-RESEARCH ARTICLE-

THE ROLE OF EXPORTS, DEVELOPMENT, IMPORTS, AND TRADE OPENNESS ON THE ECONOMIC GROWTH IN IRAQ: ASSESSMENT USING THE ARDL COINTEGRATION METHOD

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─**Abstract**─

Numerous factors have been cited as affecting economic growth. This study empirically investigates the effects of imports, exports, and trade openness on Iraq's economic growth. The study spans the years 1990 to 2021. Long-run and short-run empirical evaluations are conducted using the Autoregressive Distributed Lag (ARDL) Cointegration methodology. Exports and trade liberalization or openness significantly benefit economic growth in both the short and long run. Still, imports significantly negatively affect economic growth in both the short and long run. According to these conclusions, the Iraqi government should prioritize export diversification and the introduction of tariffs and quotas to restrict more imports. In addition, the government should pursue trade liberalization measures that will contribute to its economic growth.

Keywords: Imports; Exports; Trade openness; Iraq; ARDL Cointegration Approach

1. INTRODUCTION

The economic growth rate is an essential indicator of an economy's level of development. Constant economic growth resolves numerous macroeconomic issues, including income inequality, poverty, and unemployment. Due to the importance of economic growth, several empirical and theoretical research has been done to discover the variables that influence it, and external trade is one of them (Al-kasasbeh, Alzghoul, & Alhanatleh, 2022). International commerce is one of the primary causes of economic growth, which expands consumer options and consumption levels. Thus, it can result in

more robust economic growth rates and the preservation of national economies, particularly in developing nations.

Moreover, external trade is one of the critical elements historically determining the economic underdevelopment of underdeveloped nations (Obeid & Awad, 2018). It is a commonly accepted truth that countries that liberalized their trade, as opposed to those that imposed restrictions on their trade and financial policies, have been able to boost the efficiency of their manufacturing processes, which positively impacts economic growth. In addition to selling and buying things and services, it significantly affects the creation of new technologies, the dissemination of new ideas, and the transfer of information (Amna Intisar et al., 2020).

Since the release of Romer (1990), Young (1991), and Grossman and Helpman (1989), a growing number of research on the importance of trade to economic growth have produced conflicting arguments. First, the "export-led growth" paradigm views trade as the principal engine of economic expansion (Iqbal, Rahman, & Elimimian, 2019; Riedel, 1984). Import substitution is the second method that regards commerce as "the growth servent" (Kravis, 1970; Michaely, 1977). The empirical research on economic growth and trade relationship is still divided. Notwithstanding this, research by (Dreger & Herzer, 2013; Keho, 2017; Sunde et al., 2023), among others, has backed the export-led development argument. Research demonstrates that competitive global marketplaces can foster technical innovation, improved resource allocation, scale economies, and capacity utilization in export-driven industries (Helpman & Krugman, 1989). Yet, it is crucial to recognize imports' contribution to economic expansion (Bakari & Mabrouki, 2017). Imports can support long-term economic growth by giving home enterprises access to foreign innovations and intermediary goods (Sunde et al., 2023).

In addition to exports and imports, it has been demonstrated that trade openness can contribute more to economic growth over time by increasing the efficiency of resource allocation, facilitating the availability of products, and boosting the productivity of all factors through the dissemination of knowledge and technology (Rivera-Batiz & Romer, 1991; Sala-i-Martin & Barro, 1995). So, it is projected that countries with free trade will have the superior economic performance to those with restricted trade. From this perspective, trade with wealthy nations benefits developing countries. Empirical studies indicate that economies with excellent international orientation have more significant economic growth. Yet, some research believes greater trade openness can harm economic growth by devaluing the currency and increasing inflation (Cooke, 2010; Samimi et al., 2012). The impact of openness on economic growth can harm economies producing low-quality goods. For example, exporting nations are sensitive to swings in trade conditions. Despite these contradictory opinions, it is generally agreed that international trade benefits economic progress (Keho, 2017).

Considering the importance of trade and trade openness to a country's economic development, this study's primary objective is to estimate the influence of trade openness and imports and exports on Iraq's economic growth from 1990 to 2021. Regarding assessing the relationship between trade and economic development, the existing literature gives Iraq little consideration. Iraq is an excellent case study since its economic growth has fluctuated significantly (See Figure 1). The current estimate of Iraq's GDP as a share of the world economy is 0.32 percent, a rise over previous years. Iraq's GDP increased from its lowest position of 1.70 billion US dollars in 1960 to its highest point of 197.72 billion US dollars in 2017. 2014 saw the highest amount ever recorded, 244.65 billion USD (Abdulla et al., 2019).
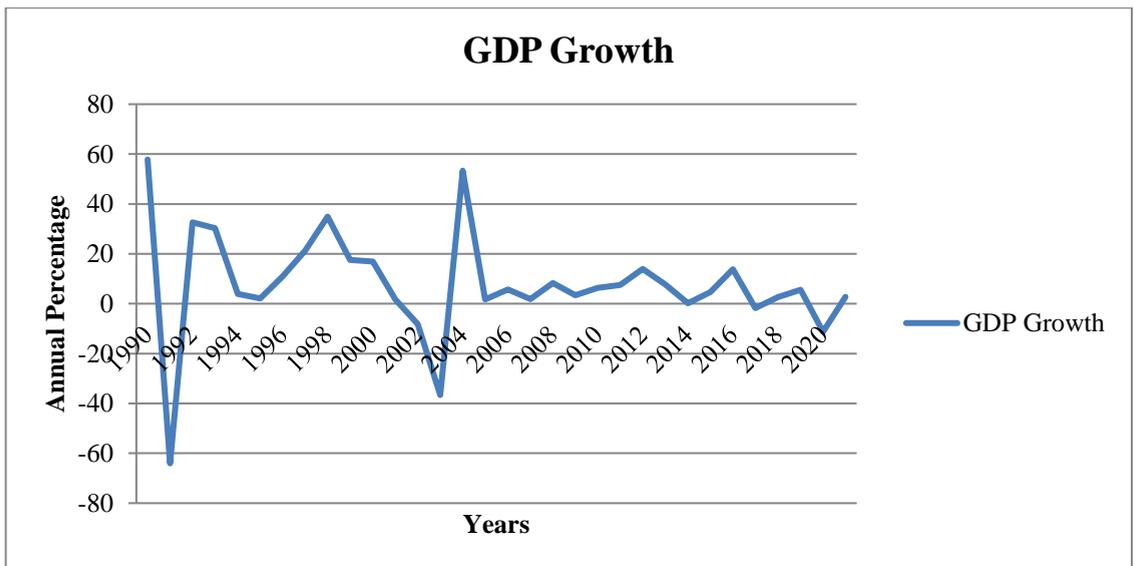
Figure 1. Economic Growth in Iraq over the 1990-2021 period

Regarding exports, Iraq ranks 43rd in the world economy. In 2017, it had exports worth 60.8 billion US dollars and imports of 29.7 billion US dollars, resulting in a trade surplus of 31 billion US dollars. In 2017, the gross domestic product was roughly 192 billion dollars, and the per capita income was $16,900. Iraq's principal exports consist of crude oil worth 57.5 billion dollars, refined oil worth 1.47 billion dollars, pure gold for 1.4 billion dollars, gas worth 92.5 million dollars, and tropical fruits worth 66.7 million dollars. The principal imports of Iraq are jewelry valued at 960 million US dollars, medication valued at 677 million US dollars, meat valued at 643 million US dollars, automobiles valued at 629 million US dollars, and gold valued at 621 million US dollars (Abdulla et al., 2019).

Current economic growth and trade performance raise the question of whether the trade is a primary growth driver. If so, is trade-driven growth long-term or short-term? The study will hopefully alleviate these worries. This study investigates the hypothesis that commerce contributes to Iraq's economic growth. This study employs Pesaran et al.

(2001)'s ARDL limits test to highlight the long-term relationship between economic growth and commerce. When variables of varying orders of integration are incorporated, the reliability of this method increases. In the following aspects, the present study is an essential contribution to the body of knowledge: Although various studies have analyzed the influence of exports, imports, and trade openness on economic growth, relatively few studies have quantified this relationship in the context of Iraq. So, this subject requires further investigation.

In contrast to the studies of Abdulla et al. (2019) and Al-Taie et al. (2022), which estimated the effects of imports and exports and trade policies on economic growth, the current study estimates the impact of imports, exports, and trade openness to illustrate a more comprehensive estimation of the trade and financial growth relationship. In contrast to the VAR estimation applied in several previous research, which dictates that all series be integrated into the same sequence, the ARDL method utilized in this work is more flexible. ARDL is more versatile and adaptive since it can be employed regardless of whether the integrated series is of order zero, one, or both.

The subsequent study sections are as follows. In part 2, a literature review is presented. The third section provides empirical data and methods. Section 4 contains the results and analysis. Section 5 has a summary and policy implications.

2. LITERATURE REVIEW

In the majority of nations throughout the world, the relationship between trade openness and economic growth has been thoroughly examined. Yet, little research has been conducted on Iraq's economic growth and trade nexus. For example, H. Saleem et al. (2020) assessed the impact of trade openness and foreign direct investment (FDI) on GDP in five South Asian nations from 1975 to 2016. According to the results of the Bootstrap ARDL cointegration test, both FDI and trade openness had a significant positive effect on the GDP of these nations. Khalid (2016) calculated the impact of trade openness on Turkey's economy from 1960 to 2014. The ARDL testing method revealed that trade liberalization contributed positively to economic growth only in the short term. In Turkey, no such association was detected over the long term. Considering Gulf Cooperation Council countries, H. Altaee et al. (2018) analyzed the impact of trade openness, imports, exports, and energy consumption on economic growth from 1992 to 2014. Using pooled OLS, one-way and two-way Random Effects and Fixed Effects Models, the authors determined that exports positively affected economic growth in the selected economies, while imports had a negative effect. In Indonesia, Juliansyah et al. (2022) investigated the impact of investment, exports, and imports on the country's growth from 1967 to 2020. The authors utilized Vector Error Correction Model to demonstrate that investments, imports, and exports had little impact on Indonesia's economic growth. Using the Panel Fixed Effect Model, Cheung et al. (2021) investigated the relationship between trade openness and economic growth for a panel of 31 OECD

nations. The study's outcomes suggested that trade openness significantly contributes to countries' economic growth.

Obeid et al. (2018) analyzed the relationship between financial development, trade openness, and economic growth in Jordan from 1992 to 2015. The ARDL Model determined that trade openness had a favorable influence on economic growth over the long term but had no effect over the short term. Amna Intisar et al. (2020) analyzed the impact of human capital and trade openness on economic growth for a selection of Asian nations from 1985 to 2017. Using the panel FMOLS and DOLS methods, trade openness and human capital contributed positively to the economic growth of the selected countries. Altaee et al. (2015) examined the impact of trade openness and financial development on Bahrain's growth. Using data from 1980 to 2012 and the VECM methodology, the authors determined that financial development and trade openness had a considerable positive impact on Bahrain's economic growth. Sunde et al. (2023) analyzed Namibian data from 1990 to 2020 to determine the effect of trade openness, imports, and exports on economic growth. Using the ARDL cointegration method, it was determined that imports harmed economic growth in both the long and short run. The short- and long-term effects of exports and trade openness were positive and significant for economic growth. Abdulla et al. (2019) estimated the impact of Iraq's exports and imports on economic development from 1980 to 2017 by analyzing export and import statistics. Johansen The cointegration method indicated a long-term link between the series. In addition, the Granger Causality analysis demonstrated both imports and exports contributed positively to economic growth. The study of the available literature reveals that the influence of trade liberalization and exports and imports on economic growth has been examined extensively in the context of other nations. Still, Iraq has not received sufficient attention to evaluating the abovementioned nexus. Other than Abdulla et al. (2019), no further study has assessed the influence of trade on Iraq's economic growth, to the author's knowledge. The current study aims to examine this nexus in the long and short run by employing the ARDL Cointegration method.

3. DATA AND ECONOMETRIC METHODOLOGY

This study uses the ARDL cointegration method and the ADF and PP tests for unit roots for empirical evaluation. ARDL includes the short-run causality test, the ECM term and short-run association estimation test, the Wald test, and the long-run OLS estimation test. The Global Development Indicators serve as the primary data source for the model variables. The period covered by this study is 1990 to 2021. In equations (1) and (2), the empirical assessment models for the analysis are provided as follows:

GDP = f (IMP, EXP, LF, CAP)   (1)

GDP = f (TO, LF, CAP, GE)   (2)

Where GDP= Economic growth, IMP= Imports, EXP= Exports, LF= Labour force, CAP= Capital and GE= Government expenditures.

The econometric forms of the models are given as follows

$$GDP_t = \alpha_0 + \beta_1 IMP_t + \beta_2 EXP_t + \beta_3 LF_t + \beta_4 CAP_t + \varepsilon_t \qquad (3)$$

$$GDP_t = \alpha_0 + \beta_1 TO_t + \beta_2 GE_t + \beta_3 LF_t + \beta_4 CAP_t + \varepsilon_t \qquad (4)$$

A detailed description of the study variables is shown in Table 1 below:

Table 1. Variable Descriptions and Sources of Data

Variables	Description	Source of data
Economic Growth	GDP Constant (2015U$)	WDI
Imports	Imports of goods & services (% of GDP)	WDI
Exports	Exports of goods & services (% of GDP)	WDI
Trade openness	Trade (as % of GDP)	WDI
Labor	Labor force (Total)	WDI
Capital	Gross fixed capital formation (% of GDP)	WDI
Government Expenditures	Government final consumption expenditures (% of GDP)	WDI

4. ESTIMATION METHODOLOGY

4.1 ARDL Model Specification

Pesaran et al. (1999) developed the first version of the ARDL cointegration technique, which Pesaran et al. (2001) subsequently improved. Compared to older and more established cointegration approaches, it has three primary benefits. First, the ARDL method does not need all series to be integrated in the same order; it is applicable whether the series are combined in order one, order zero, or have a mixed order of integration. The second advantage of the model is that it performs better with smaller and more limited data samples. The third advantage of this methodology is that the ARDL approach can generate long-term unbiased model estimations (Sunde et al., 2023). The models for this investigation are represented by equations (6) and (7).

$$\Delta GDP_t = \rho_0 + \rho_1 GDP_{t-1} + \rho_2 IMP_{t-1} + \rho_3 EXP_{t-1} + \rho_3 LF_{t-1} + \rho_4 CAP_{t-1} + \sum_{i=1}^{n} \rho_{11} \Delta GDP_{t-1} + \sum_{i=1}^{n} \rho_{12} \Delta IMP_{t-1} + \sum_{i=1}^{n} \rho_{12} \Delta EXP_{t-1} + \sum_{i=1}^{n} \rho_{13} \Delta LF_{t-1} + \sum_{i=1}^{n} \rho_{14} \Delta CAP_{t-1} + v_{1t} \qquad (6)$$

$$\Delta GDP_t = \partial_0 + \partial_1 GDP_{t-1} + \partial_2 TO_{t-1} + \partial_3 GE_{t-1} + \partial_3 LF_{t-1} + \partial_4 CAP_{t-1} + \sum_{i=1}^{n} \partial_{11} \Delta GDP_{t-1} + \sum_{i=1}^{n} \partial_{12} \Delta TO_{t-1} + \sum_{i=1}^{n} \partial_{12} \Delta GE_{t-1} + \sum_{i=1}^{n} \partial_{13} \Delta LF_{t-1} + \sum_{i=1}^{n} \partial_{14} \Delta CAP_{t-1} + v_{2t} \qquad (7)$$

Where, ρ_1 to ρ_5 and ∂_1 to ∂_5 shows the long-run coefficients. ∂_0 and ρ_0 represent the intercepts. Short-run coefficients are denoted by ρ_{11} to ρ_{14} in model 1 and ∂_{11} to ∂_{14} in model 2. ν_{1t} and ν_{2t} represent the disturbance terms.
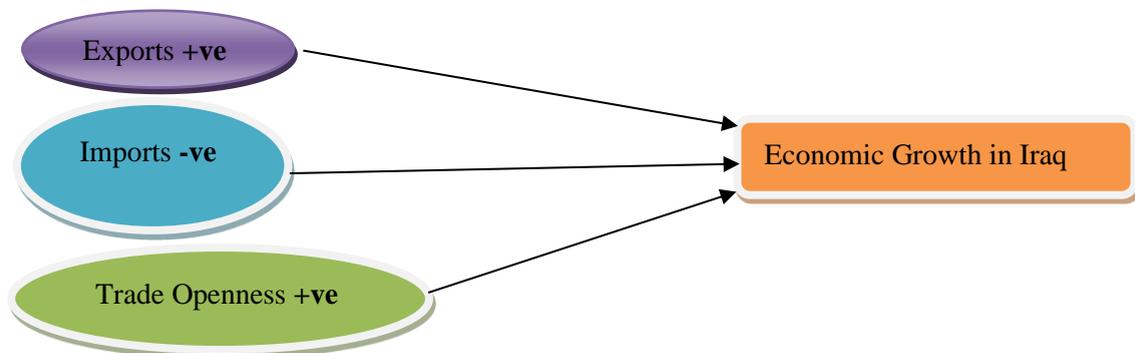
Graphical Abstract

Figure 2: Conceptual Framework

4.2 ARDL Bounds Test

Each degree of significance has a unique set of crucial values. During the determination of the first critical value, it is assumed that all series have an integration order of zero, or I(0), and during the conclusion of the second critical value, it is assumed that all series have an integration order of one, or I(1) (1). When the test statistic exceeds the higher critical boundary value, we reject the null hypothesis of the absence of cointegration. When the F-statistic is smaller than the lower critical limit, it is presumed that the null hypothesis H0 is true. If the model's variables are cointegrated, the error correction approach of ARDL must be used to calculate the coefficients, as shown in Equations (8) and (9). (9).

$$\Delta GDP_t = \varphi_1 + \sum_{i=1}^n \theta_{1i}\Delta GDP_{t-i} + \sum_{i=1}^n \theta_{2i}\Delta IMP_{t-i} + \sum_{i=1}^n \theta_{3i}\Delta EXP_{t-i} + \sum_{i=1}^n \theta_{4i}\Delta LF_{t-i} + \sum_{i=1}^n \theta_{5i}\Delta CAP_{t-i} + \lambda_1 ECT_{1t-1} + \mu_{1t} \tag{8}$$

$$\Delta GDP_t = \varphi_1 + \sum_{i=1}^n \theta_{1i}\Delta GDP_{t-i} + \sum_{i=1}^n \theta_{2i}\Delta TO_{t-i} + \sum_{i=1}^n \theta_{3i}\Delta GE_{t-i} + \sum_{i=1}^n \theta_{4i}\Delta LF_{t-i} + \sum_{i=1}^n \theta_{5i}\Delta CAP_{t-i} + \lambda_1 ECT_{2t-1} + \mu_{2t} \tag{9}$$

ECTt−i represents the error correction terms, whereas λ1 and λ2 denotes the ECM coefficients in equations (8) and (9), respectively. Every variable has been previously defined.

5. RESULTS AND DISCUSSIONS

1990–2021 time series data are used to examine the effects of trade openness, imports, and exports on Iraq's economic growth. Table 2 displays the descriptive or summary statistics for the model series. According to the statistics of Jarque Bera, each variable has a normal distribution, constant variance, and zero covariance.

Table 2. Descriptive Statistics Analysis

Variables	GDP	LF	CAP	GE	TO	EXP	IMP
Average	1.0911	71620	9.8880	15.101	71.148	39.453	31.695
Median	1.0211	69147	7.4036	16.614	70.881	39.540	29.736
Max	2.0211	10698	26.017	25.563	154.234	77.898	76.841
Min	2.2210	41473	0.7344	2.3316	0.0209	0.0053	0.0156
Standard. Deviation.	5.4210	21278	6.8524	6.0058	45.101	24.952	20.972
Skewness	0.1731	0.3381	0.5062	-0.8435	-0.1589	-0.2256	0.1184
Kurtosis	1.8599	1.8709	2.1952	2.8764	2.1903	2.1587	2.3904
Jarque-Bera	1.8895	2.3092	2.2305	3.8157	1.0088	1.21518	0.5702
Sum	3.4812	2.2908	316.47	483.217	2276.52	1262.50	1014.24
Sum Sq. Deviation.	9.1222	1.4014	1455.65	1118.16	63059.0	19300.9	13634.68
Obs	32	32	32	32	32	32	32

Following descriptive analysis, the PP and ADF tests for unit roots are employed to determine whether or not the variables included in the models are stationary. The results of the two tests are summarized in Table 3.

Table 3. Stationarity or Unit Root Tests (ADF and PP Test)

Series	ADF test		PP test	
	Int	Int & Trend	Int	Int & Trend
GDP	-0.328	-3.396***	-0.231	3.978***
IMP	-4.516***	-4.888***	1.9429***	-1.9668***
EXP	-2.224	-12.941	-1.842	-1.628
TO	3.120	1.8333	4.315	0.1762
GE	-2.234	-3.281***	-2.093	-3.214***
LF	-0.3325	-2.080	0.554	-1.789
CAP	-1.4030	-1.565	-1.705	-1.8774
	1ST Difference		1ST Difference	
	I	I & T	I	I & T
GDP	-3.831***	-4.148***	-2.336***	-4.784***
IMP	----------	----------	-----------	-----------
EXP	-4.666***	-4.7299***	-4.670***	-4.097***
GE	-3.594***	-----------	-7.638***	-----------
LF	-2.0098***	-4.114***	-3.981***	-4.873***
CAP	-4.772***	-3.812***	-2.224***	-4.556***

Where Int and Int&Trend denote Intercept and Intercept and trend, respectively, ADF and PP represent Augmented Dickey-Fuller and Philips-Perron tests, and *** represents a 1% significance level.

According to the findings, the series' order of integration is inconsistent. Since the included variables have a mixed order of integration, ARDL estimation is the optimal method for the econometric study.

6. SHORT RUN AND LONG RUN ESTIMATIONS

6.1 Optimal Model Selection

Before estimating short-term and long-term parameters, selecting the optimal ARDL model is required. Since the ARDL model incorporates the lagged values of both dependent and independent variables, choosing the ARDL model that minimizes the residual sum of squares (RSS) is crucial. The best or optimal model is determined based on the AIC. Based on AIC, the ARDL (4,4,4,4,0) model is chosen for Model 1, and the ARDL (3,4,4,4,4) model is chosen for Model 2. These models met all model fitness requirements and were selected because they have the lowest RSS.

6.2 ARDL Bound Test

Cointegration testing is the initial stage in the ARDL analysis procedure. This test can be conducted using the Wald test, which assesses the H0 that cointegration does not occur. The limits tests rely on the F-statistic, which has an odd asymptotic distribution under the null hypothesis of cointegration (H0). The first step of the ARDL limits approach is the empirical estimation of the OLS-based equations. The F-test is then applied to the variables to determine the existence of a long-term relationship. Utilizing the previous null assumptions, we investigate the significance of the correlations between the parameters of the lagged level of the series that are assumed to exist.

H0: $\rho 1 = \rho 2 = \rho 3 = \rho 4 = \rho 5 = 0$

H0: $\partial 1 = \partial 2 = \partial 3 = \partial 4 = \partial 5 = 0.$

Equation (3) relates to the first H0, while equation (4) relates to 2nd hypothesis. Table 4 displays the findings of the cointegration bounds test.

6.3 Long Run Results

Long-term analysis reveals how the dependent variable, GDP, responds to changes in the independent variable. Then, using the dynamic ARDL model, long-term relationships between variables can be predicted. Table 5 presents the long-term parameters for Models 1 and 2.

The results of Model 1's long-run estimation illustrate the enormous impact of the series on Iraq's economic expansion. Exports, labor force, and capital benefit economic growth, but imports have adverse effects. More specifically, regarding coefficients,

economic growth grows by 1.29 units for each unit increase in exports, while it decreases by 1.39 units for each unit increase in imports. Moreover, a one-unit increase in labor and capital increases economic growth by 2.55 and 1.60 units, respectively.

Table 4. Bound Test

Equation 1		
statistics	Value	K
F-stat	6.549	4
Significance	I(0)	I(1)
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37
Equation 2		
F-stat	4.64	4
Significance	I(0)	I(1)
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Table 5. ARDL Long Run Results

DV=GDP	Equation 1	
	Coeff	P-value
IMP	-1.390***	0.0024
EXP	1.290***	0.0019
LF	2.555***	0.000
CAP	1.608***	0.0477
Cons	2.031***	0.190
	Equation 2	
TO	1.4108***	0.000
GE	1.6109***	0.000
LF	1.884**	0.0698
CAP	2.589***	0.000
Cons	-6.012***	0.000

Similarly, the long-term estimates for Model 2 suggest a significant impact of trade openness and government spending on economic growth. Like Model 1, labor force and capital (the model's control variables) positively affect economic growth in Model 2. Hence, both government expenditures and trade liberalization contribute significantly to economic expansion. In terms of parameters, a unit increase in trade openness and government expenditures increases economic growth by 1.41 and 1.61 units, respectively. In addition, a one-unit increase in labor and capital raises economic growth by 1.88 units and 2.58 units, respectively.

6.4 Short-Run ARDL

Model 1 short-run ARDL is displayed in Table 6. The ECT value shows the rate of long-term equilibrium adjustment. ECT meets all three criteria because it is statistically significant, has a negative coefficient, and is smaller than one. At -0.96, the ECM coefficient is relatively high, indicating that 96 percent of the adjustment is approaching equilibrium. The negative sign suggests that the model will attain equilibrium in the long run. Each variable is statistically significant at the 1% level.

Table 6. ARDL Short Run Results

Model 1

Series	Coeff	Prob
Error correction term (ECM)	-0.964***	0.001
D(GDP-1)	1.259	0.0003
D(GD-2)	0.244	0.1226
D(GD-3)	0.254	0.0149
D(IMP)	-5.520	0.0000
D(IMP-1)	-1.780	0.0000
D(IMP-2)	-8.980	0.0000
D(IMP(-3)	-1.130	0.0000
D(LF)	4.6356	0.0007
D(LF-1)	7.6245	0.0320
D(LF-2)	3.9451	0.0053
D(LF-3)	4.7822	0.0214
D(EXP)	2.4508	0.0000
D(EXP-1)	1.7409	0.0000
D(EXP-2)	1.0109	0.0000
D(EXP-3)	8.7083	0.0000
D(CAP)	1.345	0.0005

First, the analysis reveals the strong positive impact of exports on short-term growth. Consequently, the results of this study demonstrate that the export-led theory holds in Iraq. The data support the notion that an increase in exports contributes to an increase in the country's output, resulting in more employment and economic expansion. Export growth plays a crucial role in increasing economic growth due to the positive benefits that exports have on externalities. Due to competition with foreign traders, exporting companies, for instance, may gain advantages in terms of productivity, asset diversification, greater asset utilization, improper use of scope and scale economies, technological breakthroughs, and technical progress. Increasing exports also lead to participation in the market for foreign currencies, which promotes the import of capital and, in turn, the long-term transfer of potential income and output to the nation. The scope and size of the economy are impacted by global market competition, which also boosts productivity. Empirically, this finding is consistent with the results of (Luo & Qu, 2023; Oncel et al., 2023; A. Saleem et al., 2023), who also claim that exports contribute positively to economic growth.

Second, the study's findings corroborate the concept that economic growth and imports negatively correlated over the period examined. The negative coefficient indicates that imports harm Iraq. Theoretically, imports can play a significant role in economic growth, but the kind of imports substantially impact the economic growth rate. When imports of modern technology and productive commodities constitute a considerable share of a nation's total imports, one can predict a positive and practical effect of imports on economic growth. In any case, the rise in per capita income and high level of consumption cause a significant amount of imports to be allocated to purchasing luxury goods, which is detrimental to economic growth. (H. H. A. Altaee et al., 2016) for Saudi Arabia (Mushtaq et al., 2014), China, Japan, and Indonesia, and (H. Altaee & Al-Jafari, 2018) for GCC countries all corroborate this conclusion. Thirdly, the analysis reveals that both control factors, namely labor and capital, have a significant positive impact on economic growth in Iraq. The conclusion is consistent with numerous standard neoclassical growth theories, which hold that labor and capital are the primary economic growth drivers. Kahia et al. (2016), Fu et al. (2021), and Bhattacharya et al. (2016) provide empirical evidence for our conclusion. Here we will discuss short-term ARDL estimations for Model 2. These results are provided in Table 7 below. Firstly, ECT demonstrates a 41% adjustment to long-run equilibrium and satisfies the three conventional requirements (significant, negative, less than one).

First, we discovered that trade openness in Iraq greatly enhances economic growth. Most international trade theories say trade openness significantly contributes to economic growth. Trade liberalization can result in increased specialties, stimulating productivity growth. As a result, an open economy experiences increased competition, stimulating higher output levels and economic expansion. Hence, increasing commerce promotes the development of the Iraqi economy (Al-kasasbeh et al., 2022). Overall, the findings of the two models indicate that trade supports economic growth via efficient resource

allocation, higher domestic capacity utilization, economies of scale, and enhanced productivity due to spillovers. These factors generate a competitive environment in local sectors, expanding the country's global market share and fostering economic progress. Our findings are supported by prior empirical estimates (Brueckner & Lederman, 2015; Keho, 2017; Khalid, 2016; Obeid & Awad, 2018; Zarra-Nezhad et al., 2014).

Table 7. ARDL Short Run Results

Model 2

| Series	Coeff	Prob
D(GDP)	-0.010	0.9366
D(GDP(-1)	0.208	0.1790
D(TO)	1.1708	0.0000
D(TO-1)	1.458	0.0000
D(TO-2)	4.308	0.0000
D(TO-3)	3.388	0.0000
D(CAP)	1.409	0.0000
D(CAP-1)	5.598	0.0000
D(CAP-2)	9.808	0.0000
D(CAP-3)	1.279	0.0000
D(GE)	2.469	0.0000
D(GE-1)	6.418	0.0000
D(GE-2)	1.139	0.0000
D(GE-3)	5.068	0.0000
D(LF)	23.20	0.0422
D(LF-1)	7.95	0.0098
D(LF-2)	4.981	0.7857
D(LF-3)	5.89	0.0088
ECM*	-0.413	0.0014

Second, the analysis demonstrates that government expenditures have a sizeable positive impact on the economic growth of Iraq. The result is consistent with Keynes's theory of fiscal policy, according to which public expenditures are the exogenous elements that a nation can use effectively to stimulate economic growth. In addition, several empirical investigations, like Al-Fawwaz (2016), lend credence to the study; (Dandan, 2011; Jiranyakul, 2013; Wu et al., 2010). Finally, as in Model 1, labor and capital influence economic growth strongly and favorably in Model 2, following traditional growth theories and empirical estimations by Kahia et al. (2016), Fu et al. (2021), and Bhattacharya et al. (2016).

6.5   Diagnostic Tests

The diagnostic tests in Table 8 indicate that the ECM results pass with flying colors. Secondly, the autocorrelation test demonstrates that the calculated residuals lack serial correlation. According to the ARCH heteroscedasticity test, the residuals in both models are not heteroscedastic. Thirdly, the results reveal that the residuals adhere to a normal distribution. The results of the Ramsey RESET test indicate that both estimated model specifications are valid. Last but not least, Figures 2 through 5 suggest that the CUSUM and CUSUM squares tests corroborate the parameter stability of the two estimated equations.
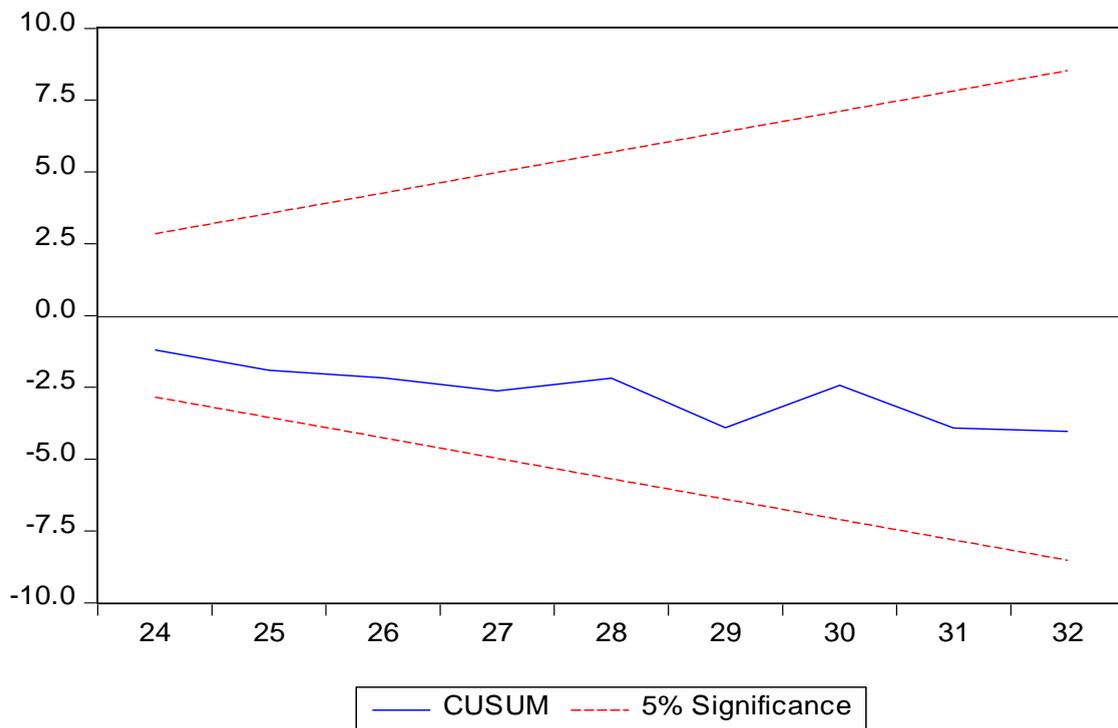
Table 8. Diagnostic Test Results

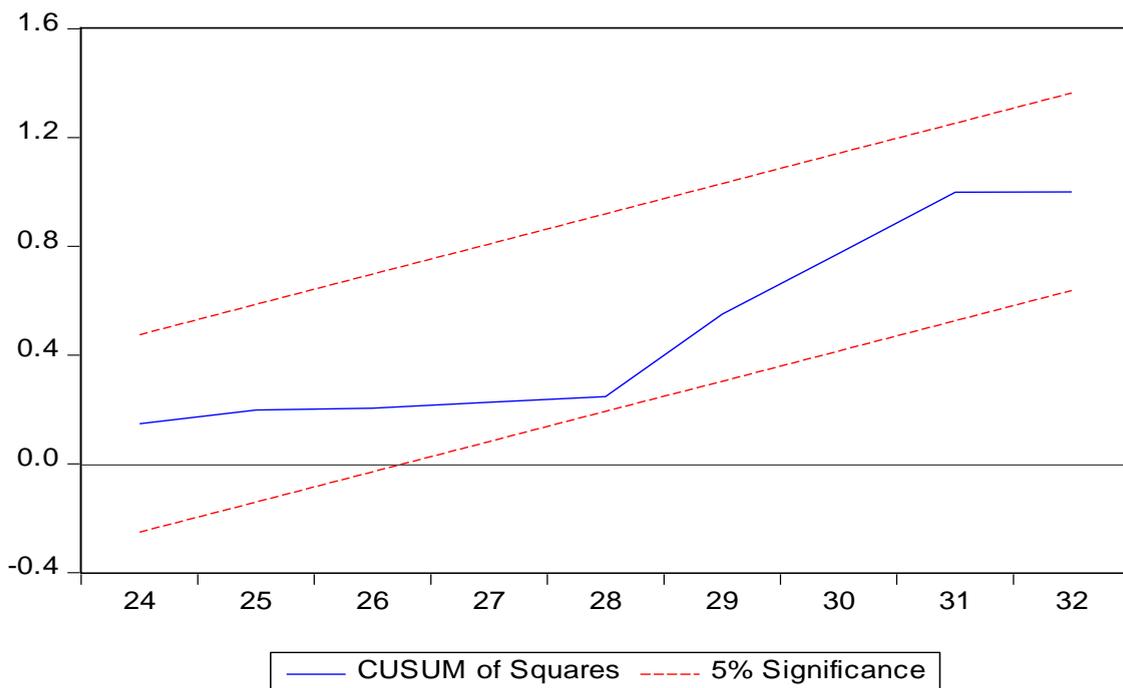|	**Test-value**	**Prob**	**Test-Value**	**Prob**
	Model 1		Model 2	
Serial Correlation	0.458	0.738	0.237	0.808
Heteroskedasticity Test	0.580	0.839	0.395	0.931
Normality Test	2.330	0.890	0.754	0.658
Ramsey RESET Test	2.331	0.585	0.515	0.642
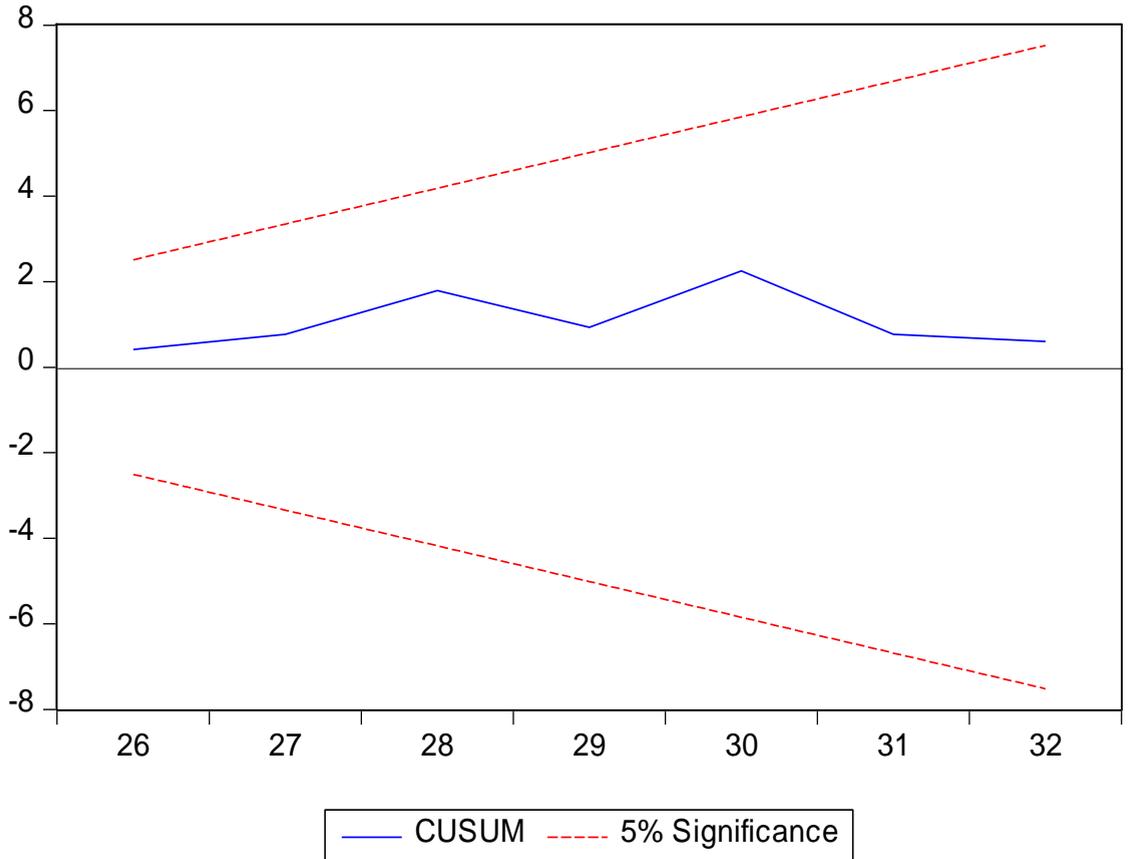
Figure 2. CUSUM Graph for Model 1 (1990–2021)
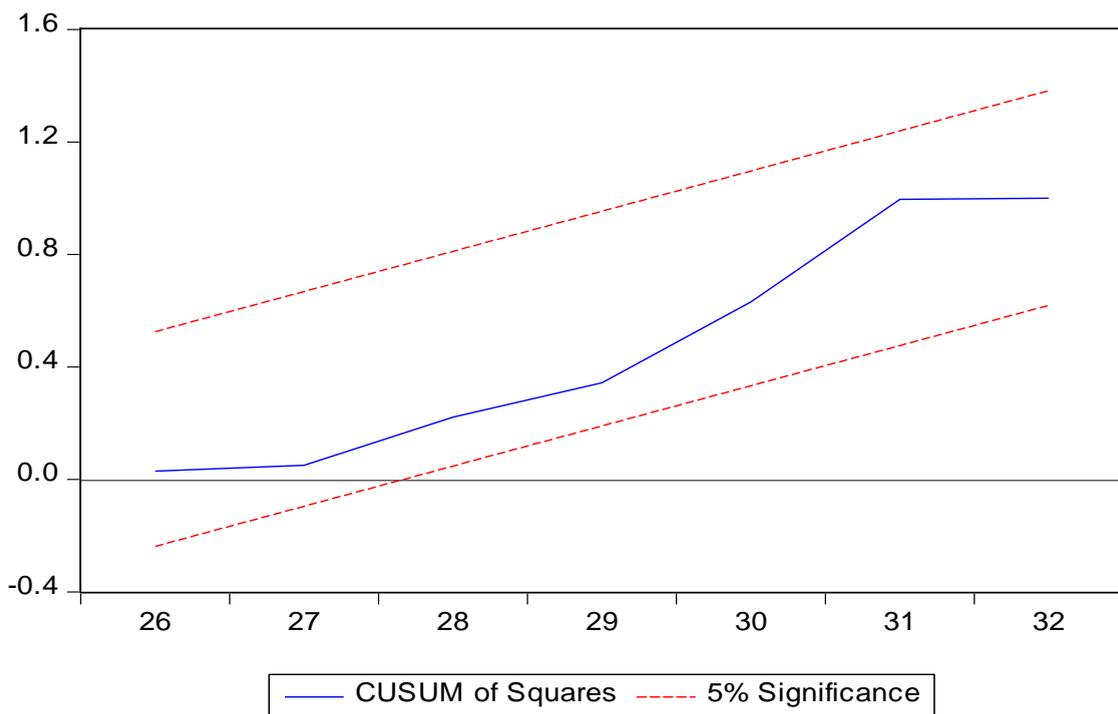
Figure 3. CUSUMSQ Graph for Model 1 (1990–2021)

Figure 4. CUSUM Graph for Model 1 (1990–2021)

Figure 5. CUSUMSQ Graph for Model 1 (1990–2021)

7. CONCLUSION

This study tries to estimate the effect of trade openness, imports, and exports on Iraq's economic growth from 1990 to 2021. Despite the abundance of previous studies assessing the trade and economic growth nexus, the literature lacks studies evaluating this nexus in the context of Iraq. In contrast to Abdulla and Ali's (2019) study, which only examined the effect of imports and exports on growth, this study also considers trade openness, as trade liberalization facilitates access to more global marketplaces, stimulating economic growth. The ARDL technique is employed to conduct the study. Two distinct models are specified to evaluate the influence of imports, exports, and trade liberalization on economic growth. In the first model, imports and exports are the two most important independent variables controlling for labor and capital. In the second model, the independent variables are trade openness, government spending, labor and capital.

The results show that trade openness and exports significantly and positively affect Iraq's economy. Additionally, the research reveals that imports had a significant adverse effect on the economic growth of Iraq. In addition, the study found that the impact of the labor force, capital, and general government final consumption expenditure on economic growth is significant and favorable. Based on the data above, the study indicates a positive correlation between foreign commerce and economic development in Iraq. Our findings support the assumption that more global trade stimulates economic expansion.

This bolsters the mercantilist philosophy, which advocates export promotion and Iraq's participation in international markets. Empirically, the findings are consistent with those of other researchers, such as Gries and Redlin (2012), H. Saleem et al. (2020), Al-kasasbeh et al. (2022), and Dahmani, Mabrouki, and Ben Youssef (2022), who provided similar evidence.

8. POLICY RECOMMENDATIONS

Based on the present study findings, researchers recommend several worthwhile policies for the government of Iraq. First, according to research findings, exports are the key driver of economic growth. This validates the notion that exports will drive Iraq's economic growth. So, increasing economic diversity must receive considerable consideration. Second, since labor and capital contribute significantly to economic growth in Iraq, efforts must be made to promote increased capital formation and a skilled and more efficient labor force. Third, since imports harm Iraq's economy, the country should reduce imports or modify its import policy to achieve more significant economic growth. It is argued that the government should restrict imports by adopting higher tariffs and quotas. This research also shows that if the economy desires to grow more swiftly over time, it should increase the process of trade openness or liberalization. By reducing tariff and non-tariff trade barriers, authorities should favor open trade, which boosts the efficiency of resource and knowledge flows and, eventually, economic growth.

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