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# The Impact of Aggregate Supply Fluctuations on Inflation in Iraq During the Period (2004-2023): An Empirical Study

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**Abstract:**
This research examines the relationship between aggregate supply and inflation in Iraq during (2004-2023) through deviations in aggregate supply that lead to changes in output and inflation. The core issue of the research lies in how any change in aggregate supply results in a shift of the aggregate supply curve from its initial position. This study employed a deductive methodology, theoretical frameworks, descriptive and quantitative assessments, and econometric techniques to analyze the connection between aggregate supply, which is treated as a dependent variable, and inflation, categorized as the independent variable. The findings of the analysis validated the hypothesis and confirmed a statistically significant association between the explanatory variable, identified as aggregate supply, and the dependent variable, recognized as inflation. Additionally, we outline a prospective research agenda and highlight the governance of oil revenues that aid in diversifying income sources to bolster resilience against shocks to aggregate supply. The core issue of the research lies in how any change in aggregate supply results in a shift of the aggregate supply curve from its initial position. This study employed a deductive methodology, theoretical frameworks, descriptive and quantitative assessments, and econometric techniques to analyze the connection between aggregate supply, which is treated as a dependent variable, and inflation, which is Categorized as the independent variable. The findings of the analysis validated the hypothesis and confirmed a statistically significant association between the explanatory variable, identified as aggregate supply, and the dependent variable, recognized as inflation. Additionally, we outline a prospective research agenda and highlight the governance of oil revenues that aid in diversifying income sources to bolster resilience against shocks to aggregate supply.
**Keywords:** Aggregate Supply, Inflation, NARDL, Oil Revenues, Iraq

## 1. Introduction:

The importance of the research lies in the fact that changes in aggregate supply affect the general level of prices. The research hypothesizes that aggregate supply has a clear effect on inflation and that the problem of the research stems from the fact that the Iraqi economy is one-sided and that any changes in oil prices will affect aggregate supply and then inflation. The research aims to clarify the effect that changes in aggregate supply have on inflation.Aggregate supply represents the geometric locus of a set of combinations that achieve equilibrium between the total output that businesses wish to produce and sell and the general level of different prices during a period of time usually a year (Yeva Nersisyan Franklin et al., 2022) Inflation also refers to the continuous rise in the general price level, as any deviation in aggregate supply leads to a change in the level of inflation from its original level on the one hand (Jalal Ali et al., 2024) and a displacement of the level of aggregate output from its original level on the other hand (Downing et al., 2012) The main reason for the deviation in aggregate supply is fluctuations in global oil prices, the weakness of the currency value, macroeconomic fluctuations, expansionary monetary policies, and the rise in commodity prices due to increased demand in emerging markets (Stiglitz & Regmi, 2022) In light of the shocks witnessed by the global economy, this leads to a deviation in aggregate supply (Arnold & Auer, 2015) Increases in the level of inflation may lead to a reconsideration of how to build economic policies to limit inflation on the one hand and maintain acceptable levels of output on the other hand (Faisal Hasan Shoman & Muneer Ismaeel, 2024) because any combination outside the aggregate supply curve represents a deviation in aggregate output and inflation from their desired levels (Touche, 2023) and these factors combined are What is known as aggregate supply shocks that shift the aggregate supply curve either to the right in the case of an increase or to the left in the case of a decrease (Abdallah & Chemise, 2021) To achieve this goal, the relationship between aggregate supply as a dependent variable and inflation as a dependent variable in the Iraqi economy is estimated and measured (Badwan, 2022) The extent of the impact of aggregate supply shocks on inflation in this economy is tested (Nasir et al., n.d.2019) The research uses the nonlinear autoregressive distributed gap (NARDL) model for this purpose (Yousuf Li & Junjie Guo, 2022), The time series of all research variables were stable at the first difference I(1) according to the Phillips-Perron test (Massudi zakarea, 2023) based on measuring the relationship between aggregate supply and inflation for the Iraqi economy during the study period extending from 2004 to 2023 (AL-Batran, 2022) This is the period during which reliable data can be obtained on all research variables. The research found a long-term equilibrium relationship between Aggregate supply as a dependent variable and inflation as a dependent variable (Moftah AIMER, n.d. 2020), confirming the existence of this relationship and the impact of aggregate supply shocks on inflation during the research period (Dabashi et al., 2022). Monetary policy is one of the most important tools for achieving stability and general economic balance. It is one of the most widely used tools in economic policy (Maize Guider, 2010). However, its success is linked to its accuracy and proper use. Monetary policy has recently occupied an important position among other economic policies, and its role has become crucial in influencing various economic changes (Abd at Abdelwahab, 2015). Monetary policy works to influence inflation through its quantitative and qualitative tools (Blumenbach Hanan, 2022) because the decline in inflation rates and their stability at low rates expresses an improvement in the standard of living of members of society (Bernanke & Mishkin, 1997). After all, this will push local price levels towards stability (Salih Issa et al., 2018), (Section 1 explains the introduction to the research, Section 2 reviews the relevant literature, Section 3 analyzes the methodology that was used, Section 4 extracts the research results, Section 5 discusses the research findings, and Section 6 shows the research conclusions).

## 2. Literature Review and Hypothesis Development

Study (Rizgar Abdlkarim Abdlaziz and others, 2022) The study aims to show the impact of oil shocks (negative or positive) on real economic and financial variables, inflation and unemployment in the Iraqi economy for the period (1990-2020) in an attempt to identify the impact of these shocks on them and to show the extent of their compatibility with economic theory.

Study (Masoud & Twaite, 2024) This paper aims to investigate and analyze the effectiveness of monetary policy in achieving economic stability for Libya through the channel of exchange prices in both official and black markets, using annual data from 1980 to 2020.

Study (AL-Jumaili, 2024) This research aimed to study the impact of oil price shocks in the global market on some indicators of the Iraqi economy for the period (2004 - 2020).

Study (Jawad et al., 2023) The research aims to analyze the relationship between oil prices and human capital, as well as to measure and analyze the impact of crude oil prices on human capital in Iraq for the period (1970-2021) using the ARDL model, and to estimate the impact of a shock to the Iraqi economy on the relationship between crude oil prices and human capital in Iraq The investigation revealed a significant long-term inverse correlation between global crude oil prices and human capital in Iraq.

Study (Ahmad & Eric Pentecost, 2012) This manuscript employs a trivariate structural VAR fram ework with a longterm identification strategy, similar tothe Blanchard and Quah approach, to disc ern external and domestic supply and demand disturbances across 22 African nations from 1980 t o 2005.

Study (Mkiyes, 2023) The purpose of this publication is to evaluate the influence of variations in the real exchange rate of the Syrian pound on essential macroeconomic indicators within the Syri an economy from 1961 to 2020.

Study (Kryeziu & Durguti, 2019) The research intended to investigate the effect of inflation on ec onomic growth in Egypt during the years (1974-2023) across both long- & short-time frames. The study utilized the non- linear autoregressive distributed lag (NARDL) model to assess long- term associations, while employing the error correction model (ECM) to analyse short-term relationships. The long-term findings indicated a non- linear correlation between inflation and economic growth, revealing that positive inflation shocks have beneficial impacts on economic growth, whereas negative inflation shocks adversely affect economic growth.

Study (AL-Khadhrawi, 2024) This article seeks to examine the influence of monetary policy shocks on the elements of aggregate demand and inflation in Egypt.

Study (Mahmoud Dagher, 2014) The manuscript aims to quantify the effect of monetary policy on maintaining price stability by exploring the causal relationships among the money supply, inflation rate, and exchange rate.

Study (Ayad ALI Al- Tamimi & Hatem Alwan, 2024) The research aspires to illustrate the significance of public spending policies in enhancing GDP by identifying the contributions of spending policy indicators to GDP throughout the research timeframe.

Study (Fadhil Hamad Al- Qaisy & Yahiya Saleh Al- Qubaisi, 2024) The study aims to assess and quantify the current state of the Iraqi economy for the period (2004-2021) by applying the concept of financial sustainability and its indicators to economic growth.

Study (AL- Qubaisi, Mohamad Salih, 2018) This analysis endeavours to explore the connection between imported inflation and international trade within the Iraqi economy over the years (1990-2015) using yearly data, To achieve the objectives of the study, statistical and standard economic techniques were employed via the NARDL model, which is designed to illustrate the non-linear connections due to the nature of most economic relationships being non- linear, in addition to elucidating the positive and negative ramifications of imported inflation.

From this, we propose the following hypothesis:

H.1 Negative aggregate supply shocks affect the increase in inflation and the decrease in output in Iraq.
H.2 Positive aggregate supply shocks affect the decrease in inflation and the increase in output in Iraq.

## 3. Methodology

**3.1.** The Sample The temporal framework for the study was established for the timeframe (2004,2023) concerning the Iraqi economy, with data gathered from the Iraqi Ministry of Finance along with the Central Bank of Iraq.

**3.2.** Variable Measurement: To fulfill the research aims and validate its hypothesis, the study utilized deductive reasoning anchored in theoretical foundations, employing all data and variables to assess the influence of (aggregate supply as the independent variable) and (inflation as the dependent variable) in Iraq. A collection of statistical examinations will be conducted within the NARDL model to interpret the data and evaluate the hypotheses. The selection of aggregate supply in Iraq during the period (2004-2023) is due to its significant impact on inflation.

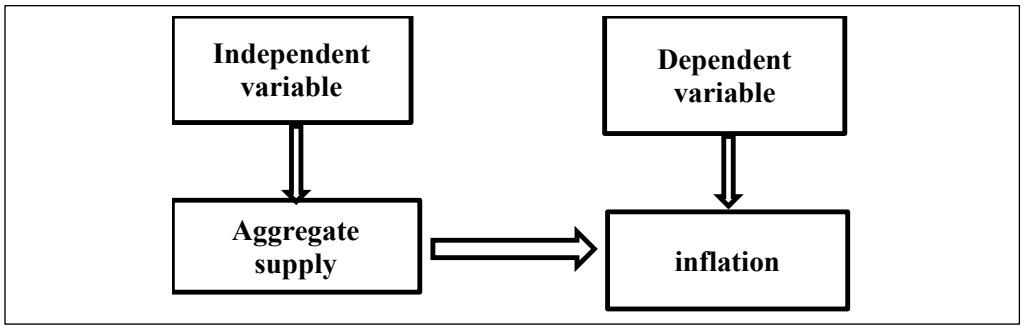


**Figure (1):** The nature of the association between the two research variables:
**Source**: Prepared by researchers

The delineation of the standard model stage is regarded as a crucial phase that can substantiate the outcomes of the analytical component. This is achieved using the most precise standard methods and an array of tests that support the outcomes of scientific research. Furthermore, the standard results can elucidate the nature of the economic relationships between the examined variables in a systematic and mathematical manner, aligned with economic theory. This assists either in substantiating or discrediting the hypothesis. The statistical software (Eviews12) and the nonlinear distributed lag autoregressive model (NARDL) were employed. Following the execution of stability assessments, it was determined that all data exhibited stationarity at the first difference. The annual data for the time (2004,2023) was utilized, categorizing the data into an independent variable (Aggregate supply) and a dependent variable (inflation), as outlined in the subsequent equations:

$$\boldsymbol{INF} = \int(\boldsymbol{AS})$$

$$INF = a + bAS + ut$$

*INF: Inflation*
*AS: Aggregate Supply*
*a, b: Model Parameters*
*ut : Random Error Limit*

### 3.3. Conceptual And Theoretical Presentation of Research Variables:

**3.3.1.** Aggregate supply shocks: Aggregate supply shocks can be defined as external events that shift the supply curve from its position and push it out of equilibrium. They can also be defined as a change in one of the components of the aggregate supply function, leading to a change in aggregate supply. For example, a rise in oil prices leads to higher costs, which leads to a decline in output and a decline in aggregate supply. They can also be defined as a sudden change in the cost of production factors or productivity, leading to sharp increases in aggregate supply. They can also be defined as a disruption in aggregate supply resulting from a deterioration in variables beyond internal control, such as an unexpected shortage of imported production inputs or a deterioration in climatic conditions that the government has no direct influence over. This disruption will lead to a change in production costs and a shift in the total supply curve. (Sullivan And others., 2006)

**3.3.2. Inflation:**

It is defined as the increase in aggregate demand over aggregate supply, which leads to continuous increases in prices measured by changes in price indices. This increase in prices occurs in all goods and services, but at different rates (i.e., they do not all increase at the same rate). The debtor benefits from it, while it harms the creditor. This concept continued until the thirties of the last century, then it began to gradually lose its importance with the emergence of Keynesian ideas and modern trends in monetary analysis. (Juma., 2000)

**Table (1):** Time series data for variables used in the standard model.

| Years | inflation (%) | Aggregate supply (million dinars) |
|---|---|---|
| 2004 | 26.9 | 53378623.4 |
| 2005 | 36.9 | 65722322 |
| 2006 | 53.2 | 73384708.3 |
| 2007 | 30.7 | 76980499 |
| 2008 | 2.7 | 112206388.9 |
| 2009 | -2.8 | 119616443 |
| 2010 | 2.5 | 121848367.9 |
| 2011 | 5.6 | 160108229 |
| 2012 | 6.1 | 156377930.6 |
| 2013 | 1.9 | 187070825 |
| 2014 | 2.2 | 192742030.3 |
| 2015 | 1.4 | 178065163.8 |
| 2016 | 0.5 | 186877249.8 |
| 2017 | 0.2 | 170362115.2 |
| 2018 | 0.4 | 192549063 |
| 2019 | -0.2 | 186575321.3 |
| 2020 | 0.6 | 170716519.6 |
| 2021 | 6 | 184172789.3 |
| 2022 | 5 | 207849718.5 |
| 2023 | 4.5 | 214510520.2 |

**Source:** Republic of Iraq, Ministry of Planning and Development Cooperation, Central Organization for Statistics and Information Technology, Directorate of National Accounts, and Department of Human Development.

**4. Results:**

A stationary test for time series on the standard model variables was conducted to assess the degr ee of stationarity in the time series data of the estimated standard model.

The Phillips-Perron (P.P) test was utilized, yielding the following results:

**Table (2):** Results of the Phillips-Perron (P.P) unit root test

| Variable | Level | | | First difference | | |
|---|---|---|---|---|---|---|
| | Fixed limit only | Flat bound and general trend | Without a fixed border or a general trend | Fixed limit only | Flat bound and general trend | Without a fixed border or a general trend |
| | Prob* | Prob* | Prob* | Prob* | Prob* | Prob* |
| AS | 0.3843 | 0.7051 | 0.9674 | 0.0006 | 0.0019 | 0.0003 |
| INF | 0.5215 | 0.7506 | 0.0853 | 0.0587 | 0.0090 | 0.0056 |

**Source:** The researcher's analysis hinges on the outputs from the statistical program EViews 12.

It is observed in Table (2) that all variables investigated were non-stationary at their initial level I (0), indicating the presence of a unit root, which is corroborated by the value of Prob)) being greater than (5%). Upon taking the first difference I (1) of the variable series data, it becomes evident that they exhibit stationarity. Consequently, the null hypothesis is rejected, and the alternative hypothesis is accepted, confirming that the time series is stationary at first difference I (1).

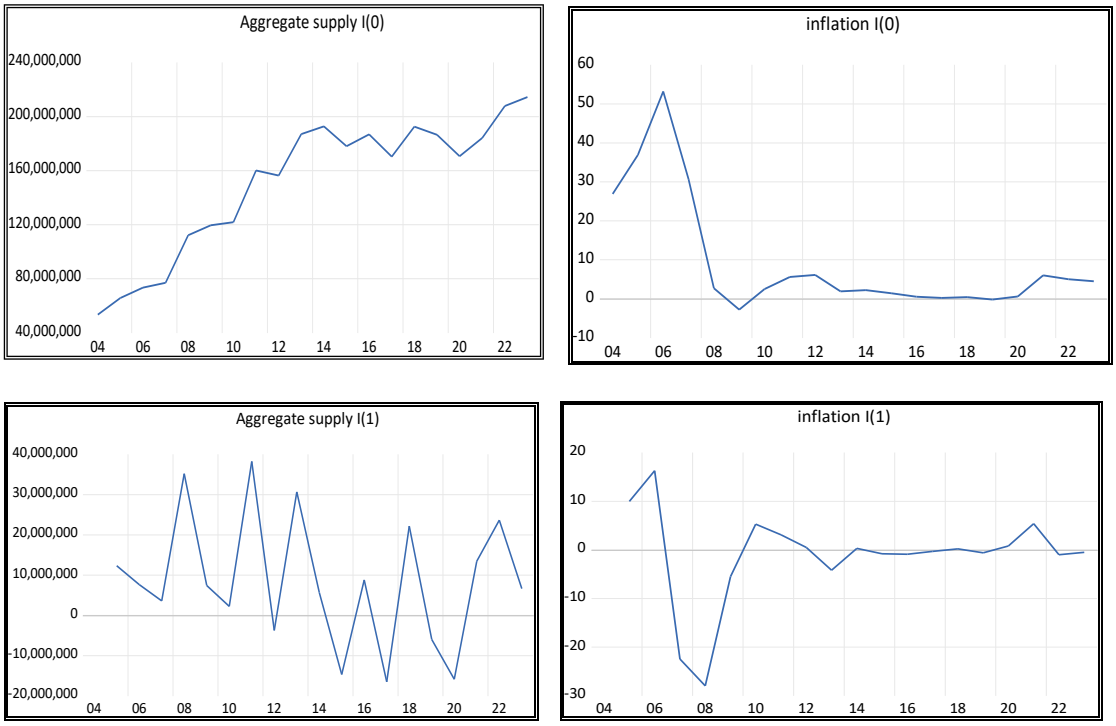


**Figure (2):** The time series is stationary at its original level I (0) and the first difference I (1).
**Source:** The researcher's analysis hinges on the outputs from the statistical program EViews 12.

**4.1. The relationship between aggregate supply and inflation using the NARDL model:**

It became clear through the results of the time series stationarity test for the variables under study, which all stationary at the first difference I(1) according to the Phillips-Perron (P.P) test, that the best model that fits these results is the non-linear distributed lag autoregressive model (NARDL) because it shows the effect of the independent variable on the dependent variable, by separating the negative and positive changes that occur in the independent variable to know their effect on the dependent variable, as it shows the dynamic multiplier of the effect of aggregate supply shocks on inflation in Iraq during the period (2004-2023) and based on the following tests:

**4.2. Cointegration Test:**

**Table (3):** The estimating the NARDL model for the impact of AS on INF in Iraq for the period (2004-2023)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| INF (-1) | 0.458479 | 0.110206 | 4.160202 | 0.0032 |
| INF (-2) | -0.321009 | 0.071619 | -4.482182 | 0.0020 |
| AS-POS | -4.91E-08 | 2.49E-08 | -1.973827 | 0.0838 |
| AS-NEG | 1.24E-07 | 7.35E-08 | 1.681722 | 0.1311 |
| AS-NEG (-1) | -1.00E-07 | 9.57E-08 | -1.045089 | 0.3265 |
| AS-NEG (-2) | -2.24E-08 | 9.14E-08 | -0.244765 | 0.8128 |
| AS-NEG (-3) | -1.06E-07 | 8.44E-08 | -1.259524 | 0.2433 |
| C | 8.799958 | 2.922072 | 3.011547 | 0.0168 |
| R-squared | 0.787513 | Mean dependent var | | 2.287500 |
| Adjusted R-squared | 0.601586 | S.D. dependent var | | 2.565638 |
| S.E. of regression | 1.619432 | Akaike info criterion | | 4.108880 |
| Sum squared resid | 20.98047 | Schwarz criterion | | 4.495175 |
| Log likelihood | -24.87104 | Hannan-Quinn critter. | | 4.128662 |
| F-statistic | 4.235614 | Durbin-Watson stat | | 2.362453 |
| Prob (F- statistic) | 0.030117 | | | |

**Source:** The scholar's analysis based on the results of statistical software EViews 12.

The findings from the NARDL model estimation presented in Table (3) indicate a notable impact of the independent variable (total supply AS) on the dependent variable (inflation INF), as evidenced by the computed (t) value at a significance threshold of (5%). The coefficient of determination ($R^2$=0.78) signifies that (78%) of the fluctuations in inflation, as a dependent variable, can be attributed to total supply as an independent variable, with (22%) being attributed to other influences excluded from the model. Regarding the Prob(F-statistic) test, which assesses the overall significance of the model from a standard perspective, it yielded a result of (0.030117), which lies below (5%), reinforcing the conclusions drawn, in addition to confirming that the model is free from spurious regression, as indicated by the value of (D.W), which is (2.36), surpassing the coefficient of determination. These insights facilitate an examination of the degree of joint integration and the establishment of a long- term equilibrated relationship between the variables through boundary testing.

**4.3. Bounds Test Outcomes:**

To evaluate the presence or absence of a long-term relationship (the presence or absence of joint integration) between the study variables (total supply AS) as an independent variable and (inflation INF) as a dependent variable, the bounds test is necessary. The results shown in Table (4) indicate that the computed (F) value of (43.29704) exceeds the tabular value at the upper limit I (1) Bound, measured at (3.87), and surpasses the tabular value at the lower limit I (0) Bound, which stands at (3.1) at a (5%) significance level. This leads to the rejection of the null hypothesis, which posits no long- term equilibrium relationship, thus we accept the alternative hypothesis, which asserts the existence of a long-term equilibrated relationship.

**Table (4):** Boundary test to find a long-run equilibrium relationship between (AS) and (INF) in Iraq for the period (2004-2023)

| Test Statistic | Value | K |
|---|---|---|
| F. Statistic | 43.29704 | **2** |
| | Critical Value Bounds | |
| Significance | I(0) Bound | **Bound(1) I** |
| 10% | 2.63 | **3.35** |
| 5% | 3.1 | **3.87** |
| 2.5% | 3.55 | **4.38** |
| 1% | 4.13 | **5** |

**Source:** Researcher's work based on the outputs of the statistical program EViews 12.

**4.4. Short-term parameter estimation results:**

After it became clear that there is a joint integration relationship between the research variables, it was necessary to confirm whether it is a short-term or long-term integration relationship. It is noted from the results of Table (5) that there is a short-term relationship between the variables included in the model, as follows:

**Table (5):** Results of short-term parameter estimation according to the NARDL model

| **Cointegrating Form** | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob* |
| D (INF (-1)) | 0.321009 | 0.039735 | 8.078729 | 0.0000 |
| D(AS-NEG) | 1.24E-07 | 5.54E-08 | 2.230906 | 0.0562 |
| D (AS-NEG (-1)) | 1.29E-07 | 5.17E-08 | 2.490746 | 0.0375 |
| D (AS-NEG (-2)) | 1.06E-07 | 5.49E-08 | 1.936741 | 0.0888 |
| CointEq (-1) * | -0.862531 | 0.055894 | -15.43158 | 0.0000 |

**Source:** The researcher's analysis is based on EViews 12.

The outcomes presented in Table (6) reveal that the error correction coefficient is both n egative and noteworthy, with a value of (-0.862531) and a probability value (Prob=0.0000) falling below (5%). This indicates a short-term equilibrium connection, suggesting a mechanism is in place for correcting errors in the short term, guiding them towards long-term equilibrium between (total supply AS) and (inflation INF). The magnitude of the error corre ction coefficient signifies that approximately (-0.862531) of the short-term discrepancies in the inflation value (the dependent variable) from the preceding period (t-i) have been rectified in the current period (t) in response to any positive or negative disturbances in total supply (the independent variable). This implies that short-term deviations self-correct until they stabilize at the long- term equilibrium level, highlighting the significant correlation between the fluctuations of the explanatory variable and its influence on the dependent variable in Iraq during the research timeframe. This corroborates the boundary test that confirms joint integration among the variables in the model, aligning with economic theory.

**4.5. Long-run parameter estimation results:**

Table (6) illustrates the outcomes of estimating the parameters of the independent variable over th e long run, indicating that an inverse relationship exists between aggregate supply AS and inflatio n INF. In the event of a positive shock to aggregate supply (a rightward shift of the aggregate sup ply curve), an increase of one unit will result in a decrease in inflation by (-5.69) at a significance level of (5%) with a probability value (Prob=0.08). Despite the establishment of a long- run equilibrium relationship in the boundary test, it is noted that during a positive aggregate supply shock, the associated probability value exceeds (5%), indicating that the influence of this positive shock in Iraq does not manifest in the long term due to the inadequate utilization of savings accrued from the positive shock. Furthermore, such savings are directed towards non-revenue-generating consumer expenditures, limiting the effect of the positive aggregate supply shock on inflation to the short term. However, it is noted that there is a long-term effect of the positive aggregate supply shock on inflation at a significance level of (10%), and this is clear from the probability value (Prob=0.08), because at a significance level of (10%), the aggregate supply shock will affect inflation through other indirect factors, and the degree of risk tolerance is greater because the significance level of (5%) is more stringent and gives more accurate results for analyzing the relationship between the variables under study. Conversely, the influence of the negative aggregate supply shock appears to persist into the long term, even with the inverse relationship maintained between aggregate supply as the independent variable and inflation as the dependent variable. When aggregate supply diminishes by one unit because of a negative shock, an increase in inflation by (-1.22) is observed, underscoring that the negative coefficient reflects the inverse correlation between aggregate supply and inflation, with this negative impact extending over the long term-evidenced by a probability value of (Prob=0.05), which is statistically significant. This scenario can be attributed to the Iraqi economy's reliance on a singular resource, namely oil, to sustain revenues, whereby any adverse shock in oil prices will trigger detrimental effects across various economic sectors that are challenging to rectify in the short term.

**Table (6):** Results of estimating long-term parameters according to the NARDL model.

| **Long Run Coefficients** | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob* |
| AS-POS | -5.69E-08 | 2.89E-08 | -1.968901 | 0.0845 |
| AS-NEG | -1.22E-07 | 5.47E-08 | -2.228489 | 0.0564 |
| C | 10.20249 | 3.356710 | 3.039431 | 0.0161 |

**Source:** Researcher's work based on EViews 12.

**4.6. Predicting the estimated long-term relationship:**

It is noted from Figure 3 that the prediction of the estimated relationship shows a direct effect of the aggregate supply on inflation through what is shown by the blue line that lies between the critical limits represented by the red lines, as it is noted that the relationship fluctuates at the beginning of the period and then stabilizes in the long term.

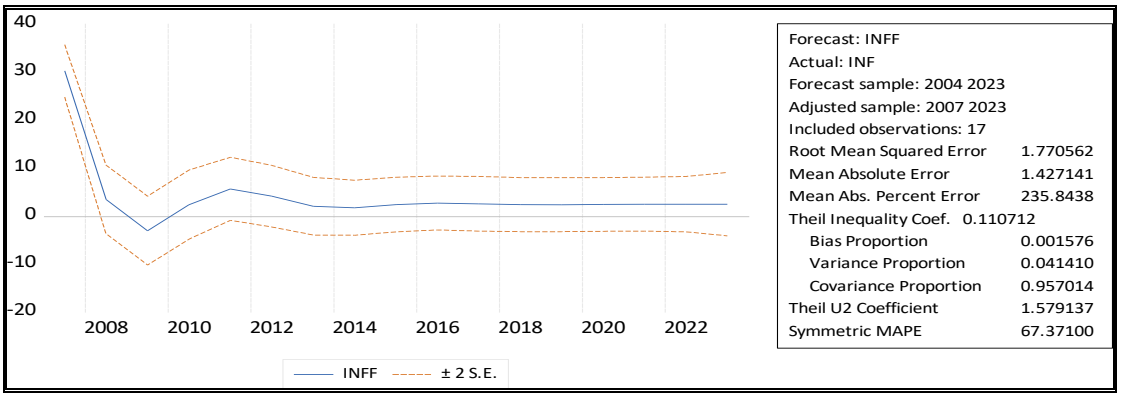


**Figure (3):** Predicting the estimated long-term relationship.
**Source:** Researcher's work based on EViews 12.

### 4.7. The dynamic multiplier of the effect of aggregate supply on inflation according to the NARD model:

In order to clarify the effect of whether it is symmetric or asymmetric in the long run of aggregate supply AS on inflation INF, we can use the dynamic multipliers that work to find the behavior of adjusting the equilibrium before the effect to the new equilibrium after the effect, and through Figure (4) we notice that the dynamic multipliers during the research period, which can be explained as follows:

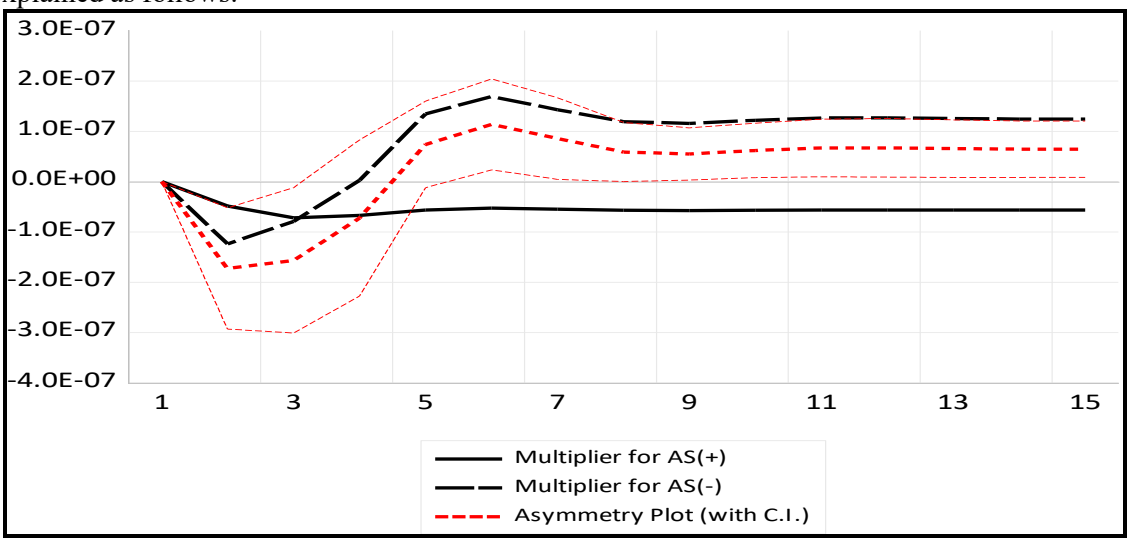


**Figure (4):** The dynamic multiplier of the effect of aggregate supply on inflation
**Source:** Researcher's work based on EViews 12.

The solid black line indicates the kinetic behavior of the independent variable (AS) when it causes positive changes in the dependent variable (INF). The dotted black line shows the kinetic behavior of the independent variable (AS) when it causes negative changes in the dependent variable (INF). The dotted red line is the asymmetric line. It shows the difference between positive and negative changes in the nonlinear regression in the dependent variable (INF) resulting from positive and negative fluctuations in the independent variable (AS).

It is noted from what the results of the dynamic multiplier test of the impact of aggregate supply on inflation show through Figure (4) that there is an asymmetric reaction of the dependent variable (INF) towards positive and negative changes in the independent variable (AS) in the short term, but in the long term the reaction of the dependent variable towards changes in the independent variable increases as a result of a negative aggregate supply shock, which peaked after about six quarters, and the negative effects approach symmetry while the positive effects move away from it, and this supports what the results of the long-term parameters of the model came with, which showed the inverse relationship between aggregate supply and inflation in Iraq, but that inverse effect in the case of a positive aggregate supply shock is not symmetrical with the inverse effect between the variables under study in the case of a negative aggregate supply shock, and this is what is shown by the gap between the solid black line (positive effect) and the dotted black line (negative effect) which approaches the dotted red line (asymmetry line) over the entire period, and this reflects the fragility of the Iraqi economy because it depends on a single source to finance its revenues and meet With its financial obligations, it is the oil supplier, which makes it vulnerable to fluctuations in its prices, which weakens its ability to exploit the savings resulting from a positive aggregate supply shock on the one hand, and the difficulty of confronting the negative effects resulting from the economy being exposed to a negative aggregate supply shock on the other hand.

**4.8. Diagnostic tests (model quality tests): Testing the problem of normal distribution (Histogram-Normality):**

The evaluation of the normality of residuals demonstrates the distribution of errors as illustrated in Figure (5). It is observed that the (Jarque-Bera) test, which examines the null hypothesis against the alternative hypothesis, yielded a value of (1.256083). Consequently, this results in a (Probability = 0.533636), which exceeds (5%), allowing us to accept the null hypothesis asserting that there is no issue with the normality of residuals (i.e., the residuals follow a normal distribution). Thus, we dismiss the alternative hypothesis positing a problem with normal distribution of residuals (i.e., the residuals do not follow a normal distribution). This outcome is favourable and contributes positively to the reliability of the results derived from the standard model implemented.

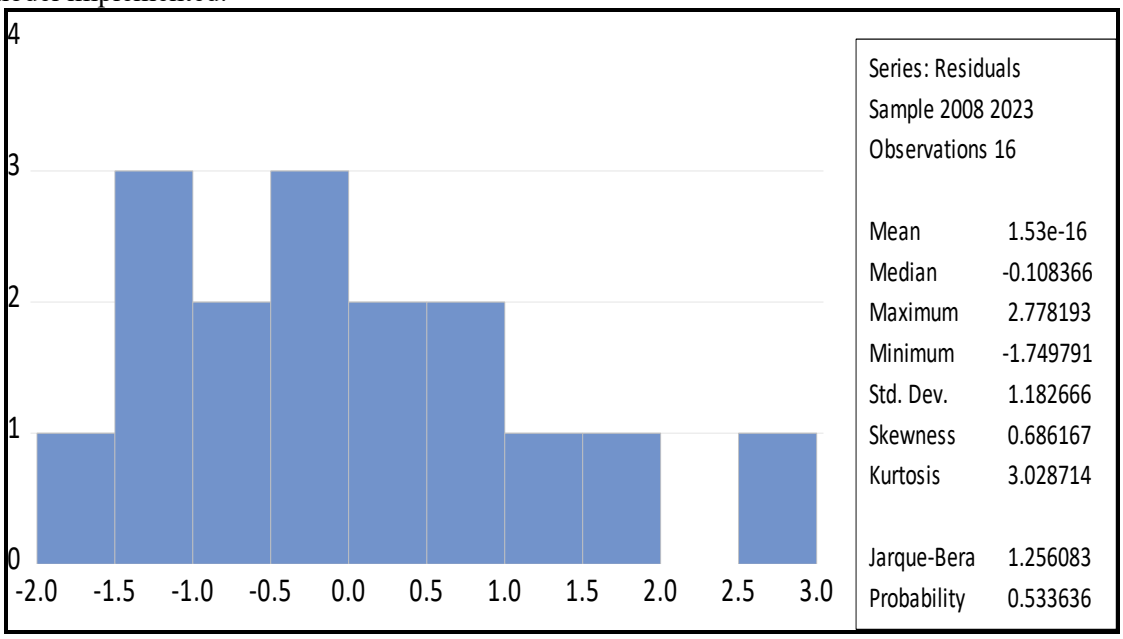


**Figure (5):** Testing the problem of normal distribution (Histogram-Normality)

**Source:** Researcher's work based on EViews 12.

**4.9. Autocorrelation Problem Test (Breusch-Godfrey Serial Correlation LM Test):**

This test shows the integrity of the model from the presence of the autocorrelation problem or not between the variables included in the model, as it is noted from what the results shown in Table (7) show that the value of (F-statistic = 0.327283) and the probability value (ProbF(3,5) = 0.8066) also the value reached ( (Obs*R-squared = 2.626209) and the probability value (Prob Chi-Square(3) = 0.4529), which is greater than 5%, and thus we accept the null hypothesis (i.e. the absence of the autocorrelation problem between the variables) and reject the alternative hypothesis that states the presence of the autocorrelation problem between the model variables.

**Table (7):** Autocorrelation Problem Test (Breusch-Godfrey Serial Correlation LM Test)

| **Breusch-Godfrey Serial Correlation LM Test** | | | |
|---|---|---|---|
| F-statistic | 0.327283 | Prob. F (3,5) | 0.8066 |
| Obs*R-squared | 2.626209 | Prob. Chi-Square (3) | 0.4529 |

**Source:** Researcher's work based on EViews 12.

**4.10. Testing the problem of instability of heterogeneity of variance (Heteroskedasticity Test):**

The examination reveals the issue of variance heterogeneity instability. According to the (ARCH) analysis and as illustrated in Table (8), the (F- statistic = 0.163166) and the probability figure (Prob F (3,9) = 0.9185) have also produced an (Obs*R-squared = 1.670579) alongside the probability figure (Prob Chi- Square (3) = 0.8801). Since this value exceeds (5%), we deduce that there is no issue with variance heterogeneity instability. Therefore, we accept the null hypothesis which posits that there is no problem regarding variance heterogeneity instability, while we reject the alternative hypothesis that suggests the existence of a variance heterogeneity instability issue, which is a favourable outcome.

**Table (8):** Testing the problem of instability of heterogeneity of variance (Heteroskedasticity Test)

| **Heteroskedasticity Test** | | | |
|---|---|---|---|
| F-statistic | 0.163166 | Prob. F (3,9) | 0.9185 |
| Obs*R-squared | 1.670579 | Prob. Chi-Square (3) | 0.8801 |

**Source:** Researcher's work based on EViews 12.

**4.11. Structural stability of model parameters (Stability Test):**

Figure (6) shows the results of the structural stability test of the model parameters, as the cumulative sum of the residuals shows that the model is stable since the cumulative series represented by the blue line falls within the critical limits defined by the red lines at a significance level of (5%), so the model was stable throughout the research period. Figure (7) refers to the cumulative sum test of the squares of the model's residuals, as there is no problem because the cumulative sum of the residuals did not go beyond the confidence limits at a significant level of (5%).

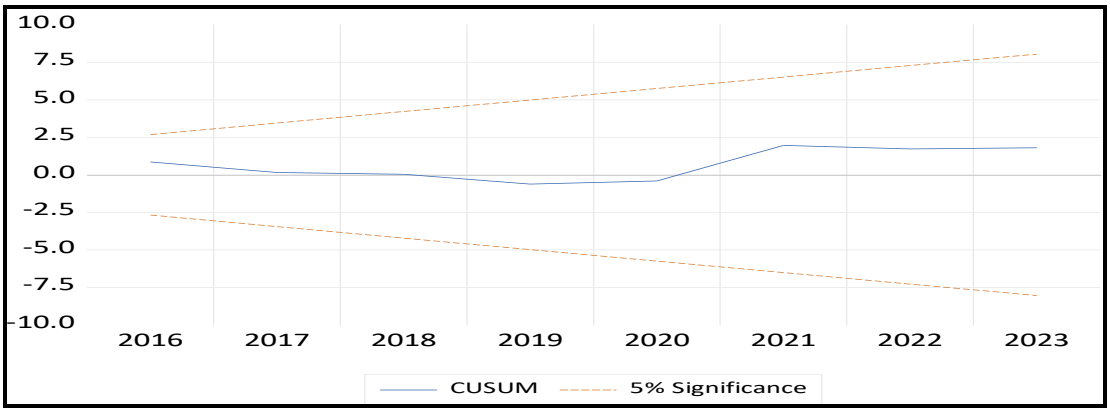


**Figure (6):** Cumulative total of residuals

**Source:** Researcher's work based on EViews 12.

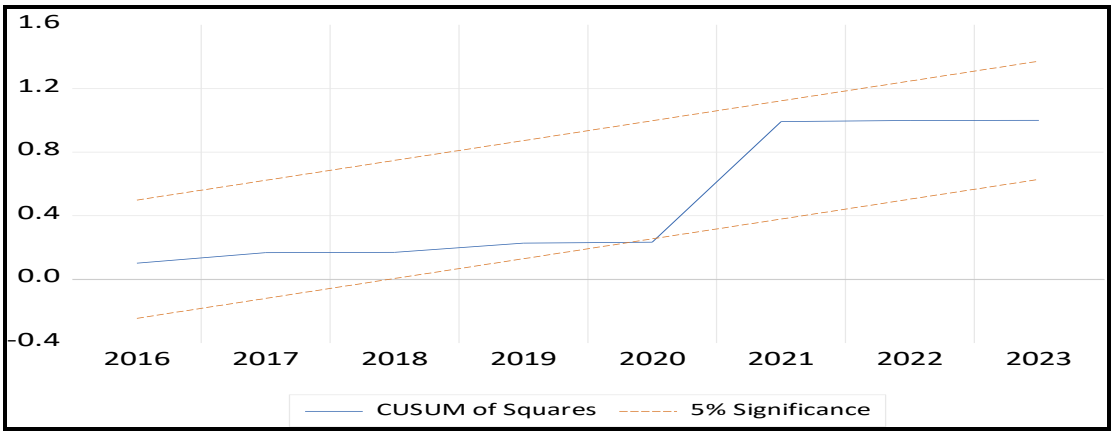


**Figure (7)** Cumulative sum of squares of residuals

**Source:** Researcher's work based on EViews 12.

**5. Discussion of Results:**

Estimating the relationship between aggregate supply as an independent variable and inflation as a dependent variable indicates an inverse effect between aggregate supply AS and inflation INF. In the case of a positive aggregate supply shock (shift of the aggregate supply curve to the right towards the increase), this increase by one unit will lead to a decrease in inflation by (-5.69) at a significance level of (5%) and a probability value of (Prob=0.08). Despite achieving the long-term equilibrium relationship in the boundary test, we note that the probability value is greater than (5%) when a positive aggregate supply shock occurs. This means that the effect of the positive shock in Iraq does not extend to the long term due to the failure to exploit the savings obtained due to the positive shock and because these savings are directed towards consumer aspects that do not generate a return. Therefore, the effect of the positive aggregate supply shock on inflation was limited to the short term. As for the impact of the negative aggregate supply shock, it is noted that it extends to the long term despite achieving the inverse relationship between aggregate supply as an independent variable and inflation as a dependent variable. When aggregate supply decreases by one unit as a result of exposure to The economy to a negative aggregate supply shock will lead to an increase in inflation by (-1.22), with emphasis on the negative sign indicating the inverse relationship between aggregate supply and inflation, and that this negative impact will extend to the long term, as shown by the probability value (Prob=0.05), which is statistically significant. This can be explained by the fact that the Iraqi economy depends on one source to feed revenues, which is the oil resource, and that any negative shock in oil prices will lead to negative effects on various economic sectors that are difficult to address in the short term.

## 6. Conclusion:

The findings from the standard assessments support the research hypothesis, which posits a considerable influence of the aggregate supply variable on inflation, that is, the occurrence of cointegration (the existence of a long-term stable relationship between the examined variables). Evidence showed a statistically significant connection between the independent variable (aggregate supply) and the dependent variable (inflation) in Iraq during 2004-2023. Furthermore, it was demonstrated that the independent variable accounted for (78%) of the variations in the dependent variable (inflation). The outcomes of the standard analysis also indicated that the repercussions of a negative aggregate supply shock persist in the long term. In contrast, the effects of a positive aggregate supply shock are confined to the short term. Accordingly, the research hypothesis was upheld.

## 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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