Measuring and Analyzing the Influence of International Trade on Economic Growth with Exchange Rate Moderation: Evidence from Selected Countries

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Abstract:

This study investigates the influence of international trade on economic growth in Iraq, Turkey, Iran, and Syria from 1995 to 2023, emphasizing the moderating role of exchange rate fluctuations. Applying panel data methodologies (such as PMG-ARDL approach, and Fixed and Random Effects models), The empirical results indicate that while imports and exports have a favorable impact on economic growth over the long run, exchange rate volatility has a negative effect.. The results in turn highlight the need for infrastructure investment, exchange rate stability,   and trade liberation. There are policy blueprints to further long-term economic growth too, including better governance,   tapping foreign capital and fostering regional partnership.

Keywords: International Trade, Economic Growth, Exchange Rate, Panel Data.

الملخص:

تتناول هذه الدراسة تأثير التجارة الدولية على النمو الاقتصادي في كل من العراق وتركيا وإيران وسوريا خلال الفترة من 1995 إلى 2023، مع التركيز على الدور التعديلي لسعر الصرف باستخدام بيانات بانل. تم استخدام نماذج التأثيرات الثابتة والعشوائية (ARDL)بطريقة المجموعة المتجمعة (PMG). توصلت الدراسة إلى أن الصادرات والواردات تؤثران إيجابًا على النمو الاقتصادي على المدى القصير والطويل، في حين أن تقلبات أسعار الصرف لها تأثير سلبي. وتُبرز النتائج الحاجة إلى تحرير التجارة، واستقرار سياسات سعر الصرف، والاستثمار في البنية التحتية لدعم النمو الاقتصادي المستدام. وتوصي الدراسة صانعي السياسات بتعزيز الحوكمة، وجذب الاستثمار الأجنبي، وتعزيز التعاون الإقليمي لتحقيق فوائد طويلة الأمد. وتُسهم هذه الدراسة في تعميق الفهم للعلاقة المعقدة بين التجارة الدولية والنمو الاقتصادي في منطقة تتميز بالإمكانات والتحديات على حد سواء، مما يوفر إرشادات قيّمة لصياغة السياسات الاقتصادية المستقبلية.

الكلمات المفتاحية :التجارة الدولية، النمو الاقتصادي، سعر الصرف، بيانات بانل .

پوختە:

ئەم توێژینەوەیە لە کاریگەری بازرگانی نێودەوڵەتی لەسەر گەشەی ئابووری لە عێراق ,تورکیا ,ئێران ,سوریا دەکۆڵێتەوە لە ماوەی ساڵانی (1995-2023) .بەتیشك خستنە سەر ڕۆڵی نرخی ئاڵوگۆڕ.بەبەکارهێنانی میتۆدەکانی(Fix, Random and PMG(ARDL).

ئەنجامەکان ئەوە دەردەخەن کە هاوردەو ناردەنی کاریگەری ئەرێنی هەیە لەسەر گەشەی ئابووری , بەڵام نرخی ئاڵوگۆڕ کاریگەری نەرێنی هەیە .ئامۆژگاری سیاسەت مەدداران دەکرێت حوکمرانی بەهێز بکەن ,هانی وەبەرهێنەری بیانی بدرێت بۆ وەبەرهێنان لەناوخۆدا بەمەبەستی گەیاندنی سودی درێژخایەن.ئەم توێژینەوەیە هەڵێکە بۆتێگەیشتن لە پەیوەندی بازرگانی و گەشەی ئابووری لەم وڵاتانە کە ڕووبەڕوی دەرفەت و ئاڵنگاری دەبنەوە ,لەڕێگەی پێشکەش کردنی ڕێنمایی بەنرخ بۆدارشتنی سیاسەتی ئابووری داهاتوو.

کلیله وشه: بازرگانی نێودەوڵەتی ,گەشەی ئابوری ,نرخی ئاڵوگۆڕ,داتای پەنێڵ.

1. Introduction

At base, Cross-border exchange of commodities and services is known as international trade, driven by the concept of comparative advantage, which is the principle that guides nations to concentrate on those sectors where they are most adept. The interaction between these two systems is affected by political and economic control, including international agreements and tariffs, which can facilitate or impede the movement of goods. There are plenty of good reasons why trade can be good: it provides more choices, efficiencies in production, and ideally would lead to the best use of resources. It also reinforces foreign direct investment, which enhances economic dynamism and productivity (Salvatore, 2013). Exchange rates are also key in this murky world, for they influence how competitive imports and exports are, determining trade balances and the direction of investment flows. Fluctuations in exchange rates can amplify or diminish the impact of international trade on growth by altering export prices and import costs. Additionally, exchange rates serve as buffers against external economic shocks and are used as policy tools to stabilize the economy.

Economic growth, measured by GDP, results from increased production, trade, investments, and technological advancements, improving living standards (U.N., 2015; Özparlak, 2022). Exports drive growth by exchanging goods, services, ideas, and technology, enhancing efficiency and specialization (Boame, 1998).

Mercantilist theory, one of the earliest economic theories, suggests that a nation's wealth is increased by minimizing imports and maximizing exports, emphasizing the accumulation of wealth through trade surpluses. Classical economists like Adam Smith and David Ricardo discussed the benefits of international trade all nations by focusing on specific area of expertise and effectively providing resources. Adam Smith developed the idea of total advantage while David Ricardo formulated the principle of comparing advantages suggesting that nations should focus on manufacturing items in which there is the lowest cost of opportunity. According to the Heckscher-Ohlin hypothesis, which promotes importing items that use scarce resources and exporting those that employ ample resources, comparative advantage arises from inequalities in resource endowments. Modern endogenous growth models emphasize the ability of international trade to spread knowledge, allow the transfer of technology, and increase productivity, all of which are critical drivers of economic growth. Countries can access cutting-edge technology advancements, integrate into global value chains, and foster economic growth by actively engaging in international commerce. This study explores how trade activities have shaped the economic paths of Iran, Syria, Turkey, and Iraq.

The core problem this study addresses is the lack of long-term empirical research on International trade's impact on economic expansion in Iraq, Iran, Turkey, and Syria.

This study is significant in that it examines the influence of international trade on economic expansion, both in the short and long term, within the contexts of Iraq, Turkey, Iran, and Syria. As foundational pillars of national development, trade and economic growth continue to shape and define the priorities of modern economic policy.

This study's main goal is to evaluate how international commerce has affected the economic development of Iran, Syria, Turkey, and Iraq between 1995 and 2023, focusing on the roles of GDP, exports, imports, and exchange rates. The analysis utilizes the Fixed and Random Effects models alongside the PMG-ARDL approach.

Null Hypothesis (H0): International trade exerts no statistically significant influence on the economic growth of Iraq, Turkey, Iran, and Syria over the short and long term.
Alternative Hypothesis (H1): International trade significantly influences the economic growth of Iraq, Turkey, Iran, and Syria in both the short term and the long term.

The current study consists of five sections. Section 1 contains the introduction. Section 2 reviews the pertinent experimental research literature that has employed a range of variables and models. The economic changes in Iran, Syria, Turkey, and Iraq between 1995 and 2023 are contrasted in Section 3. The data and methodology are described in Section 4, which also uses Fixed and Random Effects techniques in conjunction with the Pooled Mean Group's (PMG) Autoregressive Distributed Lags (ARDL) model. The empirical results are discussed in part 5, and conclusions and policy recommendations are provided in the last part.

2. Literature review

International trade and economic expansion highlights the crucial role of trade activities in fostering economic growth, with numerous studies demonstrating positive correlations between exports, imports, and GDP growth. However, there is limited empirical evidence focusing specifically on Iraq, Iran, Turkey, and Syria. This research builds upon existing studies by addressing a notable gap, offering a detailed examination of how international trade shapes economic growth in Iraq, Turkey, Iran, and Syria. The effect of Market opening on economic growth in Iraq from 1992-2020 was analyzed by Agha and Hussein (2023) who found that liberalization has significantly contributed to GDP in the short and long term and called the additional diversification of export base. Accordingly, Alsaaidi and Hameed (2023) confirmed the positive role of trade liberalization in Iraq's growth in the period 1990-2020 through ARDL models. Trade also was favorable to the pace of economic expansion from 1986 to 2020. Additionally, Abdulla and Ali (2019) showed a favorable correlation between GDP and imports and exports. From 1980 to 2017.

Tunçsiper and Horoz (2023) looked into the influence of trade on the economic growth of Turkey (1980 – 2021), finding a major and favorable correlation between exports and GDP in the short and long term, while imports oppositely affect GDP and investment positively impacts growth. Gökmen (2023) analyzed the correlation in economic growth and global trade in Turkey, highlighting that trade openness and foreign trade policies significantly related to economic growth through improved resource allocation, productivity, and technological transfers. Khalid (2016) studied trade openness in Turkey from 1960 to 2014, confirming a positive but statistically insignificant long-term relationship with economic growth. Mustafa (2011) also found a long-term positive but insignificant correlation across economy growth trade openness, emphasizing the importance of human and capital formation. Additionally, Shingil and Panshak (2017) noted the favorable long-term effects of a strong exchange rate on growth, while Uddin and Khanam (2017) found imports negatively correlated with

GDP growth in Bangladesh. Were (2015) highlighted the limited impact of trade development in least developed nations, primarily in Africa.

The studies by Stojanović et al. (2023), Czyżewski (2021), and Farahane & Heshmati (2020) jointly investigate the effect of international trade on GDP using various regions and methodologies. Stojanović et al. investigated high-income EU countries from 2015 to 2021, finding a positive relationship between imports, exports, and GDP, with imports having a more substantial impact. Czyżewski's study, covering 129 countries from 1975 to 2015, employed the Moral-Benito framework and Bayesian model averaging to manage model uncertainty and mitigate reverse causality, revealing international trade as a robust determinant of economic growth. Farahane & Heshmati focused on the Southern African Development Community (SADC) from 2005 to 2017, using panel data econometric techniques to demonstrate that while the growth in exports boosted economic expansion, expanded access to international markets had a diminishing effect on it and the incomplete establishment of SADC's integration instruments limited growth impacts. These studies highlight the complex role of international trade in economic growth, advocating for tailored trade policies. Abdullahi, Safiyanu and Soja, examined data collected from 16 West African countries from 1991-2011. They reported that exports were strongly responsible for growth, imports had a feeble but positive influence, and exchange rates had an unfavorable impact on growth. The writers also argue for export-promotion import-substitution and intelligent management of exchange rates to grow the economies of West Africa.

Ebrahimi (2017) employed co-integration and neural network methods, and found that importation in Iran is influenced by economic growth for period of 1961-2010. According to Taghavi et al. (2012), trade openness encourages exports, yet also persistently suppresses imports in the long run. Pahlavani (2005) he stated that among the forces that contribute to the growth of economic activity including GDP are capital, imports, and exports. While Heidari and Davoidi (2010) reported a positive long analysis on trade and growth effects, and long-run effect of import is negative, Rahimi and Shahabadi (2011) highlighted the Positive short-run effect of Market opening on growth. While removal of trade barriers enhances prosperity but dependence on oil exports may retard it, as indicated by Gorgi and Alipourian (2008). Above all, they reconfirm the close relationship between trade and the economic growth of Iran.

Y. Chua (2015) and Adel Shakeeb Mohsen (2015) applied VAR model and econometric test to investigate the impact of trade liberalization, investment and exports and imports on Syrian economic growth from 1960 to 2010. They find that GDP is significantly and positively affected by all factors, where imports have the most impact. GDP and trade factors have a bidirectional relationship, with trade openness, investment, and population growth promoting GDP growth. For growth, the studies underscore the need to diversify exports, increase export quality, and simplify trade procedures.

To conclude, our findings confirm that while exchange rate volatility has a detrimental influence on economic growth, exports and imports have a beneficial impact in Iraq, Turkey, Iran and Syria. The findings underline the importance of good trade policy and effective exchange rate policy, and they endorse the notion that liberalized trade stimulates growth. By comparing these countries together and implementing PMG-ARDL model, together with Fixed and Random Effects models, this paper provides a unique value addition. It is comprehensive in that it covers the short- as well as the

long-term dynamics (panel data for 1995 to 2023) and encompasses a detailed investigation to both opportunistic and structural part of the unemployment. Providing insightful information for policymakers.

3. A Comparative Analysis of Iran, Syria, Turkey and Iraq's Economic Approach (1995–2023)

The economic courses of Iraq, Turkey, Iran and Syria have been investigated in the present study over the period 1995–2023 based on the change of GDP, import, export situation and currency rates. It offers a comprehensive understanding of the way in which these countries have reacted to the opportunities presented by the global market and by new configurations of power in the last 30 years, as well as the challenges generated by them.

3.1 Analysis of Economic Indicators in Iraq (1995-2023)

Figure (1) shows that between 1995 and 2023, Iraq's economic indices saw significant swings. GDP grew from 12.89 billion USD to 36.88 billion USD between 1995 and 1999, mostly due to limited oil exports under the Oil-for-Food Program..Post-2003, GDP surged, peaking at 234.64 billion USD in 2013, bolstered by reconstruction efforts, increased oil production, and high global oil prices. However, internal conflicts and the ISIS insurgency and corona virus (2014-2022) caused disruptions, with GDP peaking again at 264.18 billion USD in 2022 before a slight decline. Exports, predominantly oil, rose from $10.15B to 92.32B billion USD, influenced by infrastructure development and fluctuating global oil prices. Imports increased due to reconstruction and consumer demand, peaking at 72.28 billion USD in 2019. The exchange rate stabilized post-2003 following currency revaluation, with oil revenues providing foreign exchange stability. The coronavirus pandemic in 2020 led to significant drops in both GDP and exports due to reduced global demand for oil. (USAID, CIA Fact Book, & CPA Ministries. (2001), World Bank. (2020), (IRIS). (2023).
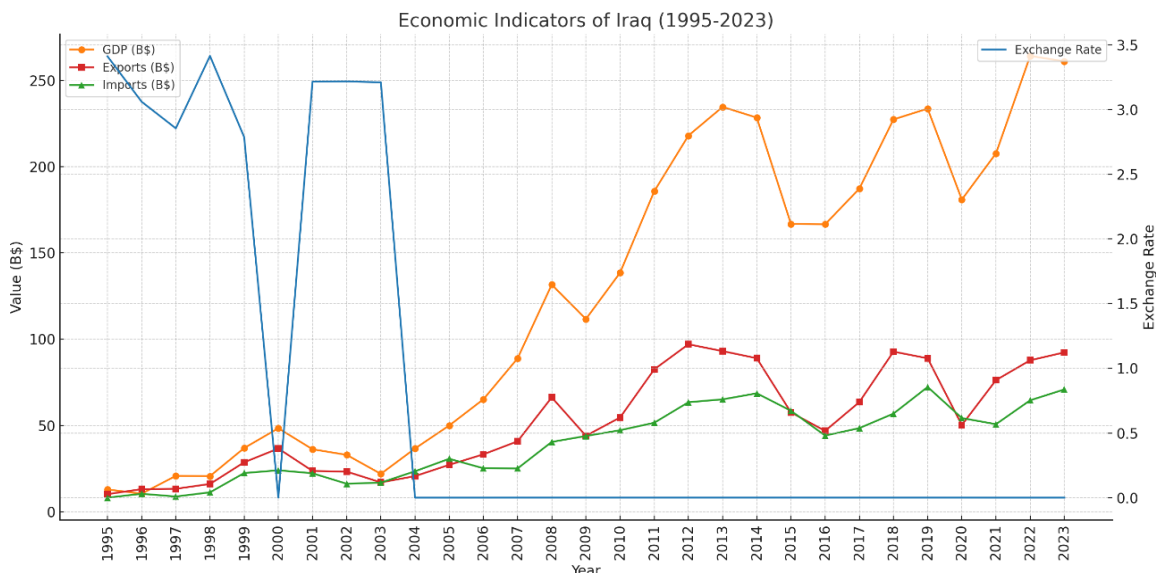

Figure (1) Iraq's Economic Indicators: GDP, Exports, Imports, and Exchange rate (1995-2023)

Source: the figure was prepared by the researchers based on the data in (macrotrends.net, fxtop.com, data.worldbank.org)

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3.2 Analysis of Economic Indicators in Turkey (1995-2023)

Between 1995 and 2023, Turkey's GDP grew from 169.32 billion USD to 1040.18 billion USD, reflecting significant economic expansion influenced by periods of robust reform and global integration, although it experienced contractions during worldwide economic recessions such as the 2008 financial crisis and the 2020 coronavirus pandemic. Exports increased from 33.68 billion USD in 1995 to 302.64 billion USD in 2023, with fluctuations aligning with global demand and economic policies. Imports followed a similar trajectory, growing from 41.23 billion USD to 327.69 billion USD, underscoring the economy's dependence on foreign goods. The exchange rate experienced a dramatic shift from being nearly stable in the early years to significant depreciation, from 0.000023% in 1995 to 0.034358% in 2023, influenced by inflationary pressures and geopolitical issues, which affected the cost of imports and economic stability. (Adler, J. H., & Wouters, V. (1959).,Chatelus, M. (1998), Argüden, Y. (2007), Bank Audi. (2023).
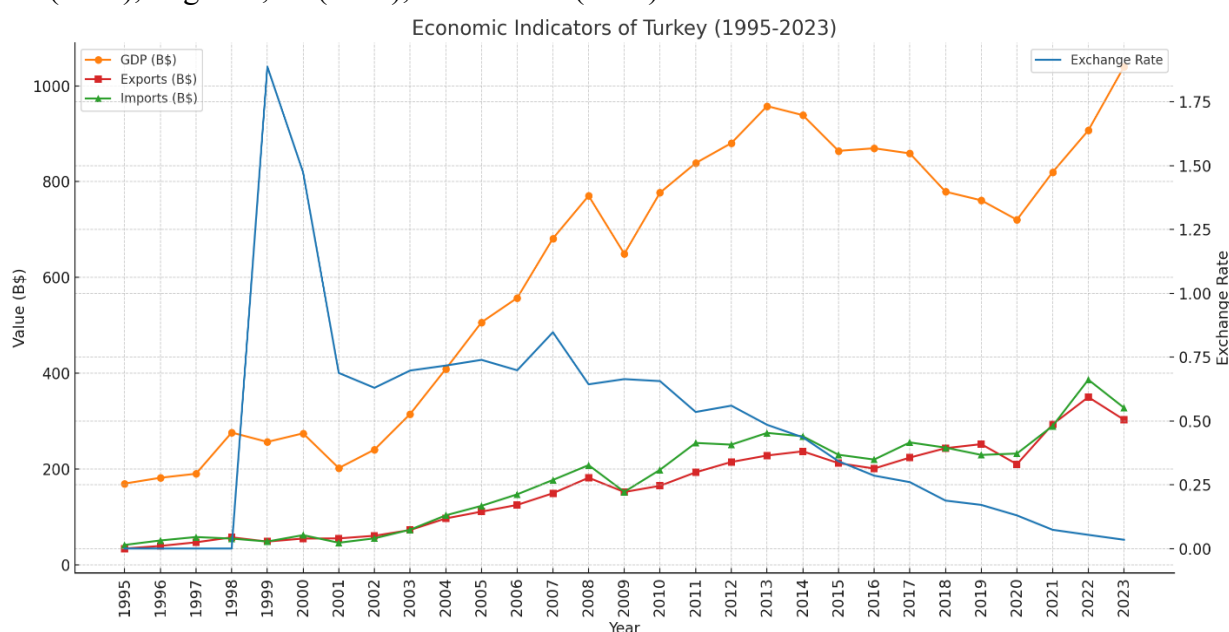

Figure (2) Turkey's Economic Indicators: GDP, Exports, Imports, and Exchange rate (1995-2023)
Source: the figure was prepared by the researchers based on the data in (macrotrends.net, fxtop.com, data.worldbank.org)

3.3 Analysis of Economic Indicators in Iran (1995-2023)

The economic indicators for Iran from the Figure (3) show varying trends in GDP, exports, imports, and the exchange rate. In 1995, GDP, exports, and imports were relatively low, reflecting early stages of economic growth. By 2005, all three indicators showed moderate growth due to increased oil revenues and stable economic policies. In 2015, GDP peaked, but exports and imports fluctuated, indicating the effects of global oil price volatility and economic sanctions. By 2023, GDP and imports slightly recovered, while exports remained stable, showing the impact of ongoing economic challenges and adjustments to sanctions. The exchange rate steadily devalued across these years, particularly from 2002 onwards, reflecting inflation, reduced investor confidence, and attempts to make exports more competitive. (Ghodsi, 2018; World Bank, 2024).
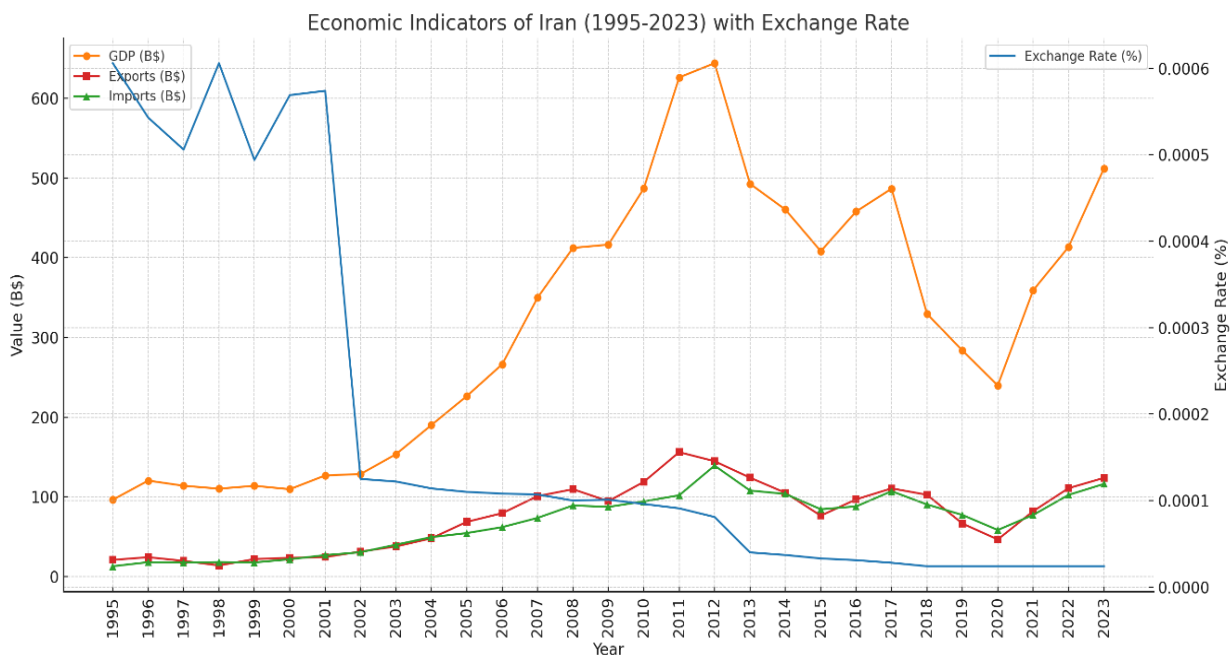
Figure (3) Iran's Economic Indicators: GDP, Exports, Imports, and Exchange rate (1995-2023)
Source: the figure was prepared by the researchers based on the data in (macrotrends.net, fxtop.com, data.worldbank.org)

3.4 Analysis of Economic Indicators in Syria (1995-2023)

The economic indicators for Syria from the graph show notable fluctuations in GDP, exports, imports, and the exchange rate. In 1995, these indicators were relatively low, indicating early development stages. By 2005, there was moderate growth in GDP, exports, and imports, driven by oil revenues and economic stability. In 2015, all indicators had drastically declined due to the Syrian civil war and international sanctions, which severely disrupted the economy, reducing production capacities and trade. By 2023, there was a slight recovery in GDP, exports, and imports, reflecting some economic stabilization efforts, but they remained significantly lower than pre-war levels. The exchange rate showed a sharp devaluation around 2011, correlating with the onset of the war, loss of confidence in the Syrian pound, and rampant inflation, continuing into 2023.Abboud, S., & Said, S. (2010). Anderson, P. (2019). Onder, H. (2021).
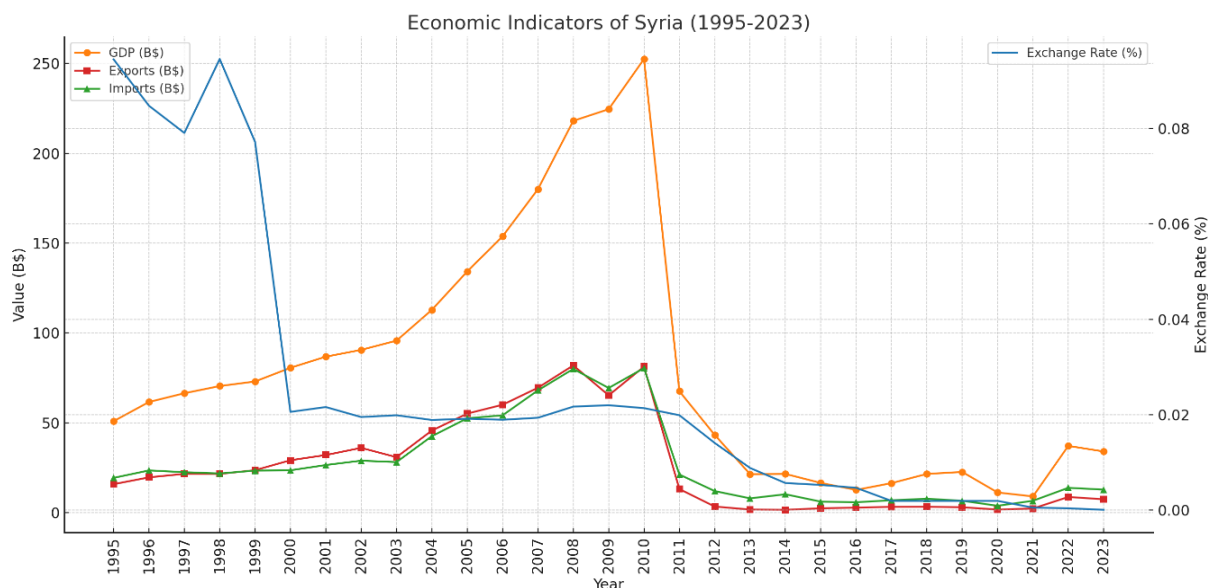
Figure (4) Syria's Economic Indicators: GDP, Exports, Imports, and Exchange rate (1995-2023)
Source: the figure was prepared by the researchers based on the data in (macrotrends.net, fxtop.com, data.worldbank.org)

4. Methodology and Data Collection

This study examines how Trade affects the GDP of Turkey, Iran, Iraq, and Syria by examining panel data from 1995 to 2023.The data were sourced from (Macrotrends.net, fxtop.com, data.worldbank.org) ensuring a comprehensive and reliable dataset. The key variables utilized in this study include (GDP) as a measure of economic growth, export and import values representing international trade activities, and the exchange rate as an important economic indicator.

Two econometric approaches are used in this study to accomplish the research goal. The first strategy deals with differences between countries by applying Fixed Effects and Random Effects models. While the RE model treats country-specific factors as random and unrelated to the main variables, the FE model accounts for factors that stay the same over time. By using both models together, the analysis provides a detailed understanding of how international trade influences economic growth based on panel data (Baltagi, 2021; Stock & Watson, 2020; Tsionas, 2019).

Fixed Effects Model Specification:

$GDP_{it} = \alpha_i + \beta_1 Export_{it} + \beta_2 Import_{it} + \beta_3 ExchangeRate_{it} + U_{it}$ …………. **(1)**
Where:

- GDP_{it} is the Economic growth of country i at time t,
- α_i represents the country-specific intercept,
- $\beta_1, \beta_2, \beta_3$ are the coefficients for exports, imports, and exchange rate respectively,
- U_{it} is the error term.

Random Effects Model Specification:

GDP it=α + β1Export it + β2Import it + β3ExchangeRate it + μi+ Uit ………… **(2)**
Where:

- GDPit represents the Economic growth of country i during the time period t,
- α represent the overall intercept,
- β1,β2,β3 represents the coefficients for exports, imports, and exchange rate respectively,
- μi represents the country-specific random effect,
- Uit is the error term.

Secondly, we also employ the ARDL model of the PMG model of Pesaran et al. (1999), which is especially designed to test for the dynamic associations between variables over different time periods. We can analyze both the short-term and long-term equilibrium linkages between global trade and economic growth using this model.

$$\Delta \ln GDPt = ao + \sum_{i=1}^{p} \alpha 1 \Delta \ln GDPt - i + \sum_{i=0}^{q} \alpha 2 \Delta \ln Exportt - i + \sum_{i=0}^{r} \alpha 3 \Delta \ln Importt - i + \sum_{i=0}^{s} \alpha 4 \Delta \ln Exchange\ rate\ t - i + \lambda\ (\ln GDPit - 1 - \gamma 0 - \gamma 1 \ln\ (Export\ it - 1) - \gamma 2 \ln\ (Import\ it - 1) + \gamma 3\ (Exchange\ rate\ it - 1) + U\ it$$ …………... **(3)**

ARDL Long-Run Model Specification

The long-run dynamics capture the equilibrium relationship between the explanatory variables and economic growth.

GDP it=α+β1log (Export it) + β2log (Import it) + β3Exchange rate it+ U it ……….**(4)**
Where:

- GDPit is the Economic growth of country i at time t,
- log (Export it) is the logarithm of exports,
- log (Import it) is the logarithm of imports,
- Exchange rate it is the exchange rate,
- α,β1,β2,β3 represents the long-run coefficients,
- U it is the error term.

ARDL short-run Model Specification:

The short-run dynamics capture the immediate influence of changes in the explanatory variables on economic growth.

$$\Delta \ln GDPt = ao + \sum_{i=1}^{p} \alpha 1 \Delta \ln GDPit - i + \sum_{i=0}^{q} \alpha 2 \Delta \ln Exportit - i + \sum_{i=0}^{r} \alpha 3 \Delta \ln Importit - i + \sum_{i=0}^{s} \alpha 4 \Delta \ln exchange\ rate\ t - i + \lambda COINTEQit - 1 + Uit$$…………..**(5)**

Where:

- Δ GDP it represent the first difference of Economic growth of country i during the time period t,
- Δ log (Export it) denote the first difference of the logarithm of exports,

- Δ log (Import it) represent the first difference of the logarithm of imports,
- Δ Exchange rate represent the first difference of the exchange rate,
- COINTEQit−1 is the error correction term that indicates the long-run equilibrium deviation,
- α,β1,β2,β3,λ are the short-run coefficients,
- Uit is the error term.

5. The Empirical Results

This section presents the empirical findings and their interpretations. The study assesses the trade's impact on GDP of Iraq, Iran, Turkey, and Syria from 1995 to 2023, aiming to derive meaningful insights from the analysis.

5.1 Descriptive statistics

Table (1) Testing results of some (Descriptive Statistics) for the variables of all countries

Variables	GDP	Export	Import	Exchange rate
Mean	5.064388	3.808748	3.849409	0.343162
Median	5.239338	4.026182	3.975720	0.001942
Maximum	6.947149	5.857933	5.956614	3.413993
Minimum	2.193886	0.412110	1.321756	4.00E-06
Std. Dev.	1.221477	1.240795	1.051039	0.823406

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

(Table 1) provides descriptive statistics for GDP, exports, imports, and exchange rates across all countries. GDP shows moderate variability with a mean of 5.064 and a range from 2.194 to 6.947. Exports have significant variability with a mean of 3.809, ranging from 0.412 to 5.858. Imports show moderate variability, averaging 3.849 with a range from 1.322 to 5.957. Exchange rates are highly volatile, with a mean of 0.343 and a wide range from 0.000004 to 3.414. This summary outlines the economic growth and variability in the selected countries, providing a foundation for further analysis of the relationships between these variables.

5.2 Stationarity test

Table (2) Unit Root test

Variables	Fisher Dickey-Fuller at Level		Fisher Dickey-Fuller at First Difference		Fisher Philips-Perron at Level		Fisher Philips-Perron at First Difference	
	Intercept	Trend	Intercept	Trend	Intercept	Trend	Intercept	Trend
GDP	0.5967	0.8949	0.0022	0.0594	0.7346	0.970	0.0000	0.0000
Export	0.6821	0.6325	0.0000	0.0001	0.5771	0.8650	0.0000	0.0000
Import	0.8156	0.8072	0.0000	0.0001	0.3864	0.9491	0.0000	0.0000
Exchange rate	0.0989	0.1505	0.0000	0.0000	0.0094	0.0843	0.0000	0.0000

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

(Table 2) illustrate the stationarity tests for GDP, exports, imports, and the exchange rate using Fisher Dickey-Fuller and Fisher Phillips-Perron tests indicate that all variables exhibit non-stationarity at their levels (p-values > 0.05) but achieve stationarity after first differencing (p-values < 0.05), suggesting that the variables are integrated of order one, I(1).meaning they achieve stationarity after differencing once. This result is crucial for econometric modeling as it suggests that using these variables in their differenced form will provide reliable and robust statistical analyses.

5.3 Correlation

Table (3) Correlation Test Results Indicating the Relationships between Model Variables in Iraq, Iran, Turkey and Syria.

Variables	GDP	EXPORT	IMPORT	Exchange rate
GDP	1	0.9289	0.9634	-0.3028
EXPORT	0.9289	1	0.9534	-0.1089
IMPORT	0.9634	0.9534	1	-0.1928
Exchange rate	-0.3028	-0.1089	-0.1928	1

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

The correlation test results reveal significant economic relationships between GDP, exports, imports, and the exchange rate for Iraq, Iran, Turkey, and Syria in (Table 3). GDP shows a strong positive correlation with both exports (0.9289) and imports (0.9634), indicating that increases in trade activities (both exporting and importing) are closely associated with economic growth in these countries. This suggests that a major contributor to their economic expansion is international trade. The strong correlation between imports and GDP implies that these economies might rely heavily on imported goods and services to support their growth. Conversely, the exchange rate demonstrates an inverse relationship with GDP (-0.3028), exports (-0.1089), and imports (-0.1928), suggesting that currency depreciation may negatively impact economic growth and trade activities. A weaker currency could lead to higher costs for imports and potentially reduce export competitiveness, thereby negatively impacting overall economic performance. These results emphasize how crucial steady trade is and currency policies to support economic growth in these countries.

5.4 Co-integration

(Table 4) Results of Pedroni Residual Co-integration Test

Model GDP				
	Alternative hypothesis: common AR coefs. (within-dimension)			
Types of tests	**Statistic**	**Prob.**	**Statistic**	**Prob.**
Panel v-Statistic	0.156595	0.4378	-1.152125	0.8754
Panel rho-Statistic	-1.906532	0.0283	-1.084098	0.1392
Panel PP-Statistic	-4.094193	0.0000	-3.162602	0.0008
Panel ADF-Statistic	-3.092019	0.0010	-2.784626	0.0027
	Alternative hypothesis: individual AR coefs. (between-dimension)			
Types of tests	**Statistic**	**Prob.**		
Group rho-Statistic	-0.676620	0.2493		
Group PP-Statistic	-3.454677	0.0003		
Group ADF-Statistic	-2.816132	0.0024		

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

The GDP model's Pedroni Residual Co-integration Test results are displayed in (Table 4). The Panel PP-Statistic, Panel ADF-Statistic, Group PP-Statistic, and Group ADF-Statistic all exhibit strong co-integration; in particular, seven of the twelve tests yield significant findings, demonstrating that the variables have a long-term equilibrium connection.

5.5 Estimation

5.5.1. Random &Fixed Effect

Table (5) Estimation Results of Fixed and Random Effects Models

(Hausman test) (Random effects) (Fixed effects)					
Fixed Effect Models			**Random Effect Models**		
variables	**Coefficient**	**Prob.**	**variables**	**Coefficient**	**Prob.**
LEXPORT	0.3138	0.0000	LEXPORT	0.2241	0.0000
LIMPORT	0.6009	0.0000	LIMPORT	0.8362	0.0000
EXCH	-0.1999	0.0000	EXCH	-0.2066	0.0000
C	1.6243	0.0000	C	1.0625	0.0000
R^2= 0.973	S.E =0.20	F-statistic= 665.7752 Prob.=0.0000	R^2= 0.946 Adjusted R^2=0.945	S.E = 0.28 SSR =9.10	F-statistic= 666.56 Prob.= 0.0000
Adjusted R^2=0.971	AIC = -0.27				
Hausman test Prob. (0.0000)					
Test Summary	Chi-Sq satatistic		Chi-Sq ,d.f		prob.
Cross-section random	108.649842		3		0.0000

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

(Table 5) compares fixed and random effects models to determine the appropriate one. The fixed effects model had significant coefficients for LEXPORT (0.3138), LIMPORT (0.6009), and EXCH

(-0.1999) with a high R-squared (0.9469) and lower standard error (0.2044). The random effects model had a higher R-squared (0.9734) but also a higher standard error (0.2850). The Hausman test (p-value = 0.0000) favored the fixed effects model, indicating it better accounts for individual heterogeneity. Both models showed that increased trade boosts economic growth, with positive coefficients for exports and imports, while a weaker currency hinders growth, reflected by the negative exchange rate coefficients. The results are consistent with economic theory. Increased trade activity (positive coefficients for exports and imports) boosts economic growth, while currency depreciation (negative coefficient for the exchange rate) hinders growth by raising import costs.

5.5.2 ARDL estimation

Table (6) Estimation Results of (PMG) (ARDL) Model for (Long-Short) run Effects

Autoregressive Distributed Lags (ARDL) Pooled Mean Group (PMG)					
Long Run Effect			Short run Effect		
variables	Coefficient	Prob.	variables	Coefficient	Prob.
LEXPORT	0.210101	0.0042	D(LEXPORT)	0.238160	0.0258
LIMPORT	0.772306	0.0000	D(LIMPORT)	0.046739	0.7875
EXCH	-0.247630	0.0000	D(EXCH)	63.05683	0.3234
			C	0.587841	0.0124
AIC = -1.08		S.E. of regression= 0.12		SSR= 1.56	
COINTEQ01= -0.45 (0.0332)					

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

   (Table 6) presents the PMG ARDL model results, showing different impacts of international trade on economic expansion in the (short & long) term. In the short run, only exports have a significant positive effect (coefficient = 0.238160, p = 0.0258). In the long run, all variables are significant: exports (coefficient = 0.210101, p = 0.0042), imports (coefficient = 0.772306, p = 0.0000), and exchange rates (coefficient = -0.247630, p = 0.0000). These findings suggest that trade fosters sustained economic growth, while currency stability is crucial. The negative long-run impact of exchange rates indicates that currency depreciation can hinder economic growth by increasing the cost of imports and creating economic instability. The model's accuracy is confirmed by SSR (0.12) and AIC (-1.08). The co-integration term (COINTEQ01 = -0.45, p = 0.0332) affirms that a long-term equilibrium relationship exists.

5.6 Diagnostic test

A) Heteroskedasticity LR Test

Table (7) Panel Cross-section Heteroskedasticity LR Test Results of Diagnostic tests

Null hypothesis: Residuals are homoskedastic			
	Value	df	Probability
Likelihood ratio	6.389482	4	0.1719

Source: the table was prepared by the researchers based on the results of the E-views 12 program.

The Panel Cross-section Heteroskedasticity LR Test, with a likelihood ratio of 6.389482 and a p-value of 0.1719, fails to reject the null hypothesis of homoskedastic residuals, indicating no significant heteroskedasticity problem in the data.

B) Normality (Jarque – Bera test for Normality)

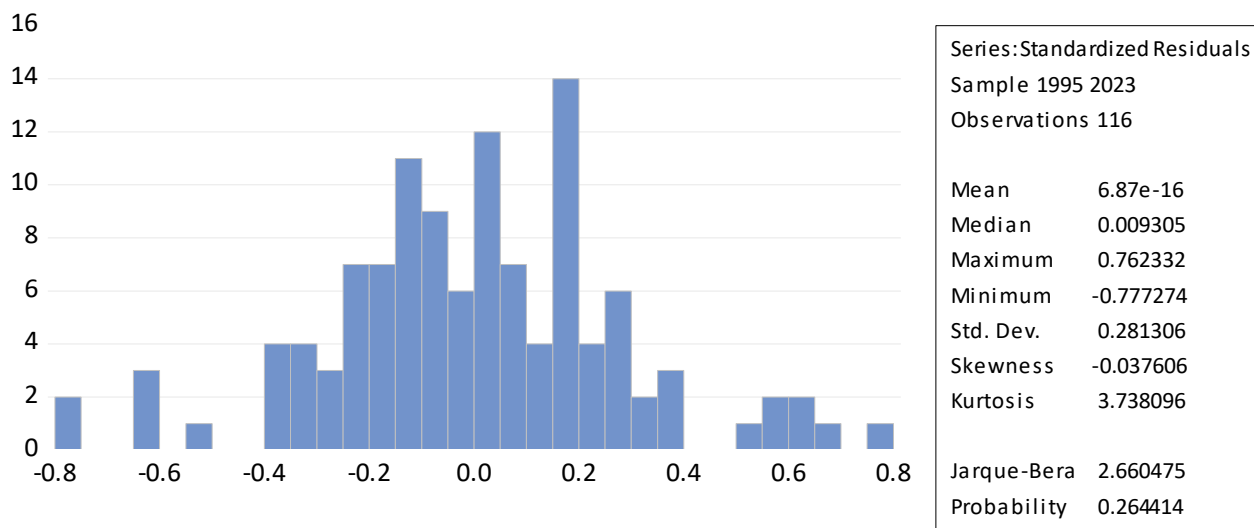| Series: Standardized Residuals	
Sample 1995 2023	
Observations 116	
Mean	6.87e-16
Median	0.009305
Maximum	0.762332
Minimum	-0.777274
Std. Dev.	0.281306
Skewness	-0.037606
Kurtosis	3.738096
Jarque-Bera	2.660475
Probability	0.264414

Figure (5) shows normal distribution of the residuals.

The Jarque-Bera test yields a statistic of 2.660475 with a p-value of 0.264414, Suggests that there is insufficient evidence to reject the null hypothesis of normality. Thus, despite minor deviations, the data is approximately normally distributed.

Conclusions and Recommendations

International trade has a major impact on economic growth in Iraq, Turkey, Iran, and Syria, according to empirical research. Exports and imports have a short- and long-term beneficial impact on economic growth, but exchange rate changes have a negative impact, according to both fixed and random effects models. The long-term advantages of trade are emphasized (PMG) (ARDL) model, which also stresses the significance of stable trade policy and exchange rate management for economic stability and growth. Policymakers should promote trade liberalization, diversify exports beyond oil, stabilize exchange rates, invest in infrastructure, strengthen economic institutions, attract foreign direct investment, and foster regional economic cooperation to enhance trade opportunities and drive sustained economic growth.

Reference

1. Abdulla, S. M. K., & Ali, H. K. (2019). An Analysis of Exports and Imports and Their Effect on the Economic Growth in Iraq. UKH Journal of Social Sciences, 3(2), 68-76. https://doi.org/10.25079/ukhjss.v3n2y2019.pp68-76
2. Abdullahi, A. O., Safiyanu, S. S., & Soja, T. (2016). International trade and economic growth: An empirical analysis of West Africa. IOSR Journal of Economics and Finance (IOSR-JEF), 7(2), 12-15. https://doi.org/10.9790/5933-07211215
3. Adler, J. H., & Wouters, V. (1959). The economy of Turkey (Report No. EA-97). International Bank for Reconstruction and Development, Department of Operations, Europe, Africa, and Australasia. Retrieved from https://www.example.com
4. Aga, A. A. K., & Hussein, J. S. (2023). The impact of trade liberalization on economic growth in Iraq: An empirical analysis. Migration Letters, 20(S2), 327-344.
5. Alsaadi, S. S., & Hameed, A. M. (2023). Foreign Trade Policy in Iraq Since 2003: Reality and Advancement Possibilities. International Journal of Law, Management, and Social Science, 7(1), 44-54. http://bharatpublication.com/journal-detail.php?jID=35/IJLML
6. Al-Shammari, H. A., & Al-Bakri, J. K. (2020). Liberalization of Foreign Trade and Its Impact on the Macroeconomic Indicators of Iraq Economy for the Period 2003-2018. International Journal of Innovation, Creativity and Change, 14(7), 1200-1212.
7. Al-Taie, A. H. H., Ali, F. K., & Jarallah, S. H. (2022). The effects of trade policies on economic growth: Empirical evidence from the economy of Iraq. International Journal of Economics and Finance Studies, 14(3), 322-336. https://doi.org/10.34109/ijefs.20220076
8. Anderson, P. (2019). Beyond Syria's war economy: Trade, migration and state formation across Eurasia. Journal of Eurasian Studies, 10(1), 75-84. https://doi.org/10.1177/1879366518814657
9. Argüden, Y. (2007, December). An overview of the Turkish economy: Outlook and current perspectives (Policy Brief No. 4). Middle East Institute. Retrieved from https://www.mideasti.org
10. Baltagi, B. H. (2021). Econometric Analysis of Panel Data (6th ed.). Springer.
11. Bank Audi. (2023, November). Turkey Economic Monitor: Navigating the perfect storm redux. Retrieved from https://www.bankaudi.com

12. Boame, K. (1998). Primary-export-led growth: The evidence of Ghana. Journal of Economic Development, 23(1), 175–194. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=db7c6f95352e68118475c0a50b5c519a81120c6e

13. Chatelus, M. (1998, November). Turkey's economic outlook. Paper presented at the international conference on "US and EU common approaches to Turkey," Rome, IAI. Retrieved from https://www.iai.it/sites/default/files/iai9824.pdf

14. Czyżewski, D. (2021). The relationship between international trade and economic growth accounting for model uncertainty and reverse causality. Munich Personal RePEc Archive. https://mpra.ub.uni-muenchen.de/108405/

15. Ebrahimi, N. (2017). An analysis of the relationship of imports and economic growth in Iran (Comparison of systematic and unsystematic cointegration methods with neural network). International Journal of Economics and Financial Issues, 7(2), 338-347.

16. Farahane, M. J., & Heshmati, A. (2020). Trade and Economic Growth: Theories and Evidence from the Southern African Development Community. GLO Discussion Paper, No. 657. Global Labor Organization (GLO). Retrieved from https://hdl.handle.net/10419/224141

17. Ghodsi, M., Astrov, V., Grieveson, R., & Stehrer, R. (2018). The Iranian Economy: Challenges and Opportunities (Research Report No. 429). The Vienna Institute for International Economic Studies. Retrieved from https://wiiw.ac.at/the-iranian-economy-challenges-and-opportunities-dlp-4599.pdf

18. Gorgi, E., & Alipourian, M. (2008). Trade Openness and Economic Growth in Iran and some OPEC Nations. Iranian Economic Review, 13(22), 32-40.

19. Heidari, H., & Davoidi, N. (2010). Exports, Imports, and Economic Growth Nexus in Iran: Bounds Test Approach to Cointegration. Urmia University.

20. Institute of Regional and International Studies (IRIS). (2023). Iraq Economic Review: The Dinar & Al-Sudani's Agenda. Retrieved from https://govinfo.library.unt.edu/cpa-iraq/economy/investment_roadshow.pdf

21. Mohsen, A. S. (2015). Effects of exports and investment on the economic growth in Syria. International Journal of Management, Accounting and Economics, 2(6), 527-537. Retrieved from https://www.researchgate.net/publication/338006967

22. Mohsen, A. S., & Chua, S. Y. (2015). Effects of Trade Openness, Investment and Population on Economic Growth: A Case Study of Syria. Hyperion Economic Journal, 3(2), 14-23. Retrieved from https://www.econstor.eu/bitstream/10419/224141/1/HEJ-2015-2-14.pdf

23. Onder, H. (2021). A decade of war in Syria: The economic side. Syria Analytical Roadmap, World Bank. Retrieved from https://thedocs.worldbank.org/en/doc/ebb9b060753b7019705d1dafe9fe2e35-0280032021/original/April-22-Harun-OnderA-Decade-of-War-in-Syria-The-Economic-Side.pdf

24. Pahlavani, M. (2005). The Relationship Between Trade and Economic Growth in Iran: An Application of a New Cointegration Technique in the Presence of Structural Breaks. University of Wollongong Economics Working Paper Series, WP 05-28.

25. Rahimi, M., & Shahabadi, A. (2011). Trade Liberalization and Economic Growth in Iranian Economy. Bu-Ali Sina University, Faculty of Economics and Social Science.

26. Salvatore, D. (2013). International economics (11th ed.). John Wiley & Sons.

27. Stock, J. H., & Watson, M. W. (2020). Introduction to Econometrics (4th ed.). Pearson.

28. Stojanović, M., Božić Miljković, I., Obradović, J., & Dimitrijević, L. (2023). The impact of imports and exports on economic growth: Panel data analysis. Ekonomika, 69(4), 69-80. https://doi.org/10.5937/ekonomika2304069S

29. Taghavi, M., Goudarzi, M., Masoudi, E., & Gashti, H. P. (2012). Study on the Impact of Export and Import on Economic Growth in Iran. Journal of Basic and Applied Scientific Research, 2(12), 12787-12794.

30. Tsionas, M. (2019). Panel Data Econometrics. Academic Press.

31. USAID, CIA Fact Book, & CPA Ministries. (2001). Trade and foreign investment opportunities in Iraq. Retrieved from https://govinfo.library.unt.edu/cpa-iraq/economy/investment_roadshow.pdf

32. World Bank. (2020). Iraq Economic Monitor: Navigating the perfect storm (Redux) - Spring 2020. Middle East and North Africa Region, Macroeconomics, Trade & Investment. Retrieved from https://govinfo.library.unt.edu/cpa-iraq/economy/investment_roadshow.pdf

33. World Bank. (2024). Iran Economic Monitor: Navigating the perfect storm redux. Middle East and North Africa Region, Macroeconomics, Trade & Investment. Retrieved from https://thedocs.worldbank.org/en/doc/65cf93926fdb3ea23b72f277fc249a72-0500042021/related/mpo-irn.pdf