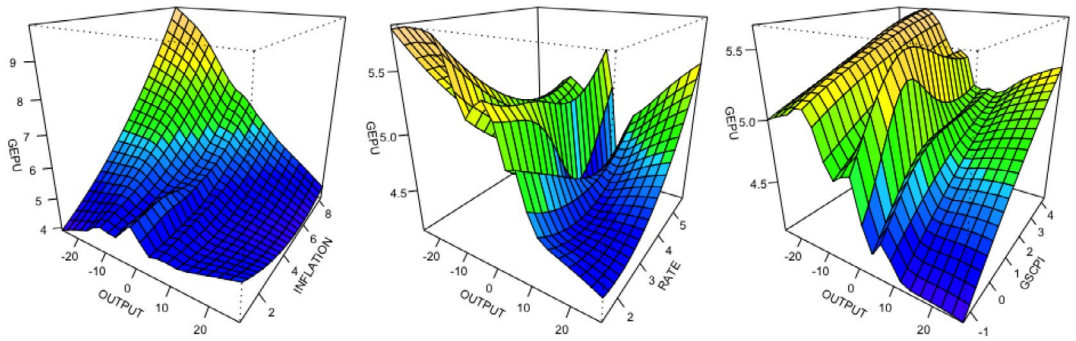

FIGURE 2 | Interaction plots (GAM regression). [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 4 | Identified shocks.

	Shock				
Response of	**Global supply**	**Uncertainty**	**Demand**	**Supply cost-push**	**Monetary policy**
Supply Chain Pressure (GSCPI)	+				
Global EPU	+	+	−	+	
Output growth	−	−	+	−	−
Aggregate inflation	+		+	+	−
Policy rate	+			+	+

therefore assumed to be contemporaneously exogenous. EPU is ordered second (e.g., Baker et al. 2016; Dufrénot, Ginn, and Pourroy 2024). The subsequent variables—output growth, aggregate inflation, and interest rate—are ordered following the existing literature (e.g., Boivin and Giannoni 2006).

A GSCPI shock, which reflects disruptions in global supply chains, is expected to raise uncertainty, reduce output, and increase both inflation and interest rates. The efficiency of global supply chains plays a critical role in the business cycle, as disruptions can cause frictions that affect both supply and demand, leading to inefficiencies and ultimately impacting production levels. These disruptions, often associated with delays and higher costs, can suppress economic output, making it crucial to understand how these frictions affect economic conditions. As global economies are interconnected, examining the effects of supply chain shocks is essential to understand the global business cycle. Furthermore, supply chain disruptions can aggravate inflation. When goods are in short supply due to bottlenecks, prices tend to rise, fueling inflationary pressures. GSCPI serves as a vital indicator of supply chain stress, tracking factors like transportation costs, delivery delays, and inventory shortages.

In the model specification, we note that the interest rate response reflects the "collective stance" by major central banks (Ratti and Vespignani 2016). The transmission of monetary policy remains equivocal insofar as policy responses are not necessarily coordinated. Domestic financial conditions can potentially become vulnerable to global shocks, which can complicate monetary policy decision making (Kamin 2010). While co-movement in domestic inflation rates may be related to cyclical fluctuations in the world economy, Woodford (2007) shows that globalisation does not impair the ability of central banks to control domestic inflation through national monetary policy.

3.2.1 | IRFs and FEVD

To enhance the analysis of dynamic responses from endogenous variables, we utilise a BVAR model with sign restrictions, producing impulse response functions (IRFs) alongside 68% and 90% confidence bands and forecast error variance decomposition (FEVD). In the previous section, a main finding is that a GSCPI increases GEPU.

Identification is based on economic theory and prior empirical findings using sign restrictions. This identification methodology has been pioneered by several authors, including Faust (1998), Canova and De Nicolo (2002), and Uhlig (2005), *inter alia*. The fundamental concept underlying this approach is to ascertain the identification of structural shocks by examining whether the patterns of impulse responses align with established economic theory. The identified sign restrictions are summarised in Table 4.

Recent studies (e.g., Diaz et al. 2023; Asadollah et al. 2024; Ascari et al. 2024; Ginn and Saadaoui 2025a) highlight the critical role that global supply chain pressures play in driving inflation and output reductions. Ascari et al. (2024) and Ginn and Saadaoui (2025a) further show that GSCPI is a significant factor in Phillips curve estimations for both the euro area and the U.S. Table 2 highlights that GEPU is associated with lower output growth, higher inflation, and lower interest rates, consistent with the literature (e.g., Hailemariam et al. 2019; Ginn 2022; Dufrénot, Ginn, and Pourroy 2024; Dufrénot, Ginn, Pourroy, and Sullivan 2024). In the prior section (Section 3.1), we find a positive relationship between GSCPI and GEPU using two models (i.e., GMM and GAM) with statistically significant coefficients. The theoretical expectation that GEPU rises in response to heightened GSCPI is also supported by Ginn (2024b), who shows that supply chain disruptions destabilise global economic conditions through lower output, higher inflation, and lower equity returns. This relationship underscores the importance of considering GSCPI as a key driver of uncertainty. These empirical findings provide a strong basis for sign identification in the BVAR model.

An uncertainty shock is typically negatively related to the business cycle (e.g., Bloom 2009; Baker et al. 2016). Aggregate demand shocks, characterised by unexpected increases in global real activity, tend to reduce uncertainty but increase inflation. On the supply side, cost-push shocks, which increase inflation while lowering output, prompt central banks to raise interest rates, resulting in elevated GEPU. Finally, a contractionary interest rate shock has a negative effect on output and inflation (Uhlig 2005).

The first column of Figure 3 shows the effects of shocks to GSCPI, where an increase in supply chain pressures leads to a persistent rise in uncertainty (GEPU), a decline in output, and a rise in inflation, accompanied by a rise in interest rates. These results align with expectations that disruptions in supply chains create economic uncertainty, constrain production, and exert inflationary pressures.

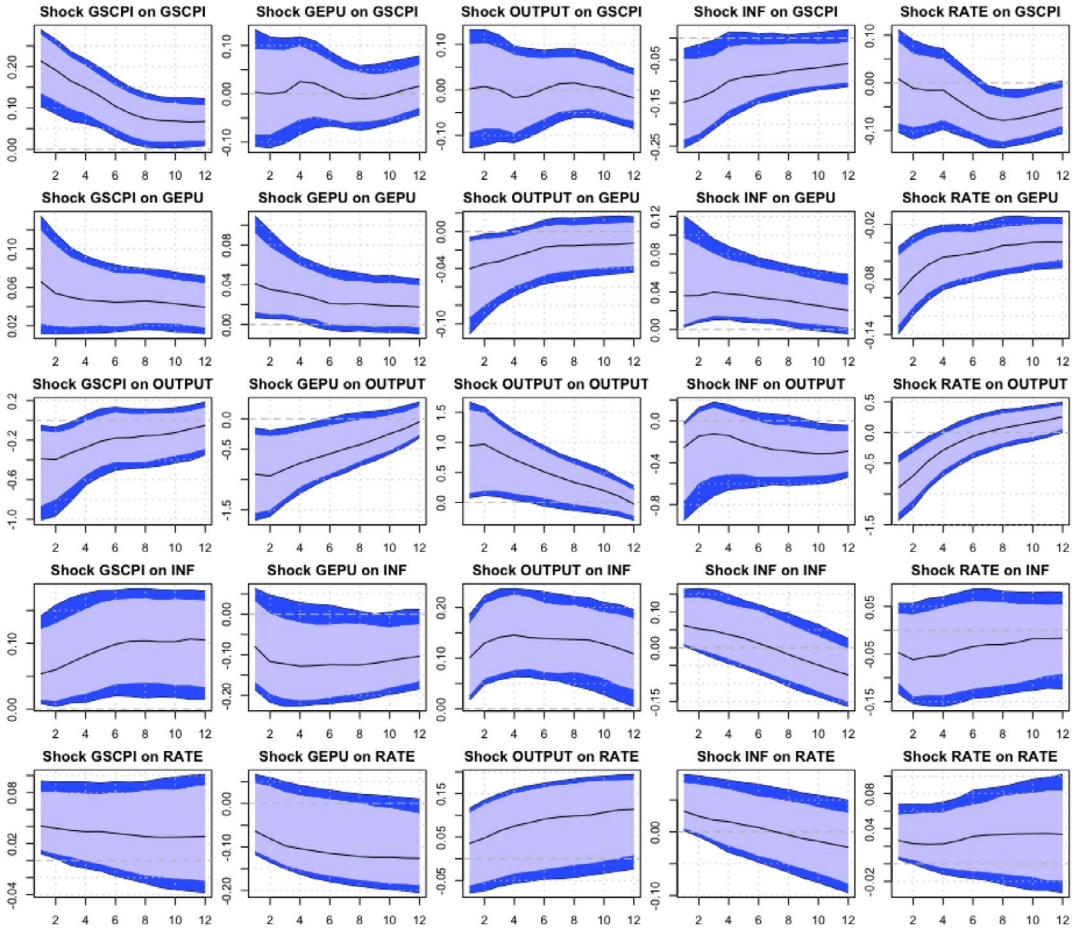

FIGURE 3 | BVAR IRFs (baseline model). [Colour figure can be viewed at wileyonlinelibrary.com]

The second column of Figure 3 examines shocks to GEPU, showing that higher economic uncertainty negatively impacts output and inflation while also leading to lower interest rates. This suggests that heightened uncertainty weakens economic activity, prompting monetary policy responses to mitigate the slowdown.

The third column of Figure 3 focuses on output shocks, where positive output shocks reduce supply chain pressures (lower GSCPI), stabilise economic uncertainty, and lead to increased inflation and rising interest rates over time.

The fourth column of Figure 3 investigates inflation shocks, revealing that higher inflation initially reduces output while leading to higher interest rates, likely as central banks respond to control inflationary pressures. Meanwhile, inflation shocks appear to slightly increase supply chain pressures, possibly reflecting rising costs affecting global trade.

Lastly, the fifth column of Figure 3 analyses interest rate shocks, where a rise in rates tends to lower inflation, weaken output, and reduce uncertainty (GEPU), consistent with the expected contractionary effects of monetary tightening.

The results of the FEVD are presented in the Appendix A (see Section A.2, Figure A3). The long-term effect of GSPCI (period 24) on GEPU, output, aggregate inflation, and the interest rate is 5%, 6%, 35%, and 7%, respectively.

3.2.2 | Historical Decomposition

We provide the historical decomposition for output growth, aggregate inflation, and the interest rate. Each is discussed in turn. The analysis is organised chronologically, covering key periods to highlight the impact of various shocks (Figures 4–6).

3.2.3 | Pre-Global Financial Crisis (GFC)

The historical decomposition for output growth during the pre-GFC period shows relatively stable conditions with limited influence from GSCPI. Shocks to global supply chain pressures had a mitigating effect on inflation, reducing inflationary pressures during this period. Output growth remained stable with minimal impact from global supply chain pressures. This period, commonly referred to as the "Great Moderation" (e.g., Galí and Gambetti 2009; Bernanke 2012), can be characterised by reduced volatility in economic activity and steady growth, indicating a period of relative economic stability.

3.2.4 | GFC

The GFC was a major global event that corresponds with a clear reduction in output growth. There was also a decrease in

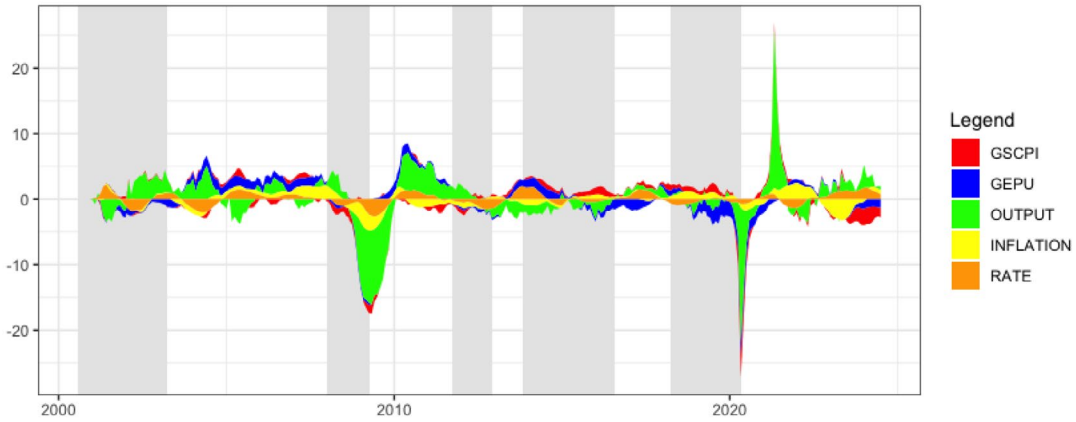

FIGURE 4 | Historical decomposition of output. Shaded areas indicate OECD recession dates. [Colour figure can be viewed at wileyonlinelibrary.com]

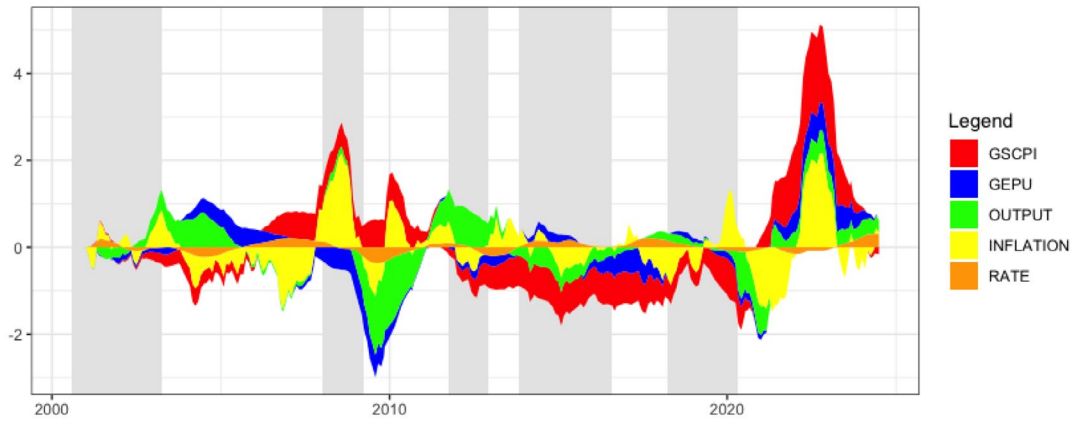

FIGURE 5 | Historical decomposition of inflation. Shaded areas indicate OECD recession dates. [Colour figure can be viewed at wileyonlinelibrary.com]

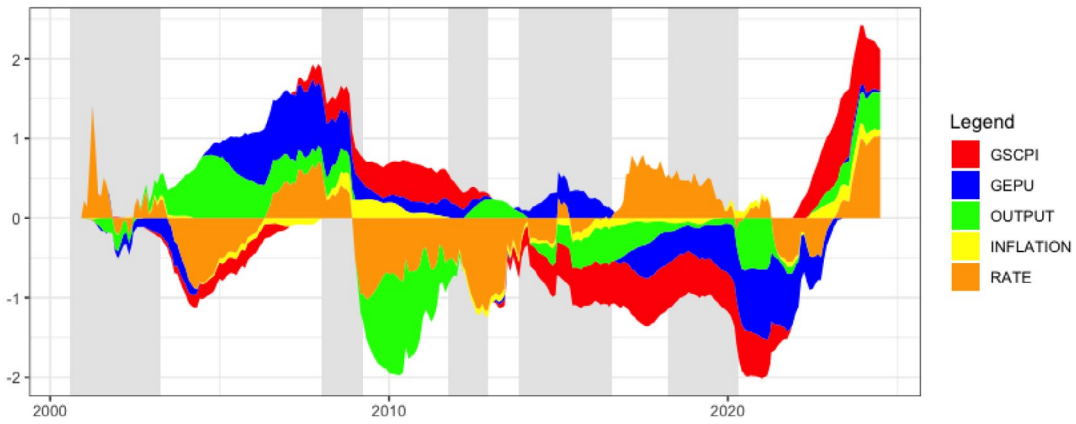

FIGURE 6 | Historical decomposition of rate. Shaded areas indicate OECD recession dates. [Colour figure can be viewed at wileyonlinelibrary.com]

inflation during this period, likely reflecting the contraction in aggregate demand.

3.2.5 | Post-GFC

In the aftermath of the GFC, output growth was primarily driven by demand shocks in the aftermath of the GFC period. During that time, supply chain pressures began to play a more noticeable role[8], where demand shocks were the dominant contributing factor, significantly lowering inflation during this period.

3.2.6 | COVID-19 Pandemic

COVID-19 emerged as a pandemic in December 2019 and swiftly spread across the globe, leading to severe consequences such as

widespread fatalities, economic stagnation, and heightened uncertainty. The pandemic's effects were profound and persistent, prompting lockdowns and other measures to mitigate the spread of the virus.

The COVID-19 pandemic severely disrupted global supply chains, with factory closures, lockdowns, and mobility restrictions causing bottlenecks, surging shipping costs, and extended delivery times. Despite these disruptions, demand shocks remained a dominant force in output growth, with GSCPI shocks also playing a significant role during 2020. The pandemic notably impacted inflation, as global supply chain pressures substantially contributed to inflationary pressures (e.g., Benigno et al. 2022; Ascari et al. 2024).

3.2.7 | Recent Period (Post-Pandemic)

As the effects of the pandemic began to subside, output growth started to stabilise. The role of global supply chain pressures has led to an inflationary environment to the extent that it was a dominant factor for this sample time period, albeit the effect of global supply chain disruptions has been diminishing. These disruptions contributed to amplifying inflation during the post-pandemic period. Additionally, surging energy and food prices due to the Russia-Ukraine conflict further exacerbated inflation.[9] The influence of demand shocks continues to be significant, but the overall inflation rate is stabilising, though the persistence of inflationary pressures has had a notable impact on interest rates.

The collective stance of central banks raised the interest rates during the post-pandemic period aimed to reduce inflationary pressures emanating from global supply chain pressures. These actions also helped anchor inflation expectations. According to U.S. Federal Reserve Chair Jerome Powell, "[o]ur restrictive monetary policy helped restore balance between aggregate supply and demand, easing inflationary pressures and ensuring that inflation expectations remained well anchored."[10]

3.3 | Additional Models (Robustness)

To enrich the robustness of the economic analysis, we include five alternative models:

- **Model II**: the model is estimated prior to 2020 (i.e., before the start of the global pandemic). The IRFs are provided in Figure A4 in the Appendix A.
- **Model III**: we replace output growth with the output gap. The IRFs are provided in Figure A5 in the Appendix A.
- **Model IV**: we replace GDP based on PPP with nominal GDP, which is used in the time-varying calculation of the relative proportions to determine global economic variables. The IRFs are provided in Figure A6 in the Appendix A.
- **Model V**: we estimate the baseline model using two lags (based on Schwartz information criterion). The IRFs are provided in Figure A7 in the Appendix A.
- **Model VI**: we change the ordering in the baseline model such that Global EPU is ordered last; GEPU is ordered last, following (Colombo 2013).[11] The IRFs are provided in Figure A8 in the Appendix A.

The empirical findings from the six models demonstrate that supply chain shocks are an important conduit for economic conditions.

4 | Policy Recommendations

This study highlights the critical role of the GSCPI in influencing key macroeconomic variables, including output, inflation, interest rates, and economic uncertainty. Our analysis reveals that supply chain disruptions, particularly those triggered by global events such as the COVID-19 pandemic and geopolitical tensions, have both immediate and lasting effects on macroeconomic stability. As previous studies have noted (Benigno et al. 2022; Di Giovanni et al. 2022; Asadollah et al. 2024), these disruptions contribute significantly to inflation through the transportation cost channel, where delays and higher transportation costs are passed on to consumers. This mechanism is central to the relationship between inflation and the GEPU index. Based on our findings from the BVAR model, strengthening the resilience of institutions and firms against such shocks is essential for improving economic stability.

4.1 | Data Collection and Monitoring

The first step in addressing supply chain vulnerabilities is enhancing data collection. Government agencies should increase the volume and scope of data collected on GSCPI and ensure its dissemination to policymakers. Regularly tracking the factors influencing GSCPI and forecasting future developments can help educate the public about potential disruptions and reduce economic uncertainty. International coordination on data sharing and analysis could also improve global responses to such disruptions.

4.2 | Strengthening Institutions

Given the persistent nature of supply chain disruptions, policymakers must prioritise strategies that minimise vulnerabilities to external shocks. This includes strengthening both fiscal and monetary policy frameworks to support economic stability.

Fiscal policy should focus on diversifying supply sources across regions and countries, minimising reliance on single-source suppliers and reducing risks from localised disruptions. Critical infrastructure investments—such as in transportation and logistics networks—are vital to ensure the smooth flow of goods during periods of disruption. Fiscal measures, including subsidies, tax incentives, and other support mechanisms, should target sectors most vulnerable to supply chain disruptions, such as manufacturing, agriculture, and transportation (Mrabet et al. 2025). Additionally, incentivising domestic production of essential goods can reduce dependence on international supply networks.

A flexible and proactive monetary policy framework is equally crucial. Our study indicates that GSCPI has a lasting impact on inflation, suggesting the need for central banks to incorporate global supply chain indicators into their forecasting models. A flexible inflation-targeting approach, which accounts for disruptions in global supply chains, is necessary to manage inflation effectively. Furthermore, international coordination among central banks can mitigate the broader economic consequences of supply chain disruptions by aligning monetary policies across regions. Clear and transparent communication from central banks about their monetary strategies and inflation expectations is also vital for stabilising market expectations.

Monetary policy plays a critical role in reducing uncertainty and anchoring inflation expectations, both of which are essential for maintaining economic stability. Central banks can manage inflation expectations by clearly communicating their commitment to price stability, which is key in shaping the public's expectations about future inflation. As highlighted by Svensson (1997), effective communication is central to anchoring inflation expectations. When the central bank conveys a clear policy stance, especially in response to shocks such as GSCPI, it helps reduce the uncertainty surrounding future economic conditions. Implementing targeted liquidity support to sectors most affected by supply disruptions can prevent financial distress from spreading (Tabachová et al. 2024), offering crucial stabilisation during times of crisis.

By signalling how it intends to respond to such shocks, the central bank can reassure markets and the public, reducing volatility and preventing inflation expectations from becoming unanchored. This allows businesses and consumers to make more informed decisions, fostering a more stable economic environment. "Monetary policy must forthrightly address any risks of a potential de-anchoring of inflation expectations, as well-anchored expectations help facilitate bringing inflation back to our target. The sharp policy tightening during 2022 likely contributed to keeping inflation expectations well anchored."[12]

Therefore, both monetary and fiscal policies share the common goal of ensuring long-term economic stability and resilience.

4.3 | International Cooperation

In an interconnected global economy, addressing supply chain disruptions requires robust international cooperation. Policymakers should prioritise strengthening trade agreements that facilitate the smooth movement of goods, reduce trade barriers, and harmonise regulations across countries. International collaboration can help mitigate these disruptions more effectively, contributing to global economic stability. Given the political dimension of supply chain disruptions, stemming from geopolitical tensions, diplomatic efforts to reduce such disruptions are also crucial. Using panel data from 20 economies, Ginn and Saadaoui (2025b) find that the interest rate reaction decreases in the short run following a geopolitical risk shock, where the policy reaction is accommodating in the short run to limit the negative effects on consumer sentiment; however, the reaction increases in the medium term, where the central bank is committed to combating inflation pressures.

5 | Conclusions

The COVID-19 pandemic exposed critical vulnerabilities within global supply chains, with production delays, shortages, and supply chain disruptions underscoring the fragility of interconnected economies. As economies began to recover, a surge in demand quickly outpaced supply, intensifying inflationary pressures and revealing the vulnerabilities of global supply networks. This study investigates the global economic consequences of these disruptions, particularly their impact on inflation dynamics and economic uncertainty, providing valuable insights into how supply chain shocks affect economic conditions.

By utilising a BVAR model, this study analyzes the transmission of global supply chain shocks across 22 economies. The results demonstrate that disruptions in global supply chains, as measured by the GSCPI, have a significant impact on output, inflationary pressures, and economic uncertainty. These shocks are not contained within individual economies but propagate through global networks, complicating the task for policymakers who must account for the international dimension of these disruptions when formulating policy.

This research extends the literature, emphasising the pivotal role of global supply chain pressures in shaping economic outcomes. Through a novel empirical approach that incorporates a comprehensive BVAR model for identifying structural shocks, this study enriches the existing literature on inflation drivers. Our findings highlight that GSCPI disruptions are crucial in amplifying inflationary pressures and contributing to economic uncertainty, especially during global crises. These insights underline the growing importance of global supply chain resilience in managing macroeconomic stability.

The findings of this research hold significant policy implications, both in the short and long term. In the short term, disturbances originating from GSCPI can trigger a spillover effect on GEPU, highlighting the need for adaptive responses. Understanding how GSCPI disrupts economic conditions is therefore a crucial issue for policymakers seeking to stabilise economies in an increasingly interconnected world. For policymakers, the findings underscore the necessity of addressing vulnerabilities within global supply chains in future economic planning. Central banks and fiscal authorities must take a broader international perspective when responding to inflation, as supply chain disruptions can exacerbate local economic shocks. Policies aimed at strengthening supply chain resilience, improving global coordination, and adopting more flexible policy frameworks are essential to mitigating the economic impacts of future disruptions.

Overall, this paper provides novel insights into the role of supply chain pressures in shaping inflation and broader economic stability. The interconnected nature of global economies necessitates that policy responses to inflation consider the dynamics of global supply chains. Our findings emphasise the importance

of policies aimed at strengthening supply chain resilience, integrating global risks into inflation forecasting models, and enhancing international collaboration. As the world continues to grapple with the long-term effects of the pandemic and other global disruptions, these insights are vital for preparing for future economic challenges and safeguarding long-term economic stability. Policymakers must remain vigilant to developments in global supply chains, as disruptions can rapidly undermine economic stability.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

[1] Opening remarks ("Monetary Policy Challenges in a Global Economy") at the 24th Jacques Polak Annual Research Conference, hosted by the International Monetary Fund, Washington, D.C. *Source:* https://www.federalreserve.gov/newsevents/speech/powell20231109a.htm.

[2] Based on IMF data, the twenty-two economies considered in this paper represent 75.2% of global output in purchasing power parity (PPP) GDP, see e.g., https://www.imf.org/external/datamapper/PPPGDP@WEO. The twenty-two economies include: Brazil ("BRA"), Canada ("CAN"), Switzerland ("CHE"), Chile ("CHL"), China ("CHN"), Columbia ("COL"), Czech Republic ("CZE"), Denmark ("DNK"), Euro zone (19 countries; "EUR"), United Kingdom ("GBR"), Hungary ("HUN"), India ("IND"), Israel ("ISR"), Japan ("JPN"), Mexico ("MEX"), Norway ("NOR"), South Korea ("KOR"), Poland ("POL"), Russia ("RUS"), Sweden ("SWE"), Turkey ("TUR") and the United States ("USA"). The Euro zone values are based on the 19 member countries (i.e., Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain).

[3] For India, manufacturing production index (FRED mnemonic INDPRMNTO01IXOBM) is used as opposed to total production index (FRED mnemonic INDPROINDMISMEI), considering data availability (the correlation is 0.9918 for Jan 2000 to Dec 2018). For China, we use total production excluding construction (FRED mnemonic CHNPRINTO01IXPYM). As the production index for China includes missing values, the Kalman smoother using an ARIMA state space representation is used to impute missing values.

[4] The cyclical component of the OECD production index is estimated by HP filter. The HP filter is used to detrend the data into a cyclical stationary component (Hodrick and Prescott 1997). The trend is based on $\lambda = 129{,}600$, a standard value for data at monthly frequency (see e.g., Ravn and Uhlig (2002)).

[5] For India, the interest rate is based on the 90 day Treasury Bill interest rate (e.g., Patnaik et al. 2011; Gabriel et al. 2012; Saxegaard et al. 2010; Anand et al. 2014; Ginn and Pourroy 2020).

[6] According to the NBER, the recession dates for the U.S. is between 2007:DEC to 2009:JUN.

[7] The model is estimated from the data without imposing a linear functional form, as in an OLS model.

[8] The increase in inflation can be attributed to natural disasters (e.g., the Tohoku earthquake and Thailand flooding in 2011) (e.g., Benigno et al. 2022; Ascari et al. 2024).

[9] Zhang et al. (2023) find that the Russia-Ukraine conflict, which began in February 2022 and is ongoing at the time of this writing, led to an increase crude oil prices and volatility. Özocaklı et al. (2024) find that international grain prices (wheat, maize and barley) spiked during the onset of the ongoing Russia-Ukraine conflict. Ginn (2023b) shows that while energy and food inflation can create a "second round" effect on headline inflation, agriculture inflation has the most significant impact on aggregate inflation.

[10] See https://www.federalreserve.gov/newsevents/speech/powell20240823a.htm.

[11] The rationale for maintaining that GSCPI is ordered first (i.e., is contemporaneously exogenous) follows the exogenous nature of GSCPI which can influence EPU. GSCPI is often driven by external factors (e.g., geopolitical tensions, pandemics, trade restrictions) which are largely exogenous, implying that GSCPI can be seen as an external shock thereby setting off a chain of reactions, which can subsequently increase EPU. This theoretical foundation supports the notion that supply chain disruptions are a primary source of shocks, while policy uncertainty is a reactionary variable.

[12] *Source:* https://www.federalreserve.gov/newsevents/speech/powell20231109a.htm.

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Appendix A

International Data

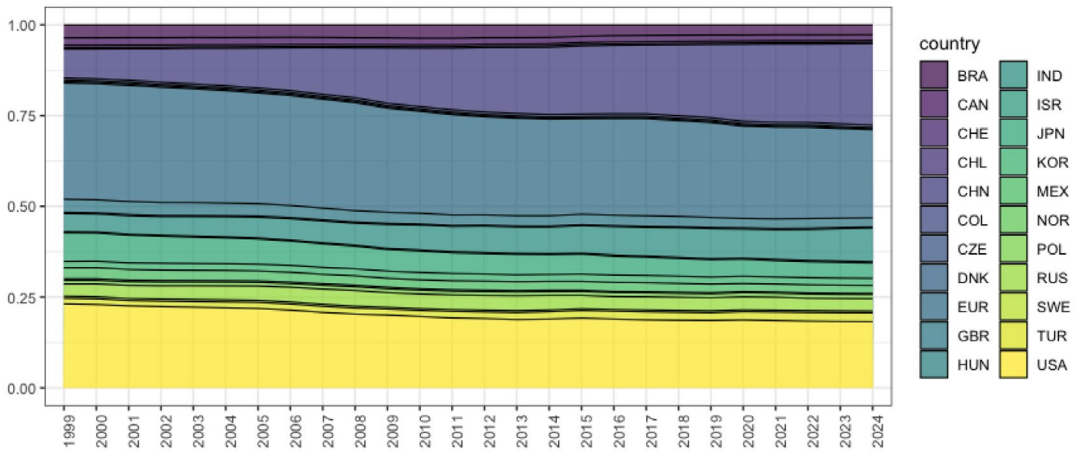

FIGURE A1 | Time varying GDP weighted index. *Source:* IMF data (in purchasing power parity terms). [Colour figure can be viewed at wileyonlinelibrary.com]

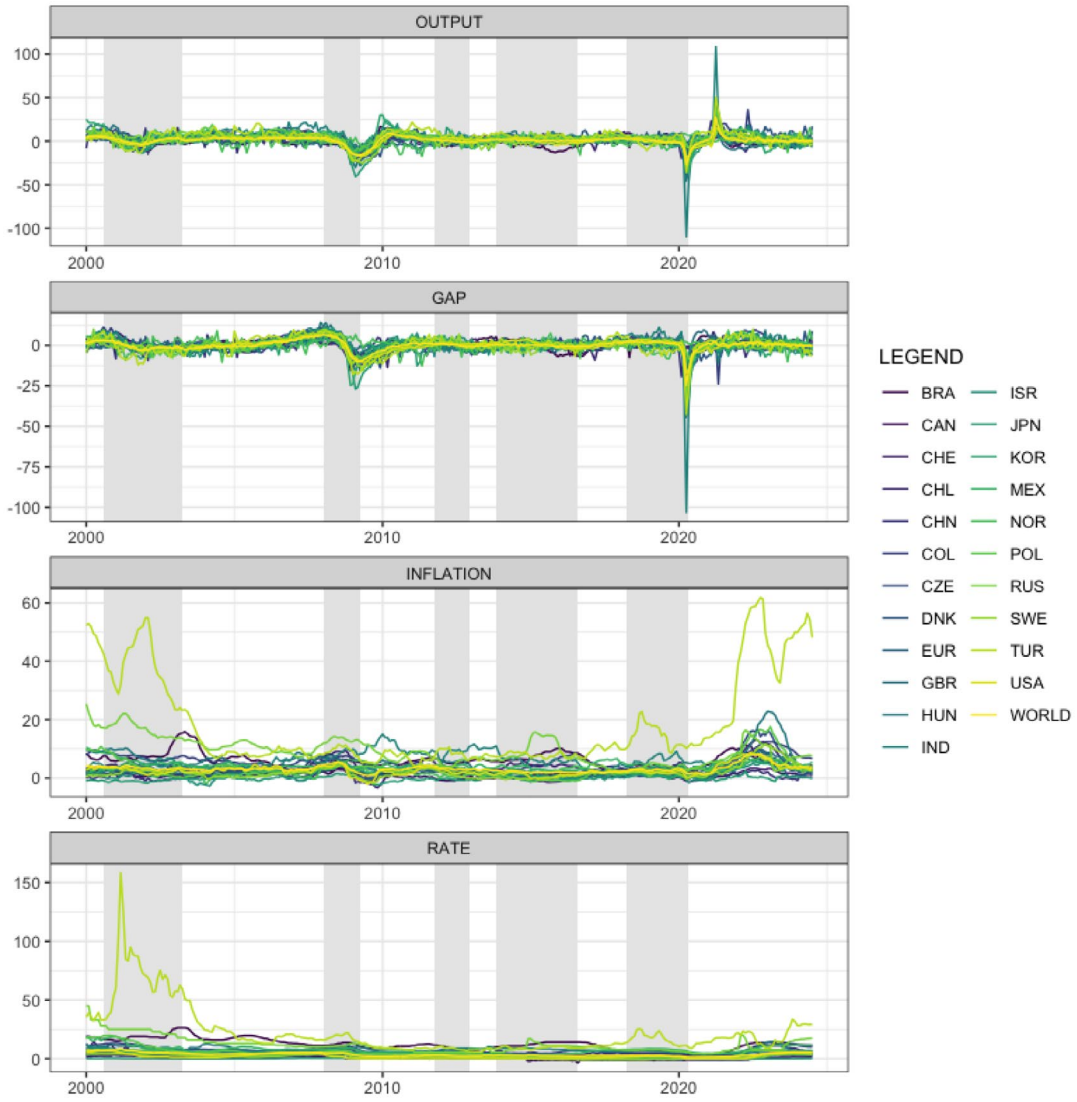

FIGURE A2 | International economic data. Shaded areas indicate OECD recession dates. [Colour figure can be viewed at wileyonlinelibrary.com]

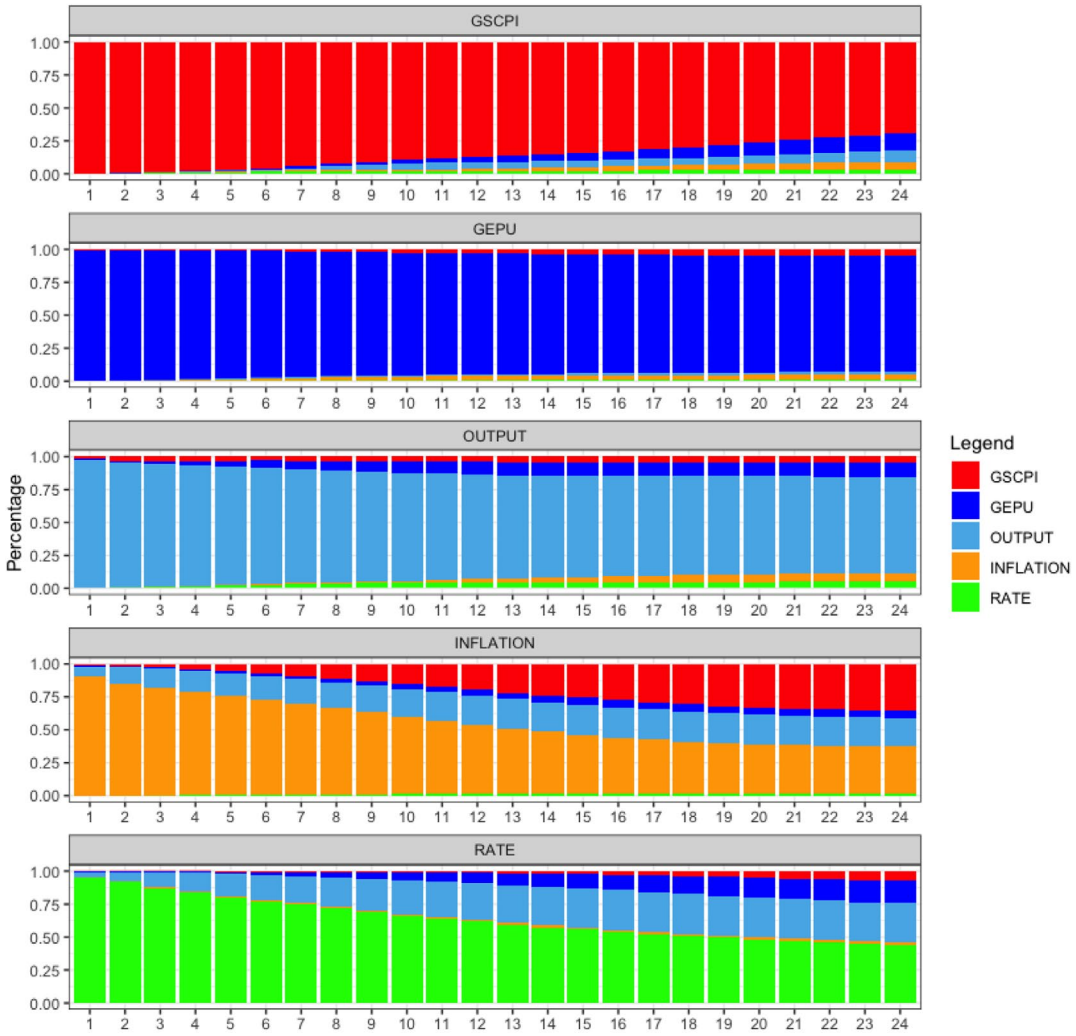

FIGURE A3 | Variance decomposition. [Colour figure can be viewed at wileyonlinelibrary.com]

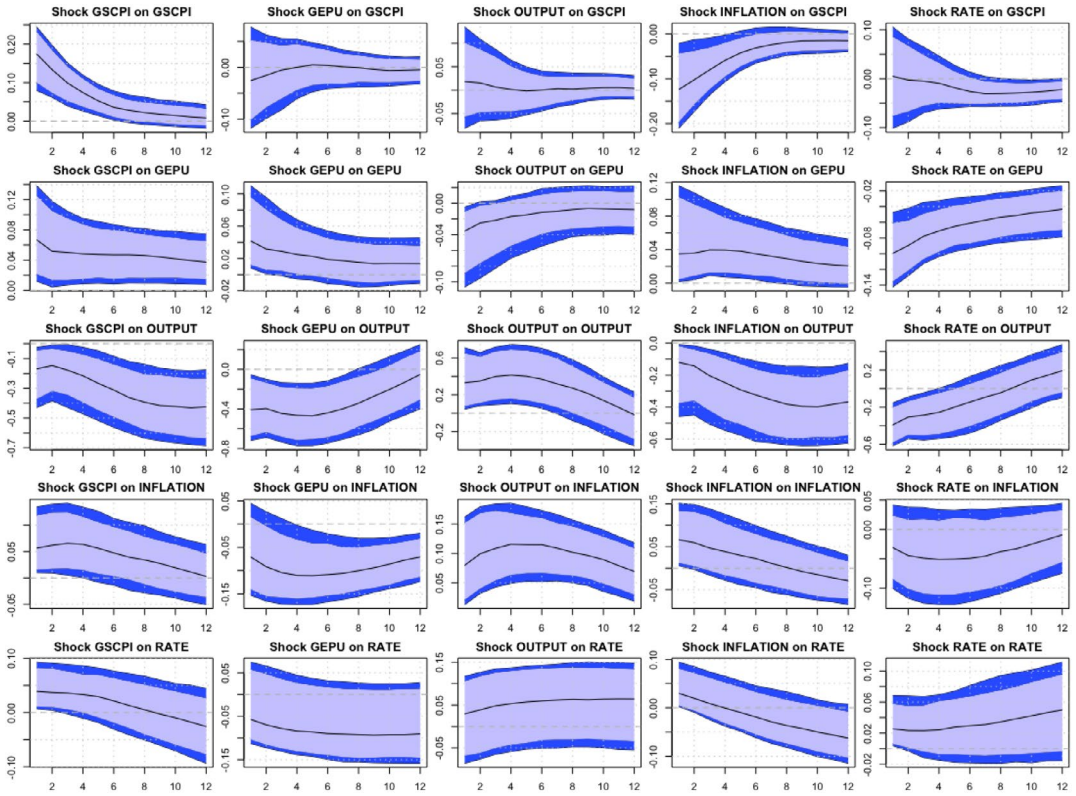

FIGURE A4 | BVAR IRFs (Model II). [Colour figure can be viewed at wileyonlinelibrary.com]

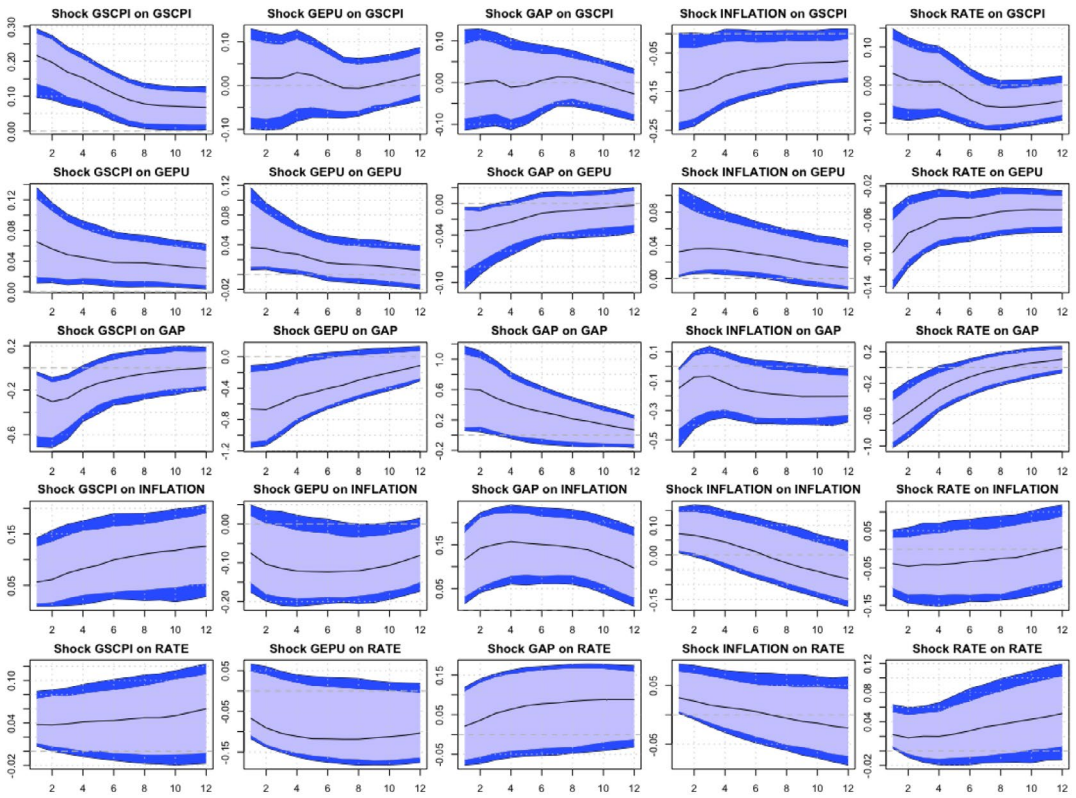

FIGURE A5 | BVAR IRFs (Model III). [Colour figure can be viewed at wileyonlinelibrary.com]

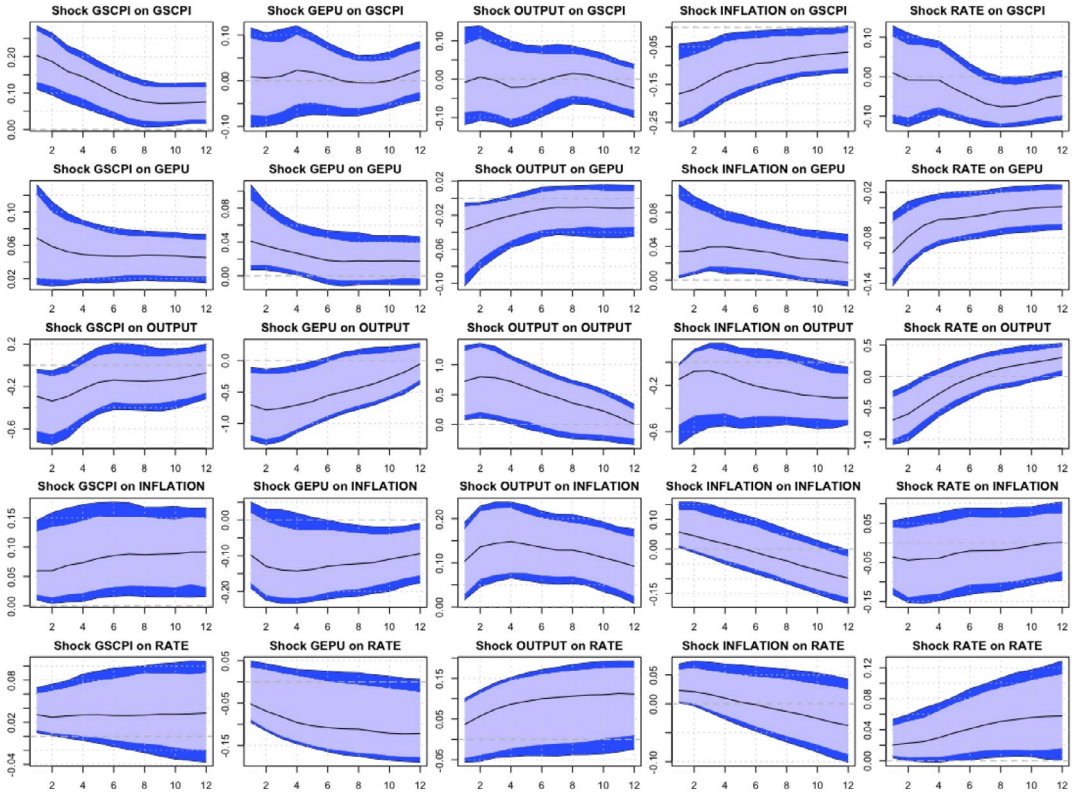

FIGURE A6 | BVAR IRFs (Model IV). [Colour figure can be viewed at wileyonlinelibrary.com]

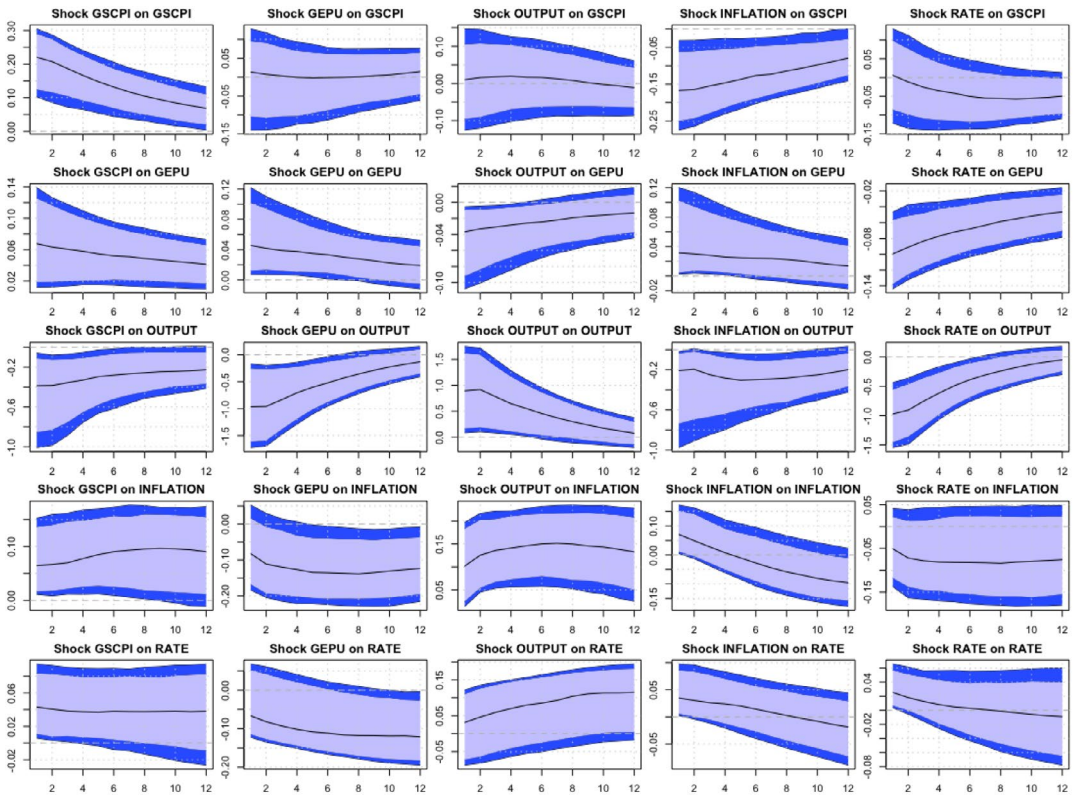

FIGURE A7 | BVAR IRFs (Model V). [Colour figure can be viewed at wileyonlinelibrary.com]

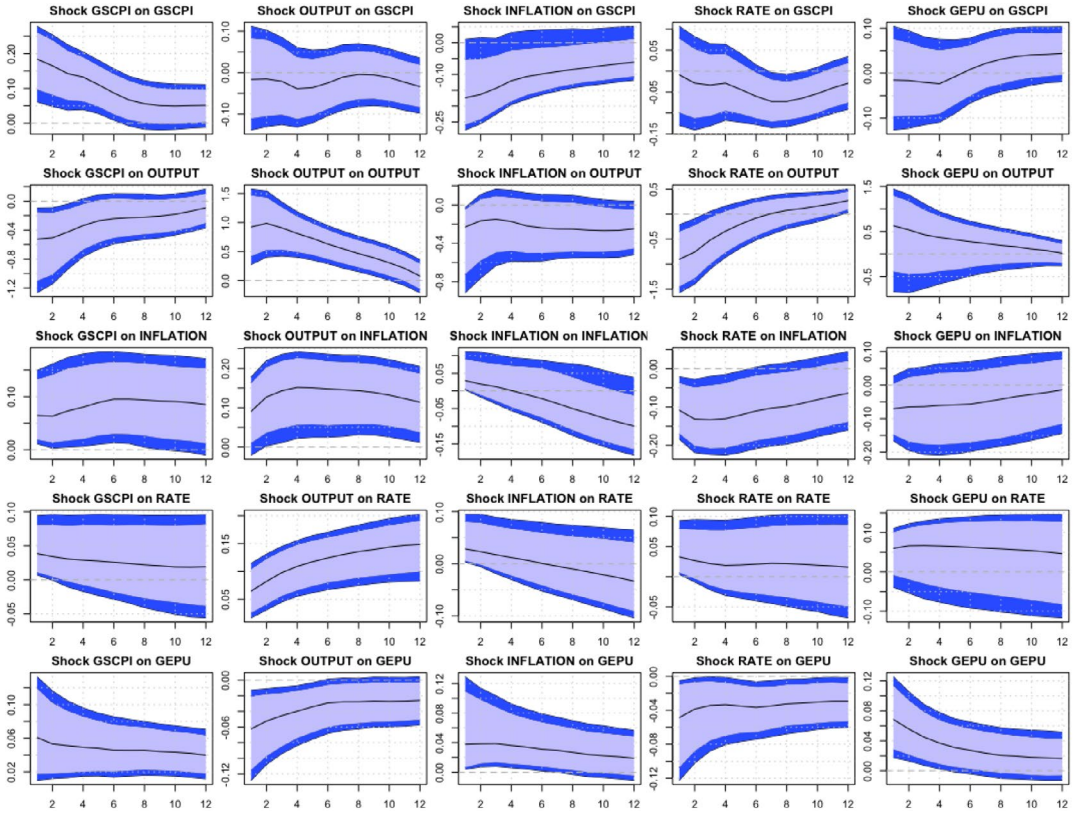

FIGURE A8 | BVAR IRFs (Model VI). [Colour figure can be viewed at wileyonlinelibrary.com]