ISSN 2303-4521
Periodicals of Engineering and Natural Sciences *Original Research*
Vol. 12, No. 2, July 2024, pp.343-354

Measuring the impact of imports on the gross domestic product in Iraq for the period 2004-2021

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ABSTRACT

The research was conducted to ascertain the impact of imports on Iraq's GDP, which is a critical element in the development of economic policies and strategies. The study demonstrated that imports had a detrimental impact on Iraq's GDP in both the short and long term by employing the Autoregressive Distributed Lag (ARDL) model to examine the relationship between imports and domestic product. According to the short-term elasticity value of (-0.24), the increase in imports resulted in a 24% decrease in GDP in Iraq, with a minor 1% offset in other sectors. This decrease in GDP underscores the substantial influence that an increase in imports can have on a nation's overall economic performance. This research emphasises the significance of evaluating the effects of import trends on technological advancements, resource allocation, and infrastructure projects in Iraq. Engineers and policymakers can strive to create sustainable solutions that foster domestic production, innovation, and economic growth in the long term by acknowledging the detrimental impacts of excessive imports on GDP.

Keywords: Iraqi imports, gross domestic product, industrial engineering

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1. Introduction

Today, the general view in most research and studies, especially economic ones, is the use of quantitative methods and tools, which can be expressed by the econometric model, which is one of the most important means used to understand the economic system [1-3]. It is well-known that Iraq's economy is rentier-based, which means that economic variables in Iraq have a smaller impact on the dependent variables than in developed countries. What's more, most of Iraq's economic variables are strongly tied to oil, so any change to one variable can have a negative ripple effect on the others. Consequently, it necessitates a quantitative approach, preferably through the use of preexisting programmes or established mathematical procedures. Programmes with up-to-date methods for determining the relative importance of the independent and dependent variables have so evolved [4, 5].

In this study, we will examine the effects of imports on Iraq's GDP from 2004 to 2021 using a model that addresses economic variables as a typical approach, taking into account the economic changes that Iraq experienced during that time. The Iraqi economy was exposed to the largest wave of trade openness and serious repercussions such as the faltering of development projects related to national industrialization, as well as the devastating effects after 2003 and the collapse of the infrastructure system and most institutions and economic units, both productive and service, so this period witnessed an openness in foreign trade in exports. Oil resources, whose resources led to a significant increase in imports for the public and private sectors. This paper aims to identify imports and measure the impact of imports on the gross domestic product in Iraq.

The Iraqi economy experienced significant trade openness and adverse consequences, particularly following 2003, which led to the collapse of infrastructure and many economic institutions, hindering national industrialization projects. This period saw a surge in foreign trade, especially in oil exports, resulting in a notable increase in imports for both public and private sectors. The research aims to identify the nature of these imports and assess their impact on Iraq's gross domestic product (GDP), with the hypothesis that imports have influenced GDP negatively.

2. Methodology

2.1. Standard methods for time series

2.1.1. Phillips-Perron (PP)

Many unit root tests, originally introduced by Phillips and Perron in 1988, are now standard practice in financial time series analysis [6]. When it comes to handling serial correlation and error heteroscedasticity, Phillips-Perron (PP) unit root tests diverge from ADF testing. Whereas ADF tests take into account the test regression's serial correlation through parametric autoregression, PP tests do not take this into account. An example of a PP regression test is [7]:

$$\Delta yt = \beta\, D_t + \pi y_{t-1} + ut \text{ ……….(1)}$$

Therefore, this test is based on estimating the following equation:

$$\Delta Y_t = ao + a_1 Y_{t-1} + a_2\, T + e_t \text{ ……..(2)}$$

2.1.2. Dickey-Fuller

The Dickey-Fuller test, named for its 1979 creators, American statisticians David Dickey and Wayne Fuller, checks autoregressive models for the presence of a unit root, a trait that can lead to issues with statistical inference. Although this technique works well for asset price and other routing time series and is the quickest method to check for a unit root, the dynamic and intricate structure of most financial and economic series makes it unsuitable for use in an autoregression model without additionally running the augmented Dickey-Fuller test.

The test is formulated as [8, 9]:

H0 is a null hypothesis
H1 Alternative hypothesis
H0-: A time series has a unit root, i.e. it is related to the data and is not stable
H1-: The time series is more likely to lack a unit root, and thus can be considered data-correlated.

2.1.3. Standard testing methods

The CUSUM and CUSUM –SQ of squares are two of the most frequently used tests for parameter stationarity in linear regression, as outlined in Brown's seminal 1975 publication. One of the reasons for their widespread use is that they can be employed to evaluate alternative hypotheses to the null hypothesis of parameter stationarity, which in turn requires additional tests. CUSUM tests are used to ascertain the stability of the coefficients in a multiple linear regression model, based on the known categories of coefficient variation or the timing of any structural shifts, using the formula y = Xb + e. A structural change in the model over time is indicated by sequence values that fall outside the expected range. Inference is based on a series of sums or sums of squares, which are one-step standard errors of prediction. These errors are computed iteratively from nested subsamples of the data under the null hypothesis of a constant coefficient [4]. For the delay period, the optimal lag period tests are those that encompass the absence of autocorrelation between the residuals or random errors. Three measures can be employed to determine the optimal lag period for the initial differences in the values of the variables in the unconstrained error correction vector model:

- Akaike information criterion (AIC).
- Schwarz Information Criterion (SIC).
- Hannan–Quinn information standard (HQ).

The Bounds test for the ARDL model is designed to determine whether there is evidence of a long-term relationship between the variables entered into the model using the (Wald) test or the (F) test statistic. These variables have a non-standard (standard) distribution and are not restricted by sample size. The trend variables included in the Estimation are also considered. The value of (F) is determined using the following formula [10].

$$F = \frac{(SSeR - SSeu)/M}{SSeu/(n-k)} \text{ ....(3)}$$

Where:

SSeR: The sum of squares for residuals of restricted model (null hypothesis), represented by the following:

(H0:a1 = a2 ….. = ak + 1 = 0)

SSeu: The sum of the squares for residuals of unrestricted model (alternative hypothesis), represented by the following:

H1:a1 ≠ a2 ….. ≠ ak + 1 ≠ 0)(

M: Total parameters for a constrained model.
n: Sample size.
K: Sum of variables.

2.2. Autoregressive conditional heteroskedasticity (ARCH)

One statistical model that may be used to estimate volatility is autoregressive conditional heteroskedasticity (ARCH). This model is useful for analyzing time series volatility and making predictions about future volatility. According to ARCH modelling, periods of high volatility are followed by periods of even greater volatility, while periods of low volatility are followed by periods of even greater volatility.

When weighing the potential dangers of keeping an asset across various time periods, investors could find this information helpful because it indicates that volatility or variance tends to aggregate. Economist Robert Engel III came up with the ARCH idea in the '80s. Engel was awarded the Nobel Memorial Prize in Economic Sciences in 2003 for his work on financial modelling using the autoregressive conditional heteroscedasticity (ARCH) model, which enhanced econometric models by substituting conditional volatility for constant volatility assumptions. Autoregression, first identified by Engel and others developing ARCH models, is the process by which historical financial data have impact on subsequent data. A conditional covariance component of ARCH merely alludes to the reality that stock market values and oil prices, among other financial variables, exhibit nonstationary oscillations. Like GDP or currency rates, which experience both high and low volatility times. For a long time, economists have been aware of the degree to which volatility might change, but they frequently failed to account for this variation when modelling variables, therefore they maintained volatility constant. Consequently, ARCH models are now the de facto standard for representing volatile financial markets (which, ultimately, encompass all financial markets) [4].

$$\text{Mean equation } r_{t=\mu+\varepsilon_t} \dots\dots\dots\dots (4)$$

r = is the ratio of returns and μ is the condition for r based on all previous shock

$$h^2 = \alpha_\circ + \alpha_1 \varepsilon_{t1}^2 + \alpha_2 h_{t1}^2 + \beta_1 v_{t_1} \dots\dots (5)$$

Where:

$$\alpha_\circ > 0 \quad \alpha_1 \geq 0 \quad \beta_1 \geq 0$$

In the equation h, it is σ_t^2 The conditional variance is the function determined on the basis of the variance of the previous period and the total variance given by the economic fluctuations at time t-1, and the ε residuals, which assume a random orientation on alternative distributions, with differences depending on the apparent fluctuations at that time This use leads to a model of conditional variance of the equation.

$\mathbf{v_t}$in the second equation is the volume of interaction between economic variables (for example, trade exchange) that occurs in time t, and we use this approach to try to explain the fluctuations that occur as a result of fluctuations in the economic variable, and the way to measure the continuity of fluctuations and it approaches (1) as in the equation below.

If the sum of the coefficients equals one, then any fluctuation that occurs will lead to a permanent change in all future values, and thus the conditional variance continues to fluctuate.

$$h^2 = \delta + \sum_{i=1}^{q} \alpha_i \varepsilon_{t1}^2 + \gamma \varepsilon_{t1}^2 d_{t1} + \sum_{j=1}^{p} \beta_j h_{t-j} \; \ldots\ldots(6)$$

Where: γ is the asymmetry or influence effect, α_i. $\beta_j$andγ are parameter constants. And d is the simulation index variable, where [10]:

(Negative volatility) dt= 1 ε_t<0 …….(7)

(Positive volatility) ε_t≥ 0 dt= 0 …….(8)

2.3. Autoregressive distributed lag methodology

Consideration of multivariate approaches is a key component of numerous intriguing investigations involving time series variables. The goal of these methods is to provide a description of the data that these variables contain in relation to time and their cross-sectional dependence. Understanding the dynamic relationship between the variables is usually the aim of the analysis. It is possible to increase the precision of forecasts using these methods in certain situations. Policy analysis and the drawing of precise conclusions regarding possible links are two other applications of models created in this field of study.

The ARDL model is an extension of the autoregressive model that incorporates lags of explanatory variables. The key distinction is that ARDL models select the appropriate lag structure from both internal and external variables, with an emphasis on exogenous variables. Since ARDL is a type of VAR, it is also strongly related to autoregressive models. The key difference is that ARDL does not require the endogenous variable to be a predictor of the exogenous factors as it is assumed that the exogenous variables are, well, exogenous. To describe the behaviour of the dependent variable and the present and lagged values of the independent explanatory factors, a two-component autoregressive distributed lag model is utilized. This model accounts for both the lag of the dependent variable and the current and lagged values of the independent variables. The letter ARDL p q is commonly used to express ARDL models in terms of the number of lags. P: is the dependent variable's lag count [11]. Q represents the number of delays in the independent variables. Finally, the distributed lag is just the total of the lags caused by the system's external variables, weighted according to their relative importance. So, if X is an endogenous variable that depends on other variables, then Y and Z are exogenous variables. Let us pretend that Y and Z are two independent variables, and that their lag orders are 2 and 1, respectively. After that, we can extract the model's distributed lag from the following:

Distributed Lags (order 2,1)= a1*Yt-1+ a2*Yt-2+b1*Zt-1…….(9)

It is important to mention that a distinct latency order will be specified for each exogenous variable. Therefore, in order to forecast an endogenous variable, we may implement a latency of order 2 for variable Y and a lag of order 1 for variable Z.

2.4. Description of the models used in the study

Here, starting with the stability test, we'll take a look at the right standard tests to get the most out of them. For data that are stable, we employ Granger causality and Johansson cointegration. For data that are unstable at the initial level, we use the autoregressive distributed lag test (ARDL), which allows for both short-term and long-term flexibility. Following econometric principles, you must identify the model variables as shown in Table 1 and provide a description of the variables and their mathematical signs utilised in the models.

The econometric theory states that imports are the independent variables and GDP is the dependent variable. The same as what is shown in Table 1.

Table 1. Description of the symbols of the variables used

code	Dependent variable	code	Independent variables
Ln GDP	gross domestic product	Ln M	Imports

The variables are described in Table 2. The function adopts the subsequent multiple double logarithmic form to assess the impact of the independent variables imports on the gross domestic product in Iraq from 2004 to 2021:

$$Lnyi = \propto_0 + Ln\propto 1\ X1 + Et \; \ldots\ldots(10)$$

Whereas,

Lnyi=dependent variable GDP

LnX1 = independent variable: exports or imports

Et=random variable

While the expected signs of all variables are consistent with economic theory, there are cases where the model's signs run counter to economic logic; this occurs for variable-specific reasons. Table 2 depicts the signs for the economic variables considered in the study.

Table 2. Summary of the anticipated indications of the study variables

The expected signs for independent variable with the dependent variable	**Dependent variable**	**Independent variables**
Since imports have a negative effect on GDP and local production is dependent on foreign imports, the connection is inverse and has a negative sign.	gross domestic product	Imports

Table 3. Studied data for the period 2004-2021

year	**gross domestic product(GDP)**	**Imports(M)**
2004	22690697	30952241.90
2005	31531303.6	29383231.80
2006	43215349.7	27443902.50
2007	52943135.7	7871971.35
2008	128049986.6	6680169.70
2009	75654131.9	20217192.00
2010	12709866.3	32688802.50
2011	103361411.1	58037545.30
2012	1129291510	28587997.40
2013	20203203.7	39057185.30
2014	150410451.9	43261711.10
2015	131008972.6	48578232.70
2016	131374153.2	57353324.30
2017	140028175.4	37361218.70
2018	136510365.1	43804511.10
2019	135057110.1	24803819.70
2020	116483279.8	18390722.90
2021	115051729.2	19273653.20

3. Results and discussion

Table 4 displays the outcomes of the unit root stationarity test done by the Augmented Dickey - Fuller (ADF) test. This test has employed for comparing the null hypothesis (H_0: β=0) that states that a variable's time series is unstable (i.e., has a unit root)—with the alternative hypothesis (H1: $\beta \neq 0$), which indicates that a time series is stable. The outcomes demonstrated that the variables have been unstable at the original level with the presence of the static term, the time trend, and the static term and without them at the levels for Gross Domestic Product (GDP). The original level maintains a constant probability P value of 0.0041, which is less than 5%. Because the calculated (t) value is smaller than the (t) value and the P value is more than 5%, the imports variable is unstable at the original data level. Using tabulation at both the 1% and 5% significance levels for the majority of the variables. According to the null hypothesis (H0: B = 0), the variables became stationary at the first difference between the two sets of data when the stationary term was there and when it was absent. This suggests that a time series is not stationary and that there is a unit root. Consider the import variable; it displayed a probability value of P(0.2885), which is higher than 5%, at the levels (1%, 5%, and 10%). At both the 5% and

10% significance levels, the t-value of -1.988423 is higher than the critical values. Therefore, we can dismiss a null hypothesis and embrace an alternative hypothesis (H1: B ≠ 0). This hypothesis asserts that the time series pertaining to these variables are unstable and lack a unit root, meaning they are integrated of orders I(0) and I(1).

Table 4. Consequences for unit root test based on the ADF test at the original level and the first difference

With Constant	Variables	LnM	LGDP
	t-Statistic	1.988423-	4.3400-
	Prob.	0.2885	0.0041
	Result	n0	*
With Constant & Trend	t-Statistic	1.884879-	4.21137-
	Prob.	0.6181	0.0207
	Result	n0	*
Without Constant & Trend	t-Statistic	0.946428-	3.252739-
	Prob.	0.2929	0.0029
	Result	n0	*
With Constant	Variables	LnM	LGDP
	t-Statistic	4.677953-	6.622585-
	Prob.	0.0024	0.0001
	Result	*	*
With Constant & Trend	t-Statistic	4.597692-	6.414544-
	Prob.	0.0113	0.0005
	Result	*	*
Without Constant & Trend	t-Statistic	4.829327-	6.852144-
	Prob.	0.0001	0.0000
	Result	*	*
Rank		I (1)	I (1)

Table 5 indicates that the results obtained from the Phelps-Perron (PP) test were not significantly different from those obtained from the Dickey-Fuller (ADF) test. This is because the time series data for all variables were non-stationary at the original level, so their first differences were taken. It was observed that the data stabilized at a level of significance (1%, 5%) as the calculated (t) value exceeded the critical (t) value at the specified significance levels (1%, 5%, 10%). Additionally, the critical probability (Prob.) values were less than 5%, which supports the acceptance of the alternative hypothesis (H1: B≠0) that there is no unit root and the data is integrated of order I(1). The results of the stationary tests are consistent with each other, which strengthens the reliability of the data's stationarity.

Table 5 .The results according to the Phelps-Perron (PP) test

With Constant	Variables	LnM	LGDP
	t-Statistic	1.995728-	4.364000-
	Prob.	0.2856	0.0039
	Result	n0	
With Constant & Trend	t-Statistic	1.903564-	4.225301-
	Prob.	0.6088	0.0202
	Result	n0	*

With Constant	Variables	LnM	LGDP
	t-Statistic	1.995728-	4.364000-
	Prob.	0.2856	0.0039
	Result	n0	
Without Constant & Trend	t-Statistic	0.946428-	3.237781-
	Prob.	0.2929	0.0030
	Result	n0	*
With Constant	Variables	LnM	LGDP
	t-Statistic	4.677953-	15.60271-
	Prob.	0.0024	0.0000
	Result	*	*
With Constant & Trend	t-Statistic	4.600106-	17.09440-
	Prob.	0.0113	0.0001
	Result	*	*
Without Constant & Trend	t-Statistic	4.829327-	15.88665-
	Prob.	0.0001	0.0001
	Result	*	*
Rank		I (1)	I (1)

In order to determine the most appropriate formula for estimating the research model, two were estimated. The linear and double logarithmic formulas stand for these concepts; the latter is useful for assessing the correlation between imports and GDP, the dependent variable, while the former is more commonly used for other purposes. It offers the finest statistical indications compared to other formulae, thanks to its minimal lag time criteria (AIC, H.Q, SC).

Three criteria were used to determine the length of the slowdown: (AIC), Akaike info criterion (SC), and Hannan-Quinn H-Q, model and logarithmic (H-Q), as shown in Table (6). The value (AIC) with the length of the slowing time (1) is used to indicate the best value, which is the lowest result, and is utilised in the tests.

Table 6. Estimation results for choosing the optimal slowdown period

Slow down lag	H-Q	SC	AIC
0	97.88739	99.65823	99.8543
1	94.88618*	98.89648*	93.7863*

The link among the dependent variable, domestic product (GDP), and the independent (explanatory) variable, imports (M), is explained by the consequences for primary estimation of the (ARDL) model that are shown in Table 7. Based on the data, we can see that the coefficient of determination (R2) was 0.51, which indicates that the independent variables account for 51% of the variance in the dependent variable and that the other 49% is due to the influence of explanatory variables. According to the ARDL approach, the model that was selected for estimating the short-term and long-term parameters had a significance value of (16) in the (F) test, a corrected coefficient of determination ($\bar{R}2$) of 0.48, and a rank. Based on the criteria for ideal deceleration period (HQ, BIC, A I C), it is (1, 1, 1, 1), since the deceleration time was selected based on the lowest value of this criterion, A I C.

Table 7. Initial estimation results of the (ARDL) model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LnM(-1)	0.756826	0.242059	3.126623	0.0074
LnGDP	-0.023058	0.014185	-1.625517	0.1263
C	10842596	7684507.	1.410968	0.1801
R-squared	0.511309	Mean dependent var		31929129
Adjusted R-squared	0.487211	S.D. dependent var		15290899
S.E. of regression	12542168	Akaike info criterion		35.68588
Sum squared resid	2.20E+15	Schwarz criterion		35.83291
Log likelihood	-300.3299	Hannan-Quinn criter.		35.70049
F-statistic	4.890793	Durbin-Watson stat		1.624956
Prob(F-statistic)	0.024503			

The Bounds Test for cointegration was performed to assess the presence of a long-term equilibrium relationship (cointegration) between the domestic product (dependent variable) and the imports (explanatory variable) in the initial estimation model. The F-statistic was computed as part of the Bounds Test. The findings of the cointegration test are elucidated in Table 8.

Table 8. Consequences for co-integration test for a model of the domestic product variable based on bounds test

Test Statistic	Value	K
F-statistic	3.83	1
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
10%	3.02	3.51
5%	3.62	4.16
2.5%	4.18	4.79
1%	4.94	5.58

Table 8 shows that the calculated F-statistic was 4.54, which is higher than the critical tabular values of the upper and lower limits at a significance level of 2.5%. This means that the null hypothesis (H0) stating that there is no long-term equilibrium relationship between the variables is rejected, and the alternative hypothesis (H1) stating that the variables in the model are cointegrated is accepted. This means that there is a long-term equilibrium relationship from the set of explanatory variables to the dependent variable (Gross Domestic Product, or GDP). This necessitates making an estimate of the error correction parameter, as well as the short- and long-term responses, as shown in Table 9.

Table 9. Results of estimating short- and long-term parameters and the error correction parameter (ECM) of the (ARDL) model for the GDP variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10842596	7684507.	0.000000	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M(-1)	-0.243174	0.242059	-1.004606	0.3321
GDP	-0.023058	0.014185	-1.625517	0.1263
CointEq(-1)	-0.11	3.654334	2.654321	0.0011

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-0.094820	0.133428	-0.710641	0.4890
C	44587862	22126055	2.015174	0.0635

Imports play a crucial role in both the short and long term, as demonstrated in Table 9 . The coefficient CointEq (-1) for this model is (-0.11) and the probability value (0.0011) confirms this. This coefficient meets the two main criteria of being negative and having statistical significance. To attain long-term equilibrium, around 11% of the short-term errors are automatically rectified within a specific time frame, such as a year. Put simply, it takes approximately nine months for imports to reach their long-term equilibrium value. This means that previous periods deviate from the equilibrium and are corrected by 11% in the present period, acting as a speed of adjustment. This implies that the model's adaptation was relatively slow.

The impacts of imports on domestic products, both in the short and long term, were negative. This model offers a comprehensive explanation of the relationship by utilising economic theory and logical reasoning, as indicated by the data. Imports have a detrimental impact on domestic product in the short term, as indicated by the imports coefficient (M). In the short term, the elasticity coefficient reached -0.24, indicating that a 1% increase in imports led to a 24% decrease in Iraq's GDP. Consequently, Iraq's economy is seeing a decline in GDP as a result of the ongoing trend of importing various items, which is adversely affecting the country's competitiveness. It is crucial to examine any alterations in the data used for model estimation, as well as ensuring that both long-term and short-term parameter estimations remain stable and consistent with each other. Two tests were employed: one for the recursive residuals and the other for the cumulative sum of squares. Compute the sum of all the squares and verify if recursion is present (Cusum-SQ).

The ARDL model's estimated parameters demonstrate structural stability when the graphs of the CUSUM and CUSUMSQ tests fall inside the critical limits at the 5% significance level, leading to acceptance of the null hypothesis. The figures demonstrate this stability. The structural stability of the coefficients in the domestic product (ARDL) model was assessed by conducting two tests using imports as the independent variable. The results of these tests, shown by the graph of the two tests (CUSUMSQ), fell within the critical limitations framework at the 5% significance level, demonstrating that the coefficients exhibit structural stability. We posit that the estimated parameters of the ARDL model are all structurally stable, based on our working premise.

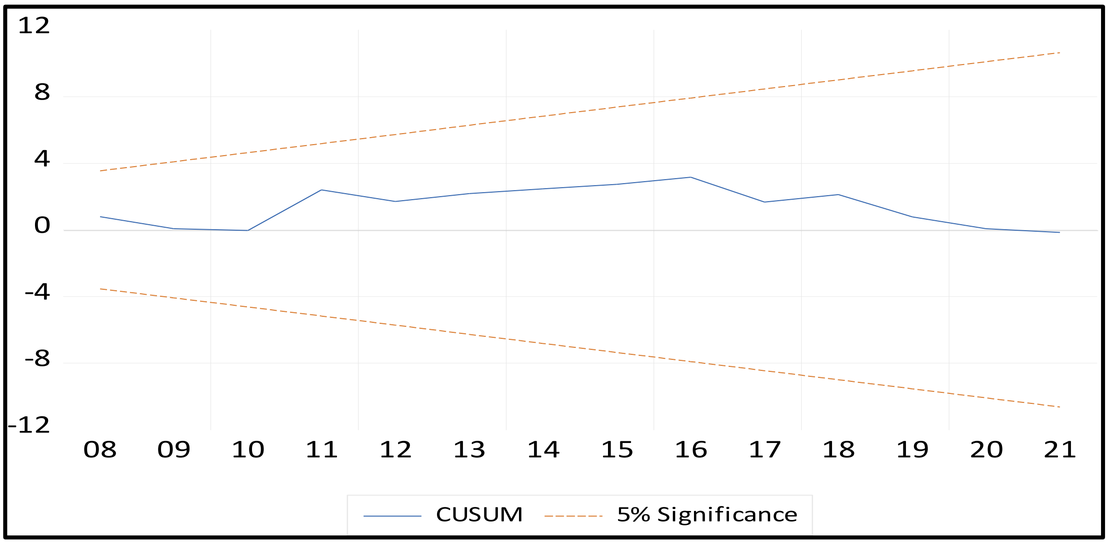

Figure 1. Testing the structural stability for coefficients of (ARDL) GDP model

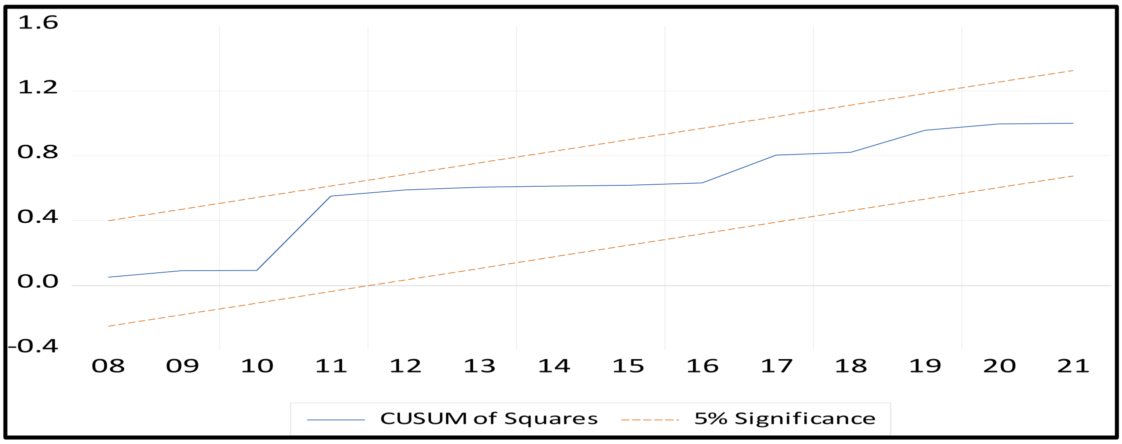

Figure 2. Testing the structural stability for coefficients of (ARDL) GDP model

Lakrange serial correlation factorial test (BGLM) is used to conduct this test: The dependent variable was one of the explanatory variables, and since it was time-regressed, we can use the LM statistic test to see if there is any autocorrelation in the series data. We are consent about null hypothesis because the combined probability of the F test and the chi-square statistic is greater than 5%. Specifically, a probability for the F statistic is 0.1321, and a probability for the chi-square statistic is 0.0877. Based on the residuals' serial correlation problem (H0:ρ=0), the model was estimated. Following the format of Table 10.

Table 10. BGLM test for the GDP model

		Breusch-Godfrey Serial Correlation LM Test	
F-statistic	2.407913	Prob. F(1,7)	0.1321
Obs*R-squared	4.868571	Prob. Chi-Square(1)	0.0877

The given import model does not exhibit heterogeneity of variance, as shown in Table 11 due to the fact that its computed F-statistic achieved (1.195840) at the probability level (Prob: 0.2926), therefore it may be accepted. A constant variance for the calculated model's random error term is a null hypothesis.

Table 11. Results of the static test of variance of error bounds (homogeneity of variance) imports

Heteroskedasticity Test: ARCH			
F-statistic	1.195840	Prob. F(1,19)	0.2926
Obs*R-squared	1.259123	Prob. Chi-Square(1)	0.2618

To make sure the model had adequate prediction performance during the study period, we utilise the Theil inequality coefficient test and test for sources of error after running the conventional test for structural stability of the model coefficients, as given in Table 12.

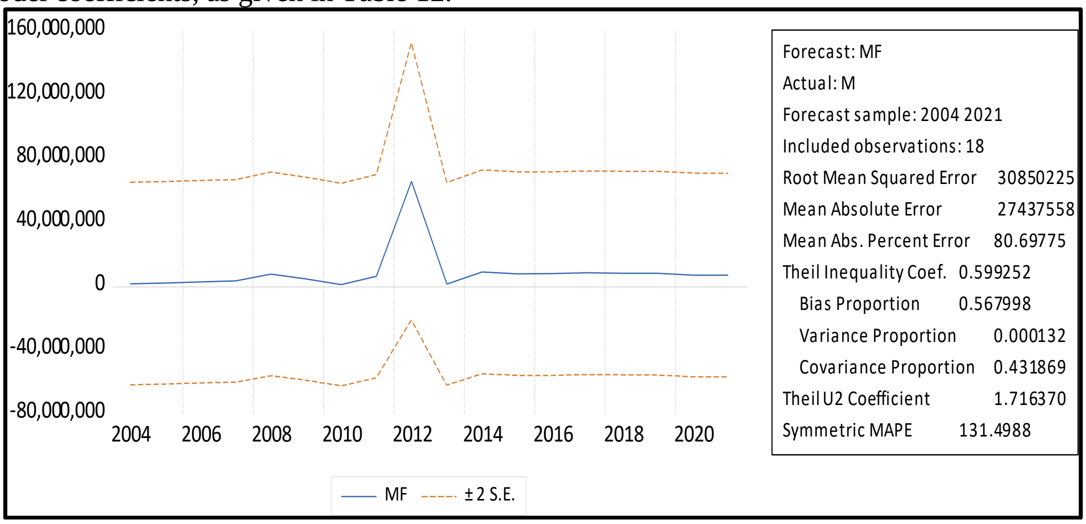

Figure 3. The predictive performance for unrestricted error correction model of an estimated model (ARDL)

The results depict that an estimated model has a great and worthy ability to predict, and the results can be used for future analysis, policy evaluation, and forecasting. They can also be used to find goals that increase the effectiveness of variables. Table (12) shows that a bias ratio (BP) is a smaller amount than the correct value (0.567), the variance ratio (VP) is less than the correct value (0.000), and the variance ratio (CP) is close to the correct value (0.431). Cybersecurity [12], cloud computing [13] and AI can be employed to boost the outcomes of this study.

4. Conclusions

The consequences for unit root stationary test, as per Phillips-Perron test (PP), were used to compare the null hypothesis (H_0: β=0) that states that a variable's time series is either not stationary or unstable (i.e., has a unit root)—with the alternative hypothesis (H1: β ≠ 0) that indicates that a time series is stationary. According to the results, the variables are not stationary at an initial level with or without the fixed limit and time trend, as well as at all levels without them. The exports variable, for instance, has a p-value of (0.0166), which is 5% lower than the critical magnitude. At both the 5% and 10% significance levels, the t-value of 2.949841 is higher than the critical values. Hence, an alternative hypothesis (H1: B ≠ 0) stating that the series for these time variables are stable and do not have a unit root can be accepted, and the null hypothesis can be excluded. To use the ARDL model for examining if there is a long-term equilibrium link (cointegration) between imports and domestic product, the dependent variable. The effect of imports on the domestic product was detrimental both immediately and over the long run. Based on the findings, this model provides an explanation of the relationship in terms of economic theory and logic. Import coefficient points to short-term negative effects on domestic product. In the near run, the elasticity value hit -0.24, which translates to a 24% drop in GDP for Iraq as a result of a 1% increase in imports. Therefore, Iraq's economy is seeing a fall in GDP due to the ever-increasing trend of importing goods of all types that has an undesirable impact on a country's competitiveness.

5. Recommendations

1. Meeting the challenges of increased competition while enhancing the country's industry and reaping the benefits of the private sector. Concurrently, in an effort to curb the influx of imported goods and byproducts, border inspections were stepped up and certain ports were shut down. Getting the main organization involved in quality control and standardization.

2. Make an effort to activate the customs tax law so that it can receive additional funding. Imports of production materials can have their customs taxes reduced and incorporated into the manufacturing process to boost domestic production. Develop the industrial, agricultural, and service sectors to diversify income sources and reduce reliance on oil revenues; increase customs taxes on imported items that compete with domestic production; and endeavor to safeguard domestic production through customs.

Declaration of competing interest

The authors declare that they have no any known financial or non-financial competing interests in any material discussed in this paper.

Funding information

No funding was received from any financial organization to conduct this research.

Author contribution

The author equally contributed in this study.

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