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## The Impact of Exchange Rate on the Gross Domestic Product (GDP) in Iraq for the period (2004-2022)

Wijdan Ogge Mohi\*

Department of Economics  
College of Administration and Economics,  
University of Baghdad, Iraq.

E-mail: [wjdan.muhi2102m@coadec.uobaghdad.edu.iq](mailto:wjdan.muhi2102m@coadec.uobaghdad.edu.iq)  
ORCID: <https://orcid.org/0009-0008-1131-9136>

\*Corresponding author

Samir Siham Dawood

Department of Economics  
College of Administration and Economics,  
University of Baghdad, Iraq.

E-mail: [dr.sameeralkafaji@coadec.uobaghdad.edu.iq](mailto:dr.sameeralkafaji@coadec.uobaghdad.edu.iq)  
ORCID: <https://orcid.org/0000-0003-4152-0152>

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### Abstract:

**Purpose:** Measuring the connection between the effect of the (EX) and GDP in Iraq.

**Theoretical Framework:** The research addressed the impact of the exchange rate on Iraq's gross domestic product. The research problem revolves around the lack of an exchange rate policy that stimulates investment and production as a result of the economic challenges that Iraq is suffering from, especially since the exchange rate is linked to the trends of the general budget and imports, which led to the weakness of the impact of this monetary instrument on the economy. Therefore, the research raises the problem of whether the exchange rate used in Iraq impacts the gross domestic product.

**Design/Methodology/Approach:** The research approach describes the topic to be investigated through scientific accreditation and depicts the results that have been adhered to. An inductive approach was adopted to explain the theoretical aspects of the research, verify the hypothesis, and achieve the desired objectives of the study. In addition, a modern econometric approach was used to demonstrate the effectuation of (EX) on the structure of imports and GDP. The program (EViews10) was used, and the data used extended between (2004-2022).

**Findings:** The (EX) indirectly affects the GDP, especially when the dinar is devalued against the dollar, increasing production costs. This results in higher prices for locally produced goods compared to imported ones, and due to competition, local production declines, thereby reducing GDP.

**Research, Practical & Social Implications:** We propose a future research agenda and highlight the analysis of the nature of the connection between the (EX) and GDP in Iraq.

**Originality/Value:** The current study adds scientific value to previous studies through its results, especially since the results indicated that the rise in the exchange rate leads to an increase in demand for oil exports. What distinguishes the study is that it examines the relationship between the exchange rate and the domestic product in an oil country like Iraq that suffers from distortions in the local economy.

**Keywords:** Exchange Rate, Gross Domestic Product, Official Exchange Rate.

**JEL Classification:** E22, E23, F13, F31.

**Authors' individual contribution:** Conceptualization — W.O.M ; Methodology — W.O.M.; Formal Analysis — W.O.M. & S.S.D.; Investigation — S.S.D. ; Data Curation — W.O.M. & S.S.D ; Writing —Original Draft — W.O.M.; Writing — Review & Editing — S.S.D.; Visualization — S.S.D.; Supervision — S.S.D.; Project Administration — S.S.D.

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## 1. Introduction :

Exchange is a process that appears when various currencies are exchanged among themselves. Each country's currency is used in internal payment operations (Al-Ajrawi, 2023). Exchange rate policy is an important tool in linking the national economy to the global economy (Almashhadany & Abdullah, 2022); (Babubudjnauth & Seetanah, 2021). The exchange rate between countries is determined by assessing the value of their respective product and service markets (Burstein & Gopinath, 2014); (Gabaix & Maggiori, 2015). The use of foreign currency makes the exchange rate risk in international investments more complicated. (Nopiana et al., 2022). Foreign exchange is crucial in many economic relationships between countries (Ramat et al., 2022); (Fenjan & Salman, 2021). The initial efforts to examine (EX) behavior were undertaken by Dornbusch (1976) and Rogoff (1983) (RAKSONG & SOMBATTHIRA, 2021). The (EX) is one of the factors that affect exports and imports (Sajida et al., 2023); (Lisdiani et al., 2021); (Ani & Udeh, 2021); (Ewubare & Ushie, 2022). The value of a foreign currency relative to local currency is essential for comprehending the economic growth of all countries (Ramat et al., 2022); (Ameen Abdullah, 2023). With a flexible exchange rate, real GDP should have a weaker reaction to economic shocks (Bedin et al., 2021). A country's GDP is the total value of goods and services produced within a year. (Toni & Simorangkir, 2022). The increase in Gross Domestic Product (GDP) is a vital indicator of a society's economic performance, and the factors affecting it have been thoroughly examined for many years (Najafi Bousari et al., 2023). Studies indicate that GDP responds significantly to changes in the exchange rate and that devaluing the exchange rate will encourage net exports and thus increase domestic processing (Hussain et al., 2019). The (EX) are independent variables, and the GDP is Dependent variable. The impact of the (EX) on (GDP) should be analyzed within a country's economic system, as the relationship between these indicators varies across different economies. Consequently, several theoretical analyses have been conducted to examine the influence of the (EX) on (GDP) (Gafurov et al., 2022). The problem of the research is that the lack of an exchange rate policy that stimulates investment and production and the link of the (OEX) to the trends of the general budget and imports led to the weak effect of this monetary tool in changing the structure of imports in a way that stimulates real production. Therefore, the problem concerns whether the exchange rate used in Iraq impacts changing the structure of imports and production. The importance of studying and probing the influence of the (EX) on both the structure of imports and the (GDP) in Iraq stems from the fact that it helps to understand better how the (EX) affects the work of the Iraqi economy and what are the factors affecting its performance. It also contributes to reaching effective economic policies within the framework of the results that will be achieved, supporting the achievement of economic stability and the advancement of national productive sectors, in addition to designing economic policies that mitigate the negative effects of exchange rate fluctuations on members of society, ensuring the improvement of their well-being.

## 2. Literature Review and Hypothesis Development:

The study (Fofanah, 2020) indicates that (EX) volatility has a Small Impact on the economy. The survey executed by (Al-Bayati et al., 2022) aimed to analyze the Consequence of (EX) Variations and Escalation of prices on the (GDP) in Iraq for the period 1988-2020. The results indicated that an increase (1%) in the official (EX) would lead to a decrease in the (GDP) by an amount of (7.666%). The method used recently is to devalue the local currency. An

increase in the parallel (EX) (1%) will lead to an increase in the (GDP) (5.785%). In a study conducted by (Putri et al., 2022), the variables of (EX) and real GDP significantly impact financial deepening. In the short term, real GDP will only have a significant impact on financial expansion, while (EX) does not have any significant impact. A study (Khudair. M. Y. & Hassan. W. A., 2022) indicated that the (EX) is a tool linking local economies to international economies. It is also a tool linking commodity prices in the local economy to their prices in the global market. A study (Jazza & Faraj, 2022) indicated that the (GDP) in Iraq witnessed during the past thirty years tangible developments, and fluctuations between increases accompanied these developments and decreases, and this is considered a natural matter due to the impact of the circumstances that passed through Iraq during those years, and that the size of the gross domestic product at current prices took An upward trajectory to reach \$178.198 billion in 2020. A study (Taha & Abdullah, 2023) indicated that there is a balanced relationship between the (EX) and the (GDP), while the relationship of the exchange rate to inflation is related to the exchange rate in the hands of the Central Bank of Iraq and the lack of interference by other parties in its work. (Direct) for the research period (2004-2020). In a study conducted by (Utouh & Tile, 2023) in Tanzania, the results of examining the relationship between foreign direct investment, the nominal (EX), real GDP, and fixed capital indicated that all these variables unidirectionally affect foreign direct investment flows in Tanzania. The study (Zahra et al., 2023) addressed the impact of exchange rates on external government debt in this study. A study (Jamil et al., 2023) indicated that the exchange rate has a positive impact on economic growth, and the (EX) and inflation have a significant negative impact on economic growth, and a decrease in GDP will lead to an increase in inflation, as the GDP decreases when the (EX) rises. A research study (Ndou et al., 2024) carried out in South Africa discovered that, since 2008, elements such as (EX) volatility, global demand, investment, imported raw materials, consumption, consumer price levels, and export quantities have reduced the positive impact of currency depreciation on GDP. From this, we propose the following hypothesis: The exchange rate affects Iraq's GDP through its impact on net exports.

### 3. Methodology:

The research methodology outlines the investigation of the topic through scientific validation and presentation of results. To test the hypothesis and achieve the research objectives, the inductive method was employed to elucidate the theoretical components of the study. Additionally, a contemporary econometric technique was utilized to illustrate the impact of the exchange rate on the composition of imports and GDP. The software EViews12 was employed, and the data spanned from 2004 to 2022. Chart (1) depicts the nature of the relationship between the two research variables:

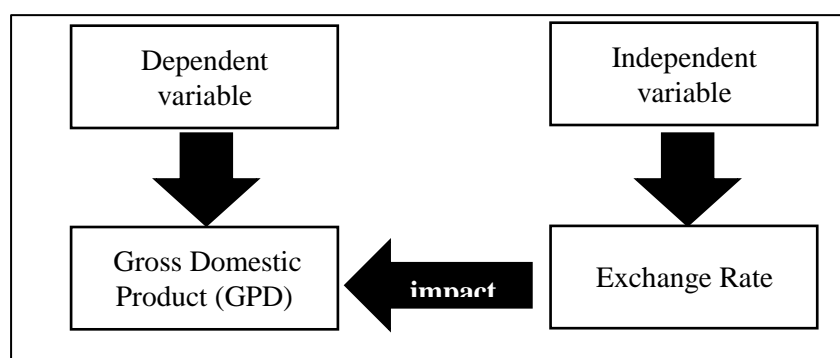


Figure 1: Hypothetical diagram of the research.

Source : researcher.

The stage of describing the econometric model is deemed crucial, as it can substantiate the analytical findings by utilizing the most precise econometric methods, along with various tests that reinforce the results of scientific research. The econometric outcomes can also

delineate the nature of economic relationships between the studied variables in a systematic and mathematical manner, consistent with economic theory, to reach conclusions that either confirm or refute the hypothesis. The statistical software EViews12 was employed, and after performing stationarity tests, it was determined that all the data were stationary at their first difference. The Autoregressive Distributed Lag (ARDL) model was then applied, using semi-annual data for the period from 2004 to 2022. The data was categorized into two independent variables: the first representing the (EX) exchange rate. The dependent variable was the (GDP) at existing prices, as illustrated in the following equations:

$$GDP = f (EXR, EXM)$$

$$GDP = B_0 + B_1x_1y_1 - B_2x_2y_2 + u_t$$

**Table 1 :** Variables of the Econometric Model

Variable symbol	Variable name	Variable type
EXR	Official exchange rate	independent
EXM	Parallel exchange rate	independent
GDP	Gross domestic product at current prices	continued

**Source :** Derived from the researcher’s analysis based on the model description.

#### 4. Results:

##### 4.1 Evaluating the Autoregressive Distributed Lag ARDL Model:

The results of the time series page test stability related to both the official exchange rate and the parallel exchange rate as two independent variables, in addition to GDP as a dependent variable, showed that all variables are fixed at the first difference I(1) . which is the condition that allows the application of the distributed self-decline model (ARDL), so these variables can be tested according to this model and their results are shown in the following table:

**Table 2:** Results of testing the ARDL model for the Gross Domestic Product (GDP) model

Variable	Coefficient	Std. Error	t-Statistic	Prob	
GDP(-1)	0.851668	0.161674	5.267820	0.0000	
GDP(-2)	0.482372	0.224222	2.151312	0.0406	
GDP(-3)	-0.429100	0.202569	-2.118292	0.0435	
EXR	895875.2	304011.9	2.946843	0.0065	
EXR(-1)	-901997.0	303074.0	-2.976161	0.0061	
EXM	-680830.4	324726.7	-2.096626	0.0455	
EXM(-1)	740625.6	311560.6	2.377148	0.0248	
C	-42263015	65221927	-0.647988	0.5225	
Adjusted R-squared	0.879585	Durbin-Watson stat	2.127111	Prob (F-statistic)	0.00000 0

**Source:** Outputs of (EViews10).

According to Table (2) and the (ARDL) test model for the independent and dependent variables, the degrees of the slowdowns were determined. The duration of the slowdown for the dependent variable was two degrees, while the share of the independent variables was one degree.

The results in the Table are also higher; the results of the R-squared test showed that the two variables explain 87% of the variations in the dependent variable, and 13% of the variations are explained by factors not included in this model. Since the modified R-squared value is lower than the Durbin-Watson statistic in this test (2.12711), the model is devoid of the problem of self-association and has a strong interpretive ability.

The statistical value obtained by F -36.47946 means that it is at a moral level below 0.05%, which indicates that the model is statistically significant.

#### 4.2 The results of the boundary test for joint integration (Bound Test):

The Bound test is one of the most important types of tests to detect whether there is a balanced relationship between the two independent variables (official exchange rate - parallel exchange rate) and the dependent variable (GDP) in the long term, and this is done by making a comparison between the F statistic and the minimum and higher critical values as shown in the following Table.

**Table 3:** Bound Test results between the official and parallel exchange rates as independent variables and the gross domestic product as a dependent variable (GDP)

Test Statistic	Value	K
F-statistic	5.070021	2
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
%10	2.63	3.35
%5	3.1	3.87
%2.5	3.55	4.38
%1	4.13	5

**Source:** Outputs of (EViews10).

Table 3 shows that the F-statistic value of 5.070021 exceeded the highest critical value of the test, at 3.87 at a moral level of 0.05%. Accordingly, we reject the hypothesis of H0, which states that there is no common integration relationship between independent and dependent variables. We accept the alternative hypothesis H1, which emphasizes that there is a common integration relationship, which is a long-term equilibrium relationship between both the two independent variables (official exchange rate - parallel exchange rate) and the dependent variable (GDP).

#### 4.3 Assess estimated (short-run) parameters and the unrestricted error correction term:

This test reveals the extent to which the two independent variables affect the dependent variable and the nature of the relationship between these variables during the short period. As for the term error correction, it explains the amount of speed at which the balance returns in the long term, and it can be explained in the following table (4):

**Table 4:** Results of the Error Correction Model and Short-Run Relationship for the Gross Domestic Product (GDP) Model

Variable	Coefficient	Std. Error	t-Statistic	Prob
D (EXR)	895875.2	268807.0	3.332783	0.0025
D (EXM)	-680830.4	281768.9	-2.416273	0.0227
CointEq(-1)*	-0.095060	0.036923	-2.574556	0.0158

**Source:** Outputs of (EViews10).

Table (4) shows that there is a direct relationship in the short term between the independent variable (EXR) and the dependent variable (GDP), as increasing (EXR) by one unit leads to an increase in (GDP) by (895875.2) at a significance level (Prob = 0.0025) with other factors remaining constant. The reason for this is that the decrease in the official exchange rate of the Iraqi dinar led to an increase in demand for oil exports, and since the GDP in Iraq depends largely on oil exports, this increase led to an increase in the GDP. The results also showed an inverse relationship in the short term between (EXM) as an independent variable and (GDP) as a dependent variable, as increasing (EXM) by one unit leads to a decrease in (GDP) by (-680830.4) at a significance level (Prob = 0.0227) with other factors remaining constant. This is because the Iraqi economy relies heavily on imports to meet the local market's needs. Therefore, any reduction in the value of the local currency, i.e., a reduction in the parallel exchange rate of the dinar against the dollar, leads to an increase in the cost of imports and, thus, an increase in prices, which has caused a reduction in the growth of the gross domestic product.



In addition to the above, the unconstrained error correction (UECM) results showed that it was also significant and reached  $-0.095060$  within the significance of  $\text{Prob} = 0.0158$ . This reflects the existence of a short-term equilibrium relationship between the independent variable and the dependent variable. The value of the error correction coefficient also means that (9%) of the equilibrium imbalance (short-term imbalance) in the previous period ( $t-1$ ) can be corrected in the current period ( $t$ ) towards the long-term equilibrium relationship as a result of any shock or change in the future.

**Table 5:** Estimation results of the error correction model and the long-term relationship of the gross domestic product (GDP) model

Variable	Coefficient	Std. Error	t-Statistic	Prob
EXR	2438723.	8323146.	0.293005	0.0215
EXM	-1357447.	7240935.	-0.187468	0.0325

**Source:** Outputs of (EViews10).

From Table (5) there is a direct relationship in the long run between (EXR) as an independent variable and (GDP) as a dependent variable, as increasing (EXR) by one unit leads to an increase in (GDP) by (2438723) at a significance level ( $\text{Prob} = 0.0215$ ) with other factors remaining constant and for the same reasons mentioned above in the short-term analysis. The results also showed an inverse relationship in the long-term wage between (EXM) as an independent variable and (GDP) as a dependent variable, as increasing (EXM) by one unit leads to a decrease in (GDP) by (-1357447) at a significance level ( $\text{Prob} = 0.0325$ ) with other factors remaining constant. Through testing the estimated parameters and the unrestricted error correction coefficient, it was concluded that the official exchange rate had the greatest impact on the GDP in the short and long term.

#### 4.4 Perform diagnostic tests on the estimated residuals

It is one of the tests used to determine the absence of a problem of variation in variance in the residuals within the presented model, and this can be demonstrated through the following table:

##### 4.4.1 Test for heteroscedasticity problem (ARCH Test):

This test is used to determine whether the estimated model is free from the problem of heteroscedasticity in the residuals, as illustrated in the following table:

**Table 6:** Results of the Variance Homogeneity Test: Error Bounds (Homoscedasticity) for the Gross Domestic Product (GDP) Model

Heteroskedasticity Test: ARCH			
F-statistic	1.857510	Prob. F (1,34)	0.1819
Obs*R-squared	1.864891	Prob. Chi-Square (1)	0.1721

**Source:** Outputs of (EViews10).

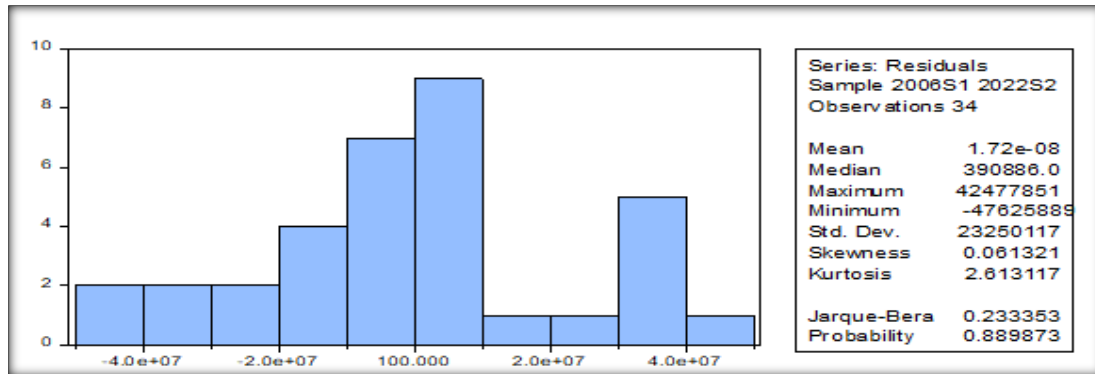
Through the results of the table above, we have shown that the current model is free of the problem of variance difference, because the F statistic has reached a probability level of 0.1819, which is higher than 0.05.

Accordingly, we accept the null hypothesis that there is no variance between the random residuals and reject the alternative hypothesis, which states that there is a difference in the variance between these random residuals.

Based on the above, the results of this test confirm the accuracy and validity of the results of the ARDL model

#### 4.4.2 Testing for the normality of the model's distribution:

This test is employed to confirm that the estimated model is free from the problem of non-normal distribution of residuals, as follows:



**Figure 2:** Outcomes of testing the normal distribution problem for the Gross Domestic Product (GDP) model

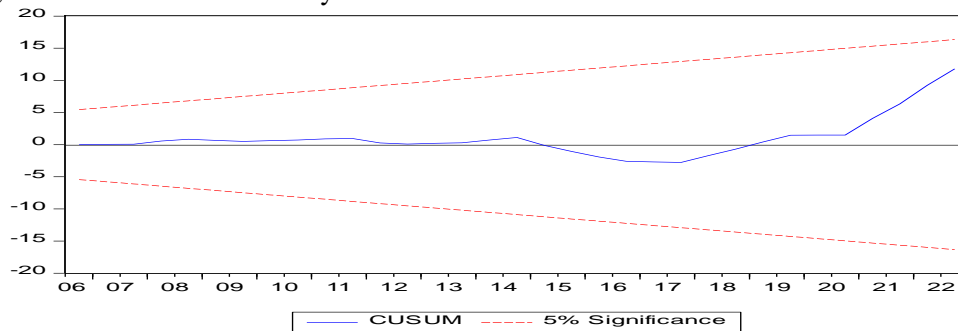
**Source:** Outputs of (EViews10).

Based on these results, we can accept the null hypothesis, which states that there is no problem with the normal distribution of random residuals, and thus we reject the alternative hypothesis, which states that this problem exists in random residuals.

In addition to the above, this test confirms the validity and accuracy of the results of the ARDL model

#### 4.4.3 Stability Tests:

The figure illustrates the cumulative sum (CUSUM) test of the residuals of the research model. It is evident from the figure that the model of the study remains stable throughout the research period, as the continuous and wavy line does not exceed the critical dotted boundaries.



**Figure 3 :** Cusum test for the cumulative sum of residuals

**Source:** Outputs of (EViews10).

### 5. Conclusion:

The exchange rate policy followed in Iraq affects the gross domestic product through its impact on the structure of imports and exports, but it did not stimulate real production by supporting capital and intermediate imports, nor did it reduce luxury consumer imports in particular.

The reason for opening up to foreign markets after 2003 is the phenomenon of declining GDP and the trend towards increasing imports from abroad to meet local demand, as goods are cheaper and the quality is higher. This phenomenon is one of the reasons for the decline in GDP. The standard analysis results showed the existence of a short-term equilibrium relationship between the independent variable EXR and the dependent variable GDP, that they are directly related in the short term, and that the relationship is directly related between them in the long term.

The standard analysis results also showed that there is a short-term equilibrium relationship between the independent variable EXM and the dependent variable GDP, that they are inversely related in the short term, and that the relationship between them is inverse in the long term.

The statistical analysis results indicated that the standard model is free from all statistical problems, providing accuracy to the model.

**Authors Declaration:**

Conflicts of Interest: None

-We Hereby Confirm That All The Figures and Tables In The Manuscript Are Mine and Ours. Besides, The Figures and Images, which are Not Mine, Have Been Permitted Republication and Attached to The Manuscript.

- Ethical Clearance: The Research Was Approved by The Local Ethical Committee in The University.

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