Transmission and Impact of the Global Monetary Policy Uncertainty Index and Shocks from Major World Economies on Iran Using the Mixed-Frequency VAR Method

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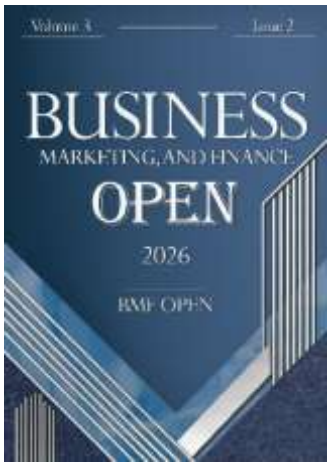

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Abstract: This study examines the transmission and impact of the Global Monetary Policy Uncertainty (MPU) Index and economic shocks in major world economies (the United States, the Eurozone, and China) on Iran's economic growth during the period 1995–2023. To gain a better understanding of intertemporal interactions, the Mixed-Frequency Vector Autoregressive (MF-VAR) model is employed, which enables the integration of datasets with different frequencies (annual and quarterly). In this study, the Global Trade Volatility Index and the Global Monetary Policy Uncertainty Index are used in annual form, while the GDP growth rates of the Eurozone, the United States, and China are measured as quarterly percentage changes. The empirical results indicate that Iran's annual growth is significantly affected by quarterly economic growth shocks in major world economies. Economic shocks from the United States have had the strongest impact on Iran's growth, whereas in the Eurozone, a similar but weaker pattern is observed. In the case of China, a distinct impact pattern emerges, reflecting the country's specific economic structure and seasonal fluctuations. Among quarterly shocks, China's first-quarter GDP growth impulse generated a positive reaction of 0.4 percentage points in Iran's economic growth, though this effect declines in subsequent periods. In contrast, annual shocks from the Global Trade Volatility Index and the Global Monetary Policy Uncertainty Index exerted only minimal influence on Iran's economic growth. The findings of this research underscore the importance of considering quarterly economic interactions and the structure of global markets in formulating Iran's domestic economic policies.

Keywords: monetary uncertainty, economic shock, MIDAS

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1. Introduction

The interaction between global financial shocks, oil price volatility, and domestic macroeconomic dynamics has been a focal point of economic research for decades. For oil-exporting countries such as Iran and Iraq, which rely heavily on energy exports as their primary source of fiscal revenue, the consequences of global monetary policy uncertainty and international spillovers are particularly pronounced. This dependency creates a structural vulnerability whereby fluctuations in global output, financial uncertainty, and commodity markets can transmit into domestic growth

trajectories. The global financial crisis of 2007–2008 demonstrated how rapidly shocks could spread across borders, highlighting the need to understand transmission mechanisms more clearly [1, 2].

One critical dimension of these shocks is oil price volatility, which has historically amplified stagflationary pressures and destabilized output growth in both advanced and emerging economies [3]. For instance, oil market disruptions in 2007–2008 were associated with sharp contractions in output and surges in inflation worldwide [1]. In oil-dependent economies, these shocks are transmitted not only through trade balances but also through fiscal channels, as government revenues are tied closely to oil exports. Recent empirical work confirms that global oil shocks significantly influence BRIC economies, with effects mediated by international financial uncertainty [4].

Beyond oil shocks, global monetary policy uncertainty has become a key factor influencing international economic outcomes. As Husted, Rogers, and Sun (2019) demonstrate, heightened uncertainty about central bank actions, such as interest rate changes by the U.S. Federal Reserve, can alter risk premia, investment flows, and exchange rates [5]. The consequences are especially severe for developing and emerging economies that lack diversified financial markets or rely on external borrowing. For Iran and Iraq, recurrent exposure to monetary and geopolitical shocks has intensified the fragility of growth prospects, as shown in studies documenting the effects of financial crises across Middle Eastern economies [6, 7].

The spillover literature emphasizes that shocks originating in advanced economies are often transmitted through both real and financial channels [8, 9]. Cross-country analyses confirm that trade linkages, investment ties, and financial flows serve as key conduits. For instance, Bayoumi and Vitek (2013) demonstrate that macroeconomic model spillovers affect not only global trade balances but also domestic fiscal stability, highlighting the disruptive effects of synchronized downturns [10]. Similarly, De Mol, Giannone, and Reichlin (2008) stress the importance of predictive modeling for understanding external shocks, suggesting that Bayesian regression provides useful insights when data dimensionality is high [11].

Emerging evidence suggests that China's rise as a global economic powerhouse has introduced a new dimension to spillovers. Arora and Vamvakidis (2010) argue that China's economic growth generates significant international spillovers, affecting both trade and commodity markets [12]. More recent research highlights that Chinese monetary policy can propagate global spillovers in ways distinct from U.S. or Eurozone policies, underscoring the growing role of Asian financial integration [13]. For economies such as Iran and Iraq, China has become a critical trade partner, amplifying the importance of understanding spillover transmission from Beijing's policy actions.

The literature also addresses the role of shocks in developing economies, particularly low-income countries linked to BRIC growth. Samake and Yang (2011) confirm that BRIC economies exert significant spillover effects on low-income countries, though the magnitude and persistence of these effects vary depending on structural characteristics [14]. In a similar vein, Masha and Yang (2011) emphasize India's growth spillovers into South Asia, reinforcing the importance of regional economic integration in transmitting global cycles [15]. Utlaut and van Roye (2010) apply Bayesian VAR models to emerging Asian economies, finding that external shocks play a decisive role in shaping cyclical fluctuations [16].

For Middle Eastern economies, vulnerability to external crises has been a recurring theme. Mehrara and Oskoui (2007) argue that oil-exporting countries exhibit macroeconomic fluctuations driven primarily by oil price shocks rather than domestic productivity gains [17]. Similarly, Majlis Research (2008) highlights the damaging consequences of the global financial crisis on Iran's economy, particularly through restricted access to global capital markets [7]. These findings are corroborated by Sadr Abadi et al. (2017), who show that global crises significantly alter Iran's trade patterns, disproportionately affecting its partners in Asia and Europe [18].

Sanctions have added an additional layer of complexity to Iran's economic trajectory. Neuenkirch and Neumeier (2015) provide robust evidence that UN and U.S. sanctions reduce GDP growth in target countries, with Iran being a primary case [19]. These structural disruptions exacerbate the impact of global financial volatility by isolating economies from international financial networks. Such isolation, while shielding economies from some global shocks, also deepens dependence on oil revenues, magnifying vulnerability to demand-side fluctuations.

Recent research also explores the interaction between technological shocks and financial market volatility. Salisu et al. (2024) show that technological disruptions significantly amplify stock market volatility, underlining the importance of structural resilience in financial markets [20]. Sydow (2024) further emphasizes that financial interconnectedness can magnify systemic risk, with shocks propagating through networks of banks and investment funds [21]. These insights are especially relevant for oil exporters, whose financial systems often lack diversification and remain heavily reliant on commodity-linked revenues.

In Iraq, similar vulnerabilities exist. World Bank reports highlight that recovery remains fragile, with economic growth tied closely to oil revenues and highly exposed to financial shocks [22]. Ridha (2023) confirms that GDP performance in Iraq responds strongly to financial shocks, particularly those affecting oil markets, reinforcing the parallels between Iraq and Iran as oil-dependent economies [23]. Comparative analyses across the region thus reveal shared structural weaknesses and the need for more diversified economic frameworks.

At the methodological level, VAR-based approaches have proven highly effective for capturing spillovers and quantifying dynamic interactions. Villani (2009) stresses the importance of steady-state priors for vector autoregressions to improve predictive accuracy [24]. Osterholm and Zettelmeyer (2008) show that external conditions have powerful effects on Latin American growth using VAR analysis [9]. Kilian (2009) also uses VAR techniques to demonstrate the transmission of oil price shocks into monetary policy and inflationary dynamics [3]. More recent developments, including Bayesian extensions, enhance the robustness of forecasts, particularly in contexts with mixed data frequencies [11].

The empirical evidence consistently demonstrates that oil-dependent economies such as Iran and Iraq are highly sensitive to global demand cycles, particularly during periods of rising oil demand in advanced economies. For example, Hsing (2012) documents how external shocks significantly affect Indonesia's output, illustrating parallels to Middle Eastern contexts [25]. Similarly, Poirson and Weber (2011) highlight how crises reshape growth spillover dynamics, producing lasting effects even after recovery [26]. Pescatori and Nazer (2022) reinforce this by showing that OPEC plays a central role in stabilizing oil markets, but member countries remain vulnerable to global demand fluctuations [27].

Monetary and fiscal policy coordination is another crucial element in managing spillovers. Baranovskyi (2024) emphasizes that coherent fiscal and monetary policy responses can mitigate the impact of external shocks, though institutional limitations often hinder effective implementation [28]. Khoir (2024) provides micro-level evidence from Indonesia, showing how monetary policy affects bank profitability, thereby influencing financial stability [29]. Such findings highlight the importance of strengthening policy frameworks in oil-exporting economies to buffer against global volatility.

From a theoretical perspective, global macroeconomic models emphasize the importance of transmission mechanisms. Bayoumi and Swiston (2009) identify foreign entanglements as major drivers of spillovers across industrial countries, while highlighting the challenges of disentangling domestic from external influences [8]. Similarly, Arora and Vamvakidis (2010) stress that global integration has increased exposure to external cycles [12].

These insights suggest that economies with weak diversification—such as Iran and Iraq—face heightened exposure, not only to oil market volatility but also to financial and policy uncertainty.

Taken together, the literature underscores three consistent themes. First, oil price shocks remain the dominant driver of spillovers for oil-exporting countries, amplifying macroeconomic fluctuations and shaping fiscal stability [3, 17]. Second, global monetary policy uncertainty has become increasingly important in shaping financial flows and growth trajectories [5]. Third, institutional and structural constraints, such as sanctions or limited policy coordination, exacerbate the vulnerability of countries like Iran and Iraq [19, 28].

The aim of this study is to empirically investigate the transmission and impact of global monetary policy uncertainty and international growth shocks from major economies (United States, Eurozone, and China) on Iran and Iraq, using advanced econometric approaches such as BVAR and VAR-MIDAS.

2. Methodology

As mentioned, in this study, an attempt is made to examine the transmission effects of growth from major economies on Iran and Iraq using two methods: BVAR and VAR-MIDAS. In this regard, the following conceptual model can be expressed:

(1) X = F(ΔY^(EUR), ΔY^(US), ΔY^(CHI), VIX, UMP)

In this equation, VIX represents the Global Trade Volatility Index as a proxy for global liquidity, which is available annually from 1995 to 2023. UMP represents the Global Monetary Policy Uncertainty Index, available annually from 1995 to 2023. ΔY^(EUR) denotes the quarterly percentage change in Eurozone GDP growth from 1995 to 2023, ΔY^(US) denotes the quarterly percentage change in U.S. GDP growth from 1995 to 2023, and ΔY^(CHI) denotes the quarterly percentage change in China's GDP growth from 1995 to 2023.

Since VAR models are powerful tools for describing data and producing reliable multivariate forecasts, Sims (1980) referred to VAR models as a theory-free approach to estimating economic relationships. When used prudently and supported by economic reasoning and institutional details, VAR models can fit data and, at best, provide reasonable estimates of certain causal relationships. Although VARs have limitations concerning structural inference and policy analysis, alternative options exist. The role of the Vector Autoregression (VAR) model as a benchmark has been significant for forecasting in macroeconomics. The popularity of the VAR model derives from its relative simplicity, flexibility, ability to fit data, and, of course, its success as a forecasting tool. In recent years, various approaches to VAR modeling have evolved to enhance the identification power and forecasting performance of these models. The VAR approach essentially circumvents the need for structural modeling by considering each endogenous variable in the system as a function of the lagged values of all endogenous variables. A simple mathematical representation of the VAR model is as follows:

(2) $y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + b_1 x_t + e_t$

On the other hand, the Mixed Data Sampling (MIDAS) approach was introduced by Ghysels and Valkanov (2006), further developed by Ghysels et al. (2007), and proposed by Andreou, Ghysels, and Kourtellos. The MIDAS regression approach is a direct forecasting tool. MIDAS directly relates future output to current indicators and lags of explanatory indicators, thereby generating different forecasting models for each horizon. Unlike the MIDAS approach and similar to a conventional single-frequency VAR model, the MF-VAR model specifies the common dynamics of monthly GDP. Based on the MF-VAR(p) model, the MF-VAR(4) model is specified, where the lag length p of the MF-VAR is set to four. The MF-VAR(4) model is specified as follows (the studied variables combine annual and quarterly data):

(3) [VA_t GDP_t x_1t x_2t x_3t] = ∑*(k=1)^4 [a*(11,k) a_(21,k) a_(31,k) a_(41,k) a_(51,k)
a_(12,k) a_(22,k) a_(32,k) a_(42,k) a_(52,k)
a_(13,k) a_(23,k) a_(33,k) a_(43,k) a_(53,k)
a_(14,k) a_(24,k) a_(34,k) a_(44,k) a_(54,k)
a_(15,k) a_(25,k) a_(35,k) a_(45,k) a_(55,k)]
[VA_(t-k) GDP_(t-k) x_(1,t-k) x_(2,t-k) x_(3,t-k)] + [ε_1t ε_2t ε_3t ε_4t ε_5t]

The general relationship can be written as follows:

(4) VA_t = ∑*(k=1)^4 [a*(11,k) + VA_(t-k) + a_(12,k) GDP_(t-k) + ∑*(j=1)^3 a*(1(j+2),k) x_(j,t-k)] + ε

3. Findings and Results

At the outset, the Augmented Dickey-Fuller unit root test was conducted to examine the stationarity of the data. The results obtained are presented in Table (1).

Table 1. Stationarity Test

Variable	Abbreviation	t-statistic	Prob
U.S. growth rate	GUS	-5.0383	0.0002
China growth rate	GCH	-3.5606	0.0372
Europe growth rate	GEU	-7.1752	0.0000
LMPU	LMPU	-4.4352	0.0531
Global trade volatility index	VIX	-3.1472	0.0327

According to the results in Table (1), it can be observed that all variables are stationary at level. The interpretation of results is presented below.

Impulse response function analysis shows that Iran's annual growth is significantly affected by quarterly economic growth shocks in major world economies, particularly during seasons associated with increased global demand for oil, which is the main source of Iran's export revenues.

For the United States, the third-quarter economic growth shock (GUS_3) generates a strong positive reaction in GIRAN (about 4.0 units in the first period), which rapidly declines and converges toward equilibrium in subsequent periods. This strong effect is attributed to increased oil demand during the summer, driven by seasonal travel and industrial activities in the U.S., which is reasonable given its role as one of the world's largest oil consumers. In contrast, the second-quarter shock (GUS_2) has a mild negative effect (-0.2 units in the first period), which may be linked to a temporary reduction in oil demand during spring, possibly due to seasonal consumption patterns or adjustments in economic activity before summer. First-quarter (GUS_1) and fourth-quarter (GUS_4) shocks are also associated with mild positive effects of 0.4 and 0.8 units, respectively, in the first period, indicating the relative sensitivity of GIRAN to seasonal oil demand fluctuations in this economy.

In the Eurozone, a similar but weaker pattern is observed. The third-quarter growth shock (GEU_3) produces a significant positive response in GIRAN (1.0 unit in the first period), which gradually decreases and is attributed to rising fuel demand during summer, especially for tourism-related travel and industrial activities in Europe. The second-quarter shock (GEU_2) has a negative effect (-0.4 units in the first period), likely linked to a temporary decline in oil demand during spring, due to holidays or reduced industrial activity in certain European countries. First-quarter (GEU_1) and fourth-quarter (GEU_4) shocks also show mild positive effects (0.6 and 0.8 units, respectively, in the first period) on GIRAN, indicating Iran's dependence on seasonal oil demand patterns in this region, though this dependence is less pronounced than in the United States.

In the case of China, a distinct pattern emerges, reflecting the country's specific economic structure and seasonal characteristics. The first-quarter growth shock (GCH_1) generates a mild positive response in GIRAN (0.4 units in the first period), which quickly diminishes, and can be attributed to increased oil demand at the beginning of the year due to large-scale industrial activities or economic policies implemented after the Chinese New Year holidays. Conversely, second-quarter (GCH_2) and fourth-quarter (GCH_4) shocks produce mild negative effects (-0.3 and -0.12 units, respectively, in the first period), possibly due to temporary declines in industrial activity or seasonal holiday effects in China. The third-quarter shock (GCH_3) shows a slight positive effect (0.2 units in the first period), indicating limited but notable sensitivity of GIRAN to China's economic growth, given its role as one of the world's largest oil importers.

In contrast to these seasonal effects, annual shocks from the Global Trade Volatility Index (VIX) and the Global Monetary Policy Uncertainty Index (MPU) have negligible impacts on GIRAN. The VIX shock, a measure of global financial uncertainty, produces a small positive effect (0.06 units in the first period) that quickly approaches zero in subsequent periods. This minor effect reflects the relative isolation of Iran's economy from global financial market fluctuations, likely due to sanctions and restrictions on access to international financial flows. Similarly, the MPU shock, which measures uncertainty in global monetary policies (such as interest rate changes or central bank actions), shows a negligible effect (0.01 units in the first period) that quickly fades. This finding indicates that Iran's economy, due to its specific structure and heavy reliance on oil revenues, remains largely insulated from direct impacts of global monetary policies.

This analysis reveals clear patterns: Iran's annual growth is significantly dependent on quarterly economic growth shocks in major world economies, especially during high-demand oil seasons such as the third quarter in the U.S. and Eurozone, or the first quarter in China. This dependency aligns with Iran's role as an oil exporter and suggests that real factors (such as global oil demand) play a more decisive role than financial or monetary factors in determining Iran's economic growth. The relative isolation from global financial and monetary shocks, reflected in the negligible effects of VIX and MPU, highlights the structural constraints of Iran's economy, including sanctions and disconnection from the international financial system. While this isolation shields Iran from global financial volatility, it simultaneously increases its dependence on oil revenues and vulnerability to changes in real demand.

The policy implications of these findings are multifaceted. First, the strong dependence on seasonal oil demand patterns underscores the necessity of diversifying Iran's economy; developing non-oil sectors such as industry and services could reduce vulnerability to global demand fluctuations. Second, more precise financial planning for managing oil revenues during high-demand seasons (such as summer in the West or the beginning of the year in China), along with the use of financial instruments to hedge revenue volatility risks, is recommended. Third, strengthening trade relations with key partners, particularly China, and diversifying export markets could mitigate risks stemming from over-concentration on a few major economies. Finally, Iran's financial isolation from global monetary fluctuations could be used as an opportunity to design more independent economic policies, provided it is accompanied by structural reforms to reduce oil dependency.

In conclusion, this study demonstrates that Iran's annual growth is significantly influenced by quarterly economic growth shocks in major world economies, while it remains largely insulated from global financial and monetary shocks. These patterns emphasize the necessity of revising Iran's economic structure, reducing oil dependency, and strategically leveraging financial isolation.

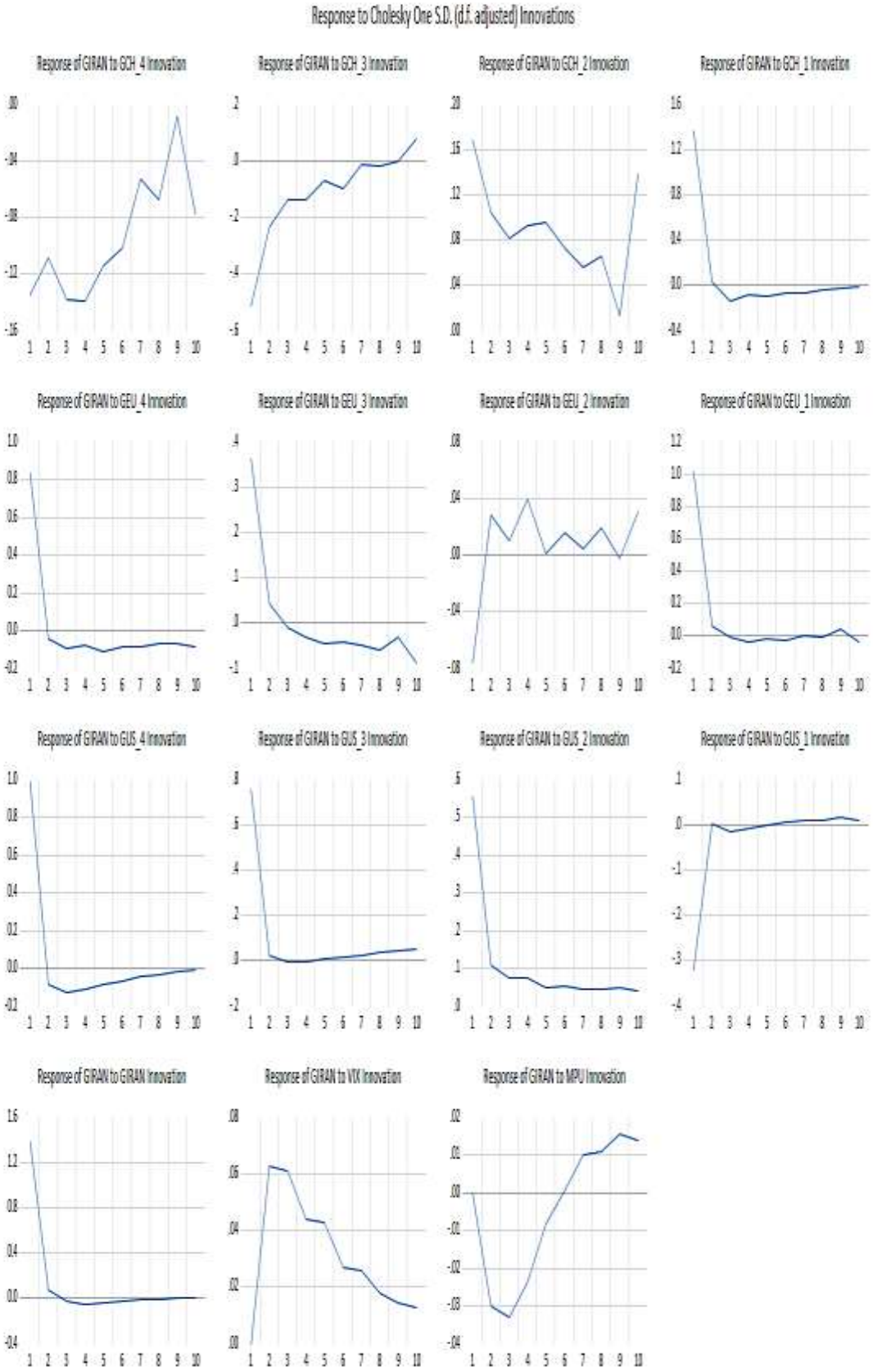

Figure 1. Impulse Response Analysis

4. Discussion and Conclusion

The empirical findings of this study reveal that Iran's annual growth is significantly influenced by quarterly economic shocks in the world's largest economies—namely, the United States, the Eurozone, and China. By employing mixed-frequency vector autoregressions (VAR-MIDAS) alongside Bayesian VAR approaches, the analysis demonstrates that seasonality in global demand for oil translates directly into fluctuations in Iranian output. For instance, shocks from the U.S. economy in the third quarter exhibited the strongest positive effect on Iranian growth, while Eurozone and Chinese shocks produced milder, though still relevant, impacts. Conversely, global monetary policy uncertainty (MPU) and the volatility index (VIX) had negligible effects on Iran's economic growth, underscoring the structural isolation of the Iranian economy from international financial markets.

These results align with prior research on the central role of oil in macroeconomic transmission mechanisms. Oil shocks have long been identified as major drivers of global recessions and inflationary cycles, most notably during the 1970s and the 2007–2008 crisis [1, 3]. Our results corroborate the argument that in oil-exporting economies, fluctuations in global oil demand exert stronger influences on growth than monetary or financial volatility [17]. The third-quarter effect observed for the U.S. and Eurozone can be logically connected to peak seasonal demand in those economies, which mirrors findings from international spillover studies showing strong cyclical dependence between advanced economies and oil exporters [8, 26].

The asymmetric effects observed across different quarters also provide support for the idea that spillovers are not uniform but conditional on seasonal consumption and production structures. In the U.S., positive responses in the third and fourth quarters reflect energy-intensive industrial cycles and travel-related fuel consumption. These results are consistent with the literature emphasizing demand-side pressures in advanced economies as the primary transmission channel for oil-exporting countries [4, 12]. Similarly, Eurozone spillovers show positive but weaker impacts, which may be due to slower industrial recovery patterns or differing fuel dependency structures, as noted by Bayoumi and Vitek (2013) [10].

For China, the findings suggest a unique pattern of spillovers concentrated in the first quarter, reflecting industrial restarts following the Lunar New Year and state-driven stimulus policies. The mild yet significant influence of China's growth on Iranian output underscores the changing geography of global demand. This resonates with Lei's (2024) evidence that Chinese monetary policy and output cycles generate distinct global spillovers, which often diverge from U.S. and Eurozone patterns [13]. Arora and Vamvakidis (2010) similarly highlight China's role in reshaping international trade flows and commodity markets [12]. The finding that Iranian growth responds to Chinese seasonal cycles reinforces the country's increasing trade alignment with Asian markets, a trend accelerated by sanctions and reduced access to Western markets [19].

The negligible impact of global financial volatility and monetary policy uncertainty on Iran is equally noteworthy. While prior research demonstrates that financial uncertainty significantly affects investment and output in integrated economies [5, 20], Iran's structural detachment from global capital flows appears to insulate it from these shocks. This isolation, however, is a double-edged sword: while it reduces exposure to global financial turbulence, it simultaneously amplifies dependence on real economic channels, particularly oil exports. Similar patterns are observed in sanctioned or financially disconnected economies, as Neuenkirch and Neumeier (2015) demonstrate in their study on the growth effects of UN and U.S. sanctions [19].

Our findings further support the literature on crisis transmission in developing economies. Poirson and Weber (2011) argue that spillovers intensify during crises but persist even in recovery phases [26]. The Iranian case

demonstrates this persistence in seasonal demand cycles rather than financial channels. Likewise, studies on low-income countries' linkages to BRIC economies emphasize that spillover magnitudes depend on structural dependencies [14, 15]. For Iran and Iraq, the overwhelming reliance on oil exports creates a direct dependency on global demand fluctuations, confirming Mehrara and Oskoui's (2007) conclusion that macroeconomic cycles in oil exporters are largely driven by exogenous oil shocks [17].

The methodological approach of this study, particularly the use of mixed-frequency VAR models, also aligns with broader econometric advances in analyzing global spillovers. Bayesian VAR techniques have been widely used to capture uncertainty and improve forecasting accuracy [11, 24]. Studies by Utlaut and van Roye (2010) and Osterholm and Zettelmeyer (2008) confirm the usefulness of these methods in identifying the role of external conditions in shaping business cycles [9, 16]. By combining annual indices of financial uncertainty with quarterly GDP growth rates, our study demonstrates the power of mixed-frequency approaches in disentangling seasonal from long-term influences.

In addition, the results resonate with research on Middle Eastern economies. Majlis Research (2008) documented the vulnerability of Iran to the global financial crisis, with disruptions spreading primarily through trade rather than financial markets [7]. Similarly, Ahmed et al. (2020) found that financial crises in Iraq, Iran, and Turkey disproportionately affected macroeconomic variables, reinforcing the centrality of real-sector transmission [6]. Ridha (2023) confirmed this in the Iraqi context, showing that GDP responses to financial shocks remain closely tied to oil market fluctuations [23]. The World Bank's (2023) report further emphasizes the fragile recovery of Iraq's economy, attributing risks primarily to oil revenue volatility rather than global monetary policy [22].

Our results also speak to broader debates on fiscal and monetary policy coordination. Baranovskyi (2024) stresses that synchronized policy actions are necessary to mitigate the effects of external shocks [28]. However, in economies like Iran, sanctions and structural rigidities limit the scope for such coordination, leaving oil dependency largely unaddressed. Khoir (2024) shows how monetary policy affects bank profitability in Indonesia [29], suggesting that more resilient financial systems can absorb shocks more effectively. In the absence of such resilience, Iranian and Iraqi economies remain exposed to external demand shocks, as highlighted by Naser Sadr Abadi et al. (2017), who showed that global crises alter Iran's trade patterns significantly [18].

Taken together, the findings point to three key insights. First, oil-exporting economies remain highly vulnerable to global seasonal demand cycles, with growth trajectories tied to oil consumption in major economies. Second, structural isolation from global finance reduces exposure to monetary policy uncertainty but deepens reliance on real-sector fluctuations. Third, without institutional reforms and economic diversification, these countries remain locked into cyclical vulnerabilities. The evidence strongly supports the arguments of Bayoumi and Swiston (2009) regarding cross-country spillovers [8] and underscores the relevance of Kilian's (2009) framework for understanding oil shocks in macro-financial contexts [3].

Despite the robustness of the econometric methodology, several limitations should be noted. First, the analysis relies on secondary data from international sources and national accounts, which may contain measurement errors, especially in contexts where data transparency is limited. Second, the study focuses primarily on Iran, with supplementary references to Iraq; therefore, results cannot be generalized to all oil-exporting economies without caution. Third, while VAR-MIDAS allows for the integration of mixed-frequency data, the approach does not fully capture potential nonlinearities or structural breaks caused by sanctions, wars, or sudden policy changes. Fourth, the study does not explicitly model exchange rate dynamics or domestic policy responses, which could mediate the

impact of external shocks. Finally, the negligible effect of global financial uncertainty may partly reflect data limitations rather than complete insulation, as informal or parallel financial channels are difficult to measure.

Future studies should extend the analysis to a broader set of oil-exporting economies, both within and beyond the Middle East, to assess the generalizability of spillover patterns. Researchers could also incorporate nonlinear models, such as threshold VAR or Markov-switching approaches, to capture structural breaks and regime shifts linked to sanctions or geopolitical events. Another promising avenue is the inclusion of exchange rate dynamics, inflationary pressures, and fiscal policy variables to better understand the mediating role of domestic policy frameworks. Future research may also benefit from disaggregating oil demand shocks into industrial, transport, and household consumption categories, thereby identifying sector-specific transmission mechanisms. Additionally, comparative studies between integrated and isolated economies could highlight the differential effects of global monetary policy uncertainty. Finally, applying machine learning techniques in conjunction with VAR models may enhance forecasting accuracy and provide richer insights into the complex interplay between real and financial shocks.

For policymakers in Iran and Iraq, the findings underscore the urgent need for economic diversification beyond oil exports. Reducing structural dependency on seasonal oil demand cycles requires investment in industrial and service sectors, as well as the development of non-oil export capacities. Fiscal planning should prioritize stabilization mechanisms, such as sovereign wealth funds or hedging strategies, to manage revenue volatility across quarters. Strengthening trade relations with emerging markets, particularly China, while broadening export destinations, can mitigate risks associated with overreliance on a few major economies. Additionally, reforms in the financial sector to enhance transparency, resilience, and integration with regional systems may gradually reduce vulnerability to external shocks. Finally, insulating fiscal policy from short-term oil price fluctuations through long-term planning and institutional reforms can provide greater macroeconomic stability in the face of persistent global uncertainties.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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