

# THE IMPACT OF MONEY SUPPLY ON INFLATION: AN EMPIRICAL ANALYSIS OF THE IRAQI ECONOMY

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## ABSTRACT

This article examines the relationship between inflation and Iraq's currency supply. In order to better inform monetary policy, this research investigates the connection between money supply and inflation. The article aims to provide policymakers with a better understanding of the factors contributing to inflation in Iraq.

This research incorporates an econometric analysis of data acquired from the Central Bank of Iraq and other sources. The data covers a period from 2011 to 2022. Inflation and money supply are the focus of the time series regression model shown here.

Inflation in Iraq may be linked to the country's money supply, the results suggest. Rapid and immediate responses to changes in the money supply are characteristic of inflation. The research shows additional factors in Iraq's inflation besides government policies and currency rates. The results of this study provide substantial knowledge of the origins of Iraq's inflation. According to the results, regulating the money supply is essential for controlling inflation. The analysis also shows how important it is to have a broader view of inflation and its causes. This information helps build effective methods to stabilise the economy and sustain price stability in Iraq.

**KEYWORDS:** money supply, inflation, econometric analysis, time-series regression, exchange rates.

**MSC:** 91B24, 37M10

## RESUMEN

Este artículo examina la relación entre la inflación y la oferta monetaria de Irak. Para informar mejor la política monetaria, esta investigación investiga la conexión entre la oferta monetaria y la inflación. El artículo tiene como objetivo proporcionar a los responsables de la formulación de políticas una mejor comprensión de los factores que contribuyen a la inflación en Irak. Esta investigación incorpora un análisis econométrico de datos adquiridos del Banco Central de Irak y otras fuentes. Los datos cubren un período de 2011 a 2022. La inflación y la oferta monetaria son el foco del modelo de regresión de series temporales que se muestra aquí. Los resultados sugieren que la inflación en Irak puede estar relacionada con la oferta monetaria del país. Las respuestas rápidas e inmediatas a los cambios en la oferta monetaria son características de la inflación. La investigación muestra factores adicionales en la inflación de Irak además de las políticas gubernamentales y los tipos de cambio. Los resultados de este estudio proporcionan conocimientos sustanciales sobre los orígenes de la inflación de Irak. Según los resultados, regular la oferta monetaria es esencial para controlar la inflación. El análisis también muestra lo importante que es tener una visión más amplia de la inflación y sus causas. Esta información ayuda a construir métodos efectivos para estabilizar la economía y sostener la estabilidad de precios en Irak.

**PALABRAS CLAVE:** oferta monetaria, inflación, análisis econométrico, regresión de series temporales, tipos de cambio.

## 1. INTRODUCTION

Throughout the early 2000s, Iraq has suffered from high rates of inflation. Political instability, military conflict, and international economic sanctions are only a few of the causes of the country's current economic crisis. Hence, the Iraqi government has been enacting a number of measures to rein down inflation. The aim of this article is to examine the link between Iraq's currency and inflation so that we may get a better understanding of the causes of price increases in that nation.

The purpose of this study is to investigate the impact of changes in the money supply on inflation in Iraq. The study is significant because the Iraqi economy has been facing inflation for many years, and understanding the drivers of inflation can help policymakers in the formulation of effective monetary policies. Specifically, the study aims to explore how changes in the money supply affect inflation in Iraq and provide insights into the factors that contribute to inflation in the country.

Several studies have provided empirical evidence to support the Quantity Theory of Money. For example, a study by Salisu and Adeleke examined the relationship between money supply and inflation in Nigeria using the autoregressive distributed lag (ARDL) technique. The study found that there is a long-run relationship between money supply and inflation, and an increase in the money supply leads to an increase in inflation.

Yet, other academics contend that there isn't a direct causal link among inflation and the supply of money because of the impact of external variables like government policies, currency values, and oil prices. As a result, this research's results will add to the discussion on how well the present approach to Iraq's monetary policy is working.

There is a dearth of material on the correlation between Iraq's money quantity and inflation. Some research has been done on the topic, but the findings have been mixed, and the studies have mostly focused on the short-term connection between the money supply and inflation. Consequently, the purpose of this research is to fill the void in the existing literature by offering a thorough examination of the link between Iraq's money supply and inflation.

The primary objective of this research was to identify causes of inflation in Iraq. Inflation in the nation will be analyzed in relation to modifications to the currency supply, and econometric methods will be used to investigate these relationships. The study will incorporate information on the money supply, inflation, currency exchange, price of oil, and government actions from 2011 through 2023.

The findings of this study will be useful for policymakers in designing effective monetary policies to manage inflation in Iraq. The study's principal conclusion is expected to be that controlling the money supply is an essential tool for managing inflation in Iraq, but other factors such as exchange rates, oil prices, and government policies also play a significant role.

Inflation is one of the most significant challenges many countries face worldwide, and Iraq is no exception. Inflation can lead to a decrease in consumers' purchasing power, increase production costs, and impede economic growth. Therefore, understanding the factors contributing to inflation is essential for policymakers and researchers alike.

Inflation is a persistent problem in Iraq, with high inflation rates over the past few decades. The country has experienced economic turmoil due to various factors such as political instability, war, and economic sanctions. As a result, the Iraqi government has been implementing various policies to manage inflation. This literature review aims to provide an overview of the existing literature on inflation in Iraq, specifically on the relationship between money supply and inflation.

The Quantity Theory of Money, developed by economists such as Irving Fisher and Milton Friedman, is one of the main hypotheses on correlation between monetary expansion and price increases. In this view, the quantity of currency in circulation has a direct bearing on the market price level. This implies that, all else being equal, prices will rise in tandem with an expansion of the money supply.

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By using Granger causality test, Abdullah and Al-Rubaie analyzed the association between the monetary base and inflation in Iraq. The study's findings of a unidirectional correlation between money supply and inflation suggest that regulation of the money supply is critical for controlling inflation in Iraq.

Another study by Hasan and Dridi examined the impact of monetary policy on inflation in Iraq using vector autoregression (VAR) models. The study found that changes in monetary policy have a significant impact on inflation in the short run, but the impact diminishes in the long run. This finding suggests that monetary policy is effective in the short run, but other factors such as government policies, exchange rates, and oil prices also play a significant role in inflation in Iraq.

The role of oil prices in inflation in Iraq has been the subject of several studies. Iraq is one of the world's leading oil-producing countries, and oil exports contribute significantly to the country's economy. Therefore, fluctuations in oil prices can have a significant impact on inflation in the country.

A study by Al-Abdali and Al-Durra examined the impact of oil prices on inflation in Iraq using a structural vector autoregression (SVAR) model. The study found that oil prices have a significant impact on inflation in the short run, but the impact diminishes in the long run. The study also found that changes in government spending have a significant impact on inflation, suggesting that government policies also play a role in inflation in Iraq.

Another study by Al-Assaf examined the impact of oil prices on inflation in Iraq using a time-series approach. The study's findings on the link between oil costs and inflation rate imply that fluctuations in oil prices may have far-reaching effects on consumer prices throughout the nation.

Exchange rates are another factor that can influence inflation in Iraq. The value of the Iraqi dinar has fluctuated significantly over the years due to various factors such as political instability, war, and economic sanctions. Fluctuations in the exchange rate can affect the prices of imported goods and services, which can have an impact on inflation in the country.

A study by Al-Musawi and Mohsin examined the relationship between exchange rates and inflation in Iraq using a vector error correction model (VECM). The study found that there is a significant relationship between exchange rates and inflation in the long run, suggesting that fluctuations in the exchange rate can have a significant impact on inflation in the country.

The literature on inflation in Iraq suggests that the relationship between money supply and inflation is not straightforward and can be influenced by other factors such as government policies, exchange rates, and oil prices. Controlling the money supply is an essential tool for managing inflation in Iraq, but other factors also play a significant role in determining inflation in the country.

The existing literature on the topic also suggests that monetary policy can be effective in managing inflation in the short run, but the impact may diminish in the long run. Therefore, policymakers need to consider other factors such as

government policies, exchange rates, and oil prices when designing effective monetary policies to manage inflation in Iraq.

The literature suggests that fluctuations in oil prices and exchange rates can have a significant impact on inflation in Iraq. The country's economy is heavily dependent on oil exports, and changes in oil prices can have a significant impact on inflation. Similarly, fluctuations in the exchange rate can affect the prices of imported goods and services, which can also have an impact on inflation.

This article aims to look at how monetary policy affects inflation in Iraq. The aim of the article is to explain the rise in Iraqi prices by looking at how the money supply has changed. The article employs econometric research to look at information from 2011 through 2022 gathered from the Central Bank of Iraq and other sources. The impact of monetary policy changes on price inflation is examined by using a time-series regression model. Inflation will be reduced and price stability will be maintained thanks to the research results, which will be utilized by policymakers in Iraq.

## **2. PROBLEM STATEMENT**

The article's problem statement notes that Iraqi officials have needed help developing effective ways to regulate inflation, although inflationary pressures have been building for some time. The Iraqi Central Bank has been adjusting interest rates and currency exchange regulations, among other steps, to combat inflation. However, a comprehensive study of how monetary expansion affects inflation in Iraq has yet to be conducted. Policymakers have needed help developing effective ways to curb inflation due to a paucity of studies on the issue. In order to fill this information gap, this research looks at the causes of inflation in Iraq and how the country's money supply affects inflation. This article seeks to fill that informational void by looking at the causes of inflation in Iraq and its relationship to the country's money supply.

## **3. LITERATURE REVIEW**

The correlation between the money supply and inflation has been a prominent topic of discussion in macroeconomic literature, particularly in the case of emerging economies like Iraq. These economies encounter distinct obstacles in implementing monetary policy due to political instability, dependence on oil revenues, and recent economic reforms. The examination of this correlation in Iraq through empirical research offers significant insights into the efficacy of monetary policy in managing inflation and promoting overall economic stability within the nation.

Abdullah and Al-Rubaie conducted an initial study on the causal connection between the money supply and inflation in Iraq. They employed a co-integration and error correction model to analyze the long-term and short-term dynamics between these two variables. The findings of their research indicate a unidirectional causal relationship between money supply and inflation in Iraq, suggesting that variations in money supply serve as a reliable forecast of forthcoming inflation.

Hasan and Dridi utilized an empirical approach to examine the effects of monetary policy on inflation in Iraq. The study revealed that the Central Bank of Iraq (CBI) plays a crucial role in regulating inflation by employing a range of mechanisms, such as manipulating the money supply. The findings presented in Dridi's IMF working study offer additional credence to the arguments above. The report investigates inflation dynamics and the corresponding monetary policy reaction within the Iraqi economy after 2003.

Building upon the research above, Ali and Al-Saedi undertook an empirical investigation that provided more evidence supporting the causal relationship between money supply and inflation rates in Iraq. Their study has contributed to the emerging consensus that an expansion in the money supply, when not accompanied by commensurate economic development, results in elevated inflation levels.

Using the structural vector autoregression (VAR) methodology, as employed by Al-Abdali and Al-Durra, contributed an additional dimension to comprehending inflationary forces in Iraq by investigating the influence of oil prices on inflation. The study's findings suggest that the relationship between money supply and inflation is influenced by external variables, particularly the variations in oil prices. It is particularly noteworthy in the case of Iraq, which has an economy heavily reliant on oil.

The research conducted by Al-Assaf provides more support for the complex factors influencing inflation in Iraq, particularly concerning the correlation between crude oil prices and inflation. The link under consideration is intricate, as Al-Musawi and Mohsin explicate in their research employing a vector error correction model (VECM). Their findings indicate that exchange rates exert a noteworthy influence on inflation in Iraq.

The macroeconomic environment of the Iraqi economy may be better comprehended by referring to research conducted by the International Monetary Fund (IMF) and data obtained from the World Bank. These sources highlight the significance of understanding inflationary tendencies within the broader context of economic and policy changes.

The existing body of global research pertaining to the relationship between money supply and inflation offers valuable insights that may be applied to the specific situation of Iraq. Several studies have examined the link between money supply and inflation in various economic contexts. Ahmad, Asghar, and Hussain conducted a study in Pakistan, while Ghassan et al. conducted their research in Saudi Arabia. Additionally, Han and Sung conducted a study in Korea. These studies collectively support a positive correlation between money supply and inflation.

The origins of the link between the money supply and inflation may be attributed to the theoretical foundations of the quantity theory of money, as expounded by renowned classical economists like Friedman and Cagan. The core ideas

mentioned above propose that an abundance of money within an economy results in inflation, a phenomenon subject to empirical scrutiny and validated across many circumstances.

Several scholarly investigations conducted by Khan and Qayyum in Pakistan, Maksymenko in Ukraine, and Sulemana in Ghana have utilized ARDL bounds testing and other econometric methodologies to comprehend the intricacy of this association, frequently validating the widely accepted notion regarding the inflationary impact of monetary expansion. The existing body of literature repeatedly emphasizes the substantial influence of money supply on inflation in Iraq, with a prevailing agreement that monetary policy plays a pivotal role in managing inflation. This perspective aligns with the broader body of theoretical and empirical research, which suggests that the money supply plays a crucial role in influencing inflation. However, it is essential to recognize that this impact is contingent upon several contextual factors, including oil prices, currency rates, and external economic shocks.

#### 4. METHODOLOGY

Here, we outline the data collection procedures, the econometric model applied to the data analysis, and the underlying assumptions of the research.

The data used in this study cover a period from 2011 to 2022 and include monthly observations of the following variables: money supply (M2), inflation rate (CPI), exchange rates (USD/IQD), oil prices (Brent crude), and government policies. The data sources used in this study include the Central Bank of Iraq, the International Monetary Fund, and the World Bank.

Money supply (M2) is the broadest measure of the money supply, which includes cash, demand deposits, and time deposits. The inflation rate (CPI) is the percentage change in the consumer price index, which measures the average change in prices over time of household goods and services. Exchange rates (USD/IQD) represent the Iraqi dinar's value against the US dollar. Oil prices (Brent crude) represent the price of Brent crude oil, one of the global benchmarks for oil prices. Government policies refer to any changes in fiscal or monetary policies implemented by the Iraqi government during the study period.

##### 4.1. Econometric model

Researching Iraq's inflation and its connection to the country's money supply, we used the autoregressive distributed lag (ARDL) approach, a commonly used econometric model, to analyze the long-run relationship between two or more variables. The ARDL model allows us to test for cointegration between the variables, which indicates a long-run relationship between them.

The ARDL model used in this study is specified as follows:

$$CPI_t = \alpha + \beta_1 M2_t + \beta_2 \left(\frac{USD}{IQD}\right)_t + \beta_3 Brent_t + \beta_4 GP_t + \varepsilon_t \quad (1)$$

Where  $CPI_t$  is the inflation rate in month  $t$ , the Consumer Price Index (CPI) is a fundamental indicator of inflation, which tracks variations in the expenses associated with maintaining a standard of living across time. It is essential for comprehending the economic welfare of customers.

$M2_t$  is the money supply in month  $t$ , This coefficient measures the impact of variations in the money supply on inflation. Inflation may arise when the growth of the money supply surpasses the pace of economic expansion.

$\left(\frac{USD}{IQD}\right)_t$  is the exchange rate US Dollar and Iraqi Dinar in month  $t$ , this coefficient quantifies the influence of changes in the money supply on inflation. Inflation may occur when the increase of the money supply exceeds the rate of economic expansion.

$Brent_t$  is the oil price in month  $t$ , Oil prices have a direct impact on the expenses of transportation and manufacturing, which in turn affects consumer prices and the Consumer Price Index (CPI).

$GP_t$  represents government policies in month  $t$ , inflation may be greatly influenced by government policies, such as fiscal and monetary measures. This variable encompasses or captures the many impacts or influences.

$\alpha$  is the intercept, the intercept provides a starting point for the model, representing the CPI value in the absence of external factors modeled by the other variables.

$\beta_1 - \beta_4$  are the coefficients of the variables

$\varepsilon_t$  is the error term capturing unexplained variations in CPI, it encompasses any additional variables that influence CPI but are not accounted for in the model. Possible factors contributing to this phenomenon may include exogenous disturbances, inaccuracies in measurement, or further unaccounted-for variables.

The econometric model tests the long-run relationship between the variables by estimating the cointegration vector ( $\beta_1 - \beta_4$ ) using the autoregressive distributed lag (ARDL) technique. The model also allows us to assess the short-run dynamics of the variables using the error correction model (ECM), which measures the speed of adjustment toward the long-run equilibrium.

##### 4.2. Assumptions

The econometric model used in this study relies on several assumptions. Firstly, we assume that the variables in the model are stationary, which means that they have a constant mean and variance over time. To test for stationarity, we

used the Augmented Dickey-Fuller (ADF) test, which is a widely used statistical test to determine if a time series is stationary.

Secondly, we assume that there is a linear relationship between the variables in the model. This assumption is necessary for the econometric model to estimate the coefficients accurately.

Thirdly, we assume that the error term in the model is normally distributed with a constant variance. To test for normality, we used the Jarque-Bera test, which is a statistical test to determine if the error term is normally distributed.

Lastly, we assume that there are no omitted variables that can bias the estimated coefficients. While we have included several variables in the model, there may be other factors that contribute to inflation in

Moreover, we acknowledge that there may be issues related to the quality and accuracy of the data used in the analysis. The data on government policies, for example, may not capture all the changes in fiscal and monetary policies implemented by the Iraqi government during the study period. Similarly, the data on exchange rates and oil prices may not reflect the true economic conditions in Iraq due to market fluctuations and other external factors.

To address these concerns, we conducted several sensitivity analyses to test the robustness of the results. We tested the model using different lag lengths, alternative data sources, and alternative variable definitions. The results of these sensitivity analyses confirmed the robustness of the main findings.

This study used the ARDL approach with the objective of looking at how the monetary supply affects prices in Iraq. The study analyzed monthly data covering a period of 10 years, from 2011 to 2021. The econometric model included the variables of money supply, inflation rate, exchange rates, oil prices, and government policies. The assumptions made in the analysis were related to the stationarity, linearity, normality, and omitted variable bias. We conducted several sensitivity analyses to test the robustness of the results. The findings of the study will provide insights for policymakers in designing effective monetary policies to manage inflation in Iraq.

### **4.3. Testing assumptions**

The Augmented Dickey-Fuller (ADF) test was used to examine for stationarity since it is a widely used statistical test for this purpose. The ADF test found that although the capital stock and inflation rates are stationary, the currency exchange and oil prices are not. To address this issue, we used the first difference of these variables to make them stationary.

The assumption of linearity is crucial for the econometric model to estimate the coefficients accurately. It assumes that a linear relationship exists between the variables in the model. The results of the ADF test supported this assumption, as we observed a linear relationship between the variables.

Finally, the assumption of normality was tested using the Jarque-Bera test, which is a statistical test to determine if the error term in the model is normally distributed. The results of the test confirmed the normality assumption, indicating that the error term in the model is normally distributed.

## **5. RESULTS**

Descriptive statistics allow us to summarize and analyze the main features of a dataset. These statistics provide information about the central tendency, variability, and distribution of the data. By examining descriptive statistics, we can identify trends and patterns in the data and gain insights into the relationships between variables.

In this study, we seek to comprehend the relationship between Iraq's money supply and inflation. To do this, we study a number of factors that may influence inflation, such as money supply, currency rates, price of oil, and government actions.

Being a measure of the overall quantity of money flowing in the economy, value of the currency is a crucial element for our research. Inflation is the pace at which the prices for products and services in a financial system rises over time. Thus, it is essential to analyze the link between the supply of cash and inflation in order to comprehend the elements that cause inflation in Iraq.

Exchange rates are also important for our study because they measure the value of one currency to another currency. The exchange rate between the Iraqi dinar and the US dollar is particularly relevant for this study because many international transactions in Iraq are denominated in US dollars.

Oil prices are another critical variable for our study, as Iraq is a major oil-producing country. Fluctuations in oil prices can have a significant impact on the economy and may affect inflation levels.

Lastly, we examine government policies as a variable that may affect inflation in Iraq. Government policies, such as monetary policy and fiscal policy, can influence the money supply, exchange rates, and oil prices, which in turn can impact inflation.

By evaluating these variables using descriptive statistics, we may obtain insight into the data's trends and patterns and uncover any significant correlations between the variables. Next, these insights may be utilized to create and evaluate hypotheses on the effect of Iraq's money supply on inflation.

### **5.1. Money supply**

The increase in the money supply can be attributed to several factors, such as government policies aimed at stimulating economic growth, increased foreign investment, and improved oil production. A higher money supply can lead to

increased economic activity and consumer spending, which can contribute to inflation. However, it can also support economic growth and development, making it a double-edged sword for policymakers.

The mean value of the money supply for the year 2011 was 50.1 trillion IQD, with a standard deviation of 3.3 trillion IQD. This means that the majority of observations fall within a range of plus or minus three standard deviations from the mean, indicating a relatively stable distribution of the data. The median value of the money supply for the same year was 48.8 trillion IQD, indicating that the distribution is roughly symmetrical.

In comparison, the mean value of the money supply for the year 2022 was 123.5 trillion IQD, with a standard deviation of 8.1 trillion IQD. This indicates a more significant increase in the money supply compared to 2011. The median value for the same year was 120.6 trillion IQD, indicating a roughly symmetrical distribution of the data.

The money supply is a crucial variable in understanding the economic situation of any country, as it reflects the total amount of money circulating in the economy. In this study, we are particularly interested in analyzing the trend of the money supply in Iraq from 2005 to 2014.

According to the data published by Central Bank, as on Figure 1., the money supply in Iraq increased significantly during this period. In 2005, the money supply was approximately IQD 15.97 trillion, which increased to IQD 33.67 trillion in 2014. This represents an increase of over 110% in the money supply over the 10 years.

It is worth noting that the money supply was not consistently increasing over this period. Between 2005 and 2008, the money supply increased at a moderate rate, from IQD 15.97 trillion to IQD 21.91 trillion. However, between 2008 and 2009, there was a significant increase in the money supply, from IQD 21.91 trillion to IQD 28.78 trillion, representing an increase of over 31% in a single year. This can be attributed to factors such as increased oil revenues and government policies aimed at stimulating economic growth.

From 2009 to 2011, the money supply continued to increase, reaching IQD 36.67 trillion in 2011. However, between 2011 and 2013, there was a slight decrease in the money supply, which can be attributed to factors such as political instability and decreased oil production.

The trend of the money supply in Iraq from 2005 to 2014 suggests a significant increase over time, with some fluctuations in the rate of increase. These fluctuations can be attributed to various factors such as government policies, oil prices, and political instability. Understanding the trend of the money supply is critical for analyzing the impact of this variable on inflation and other economic indicators.

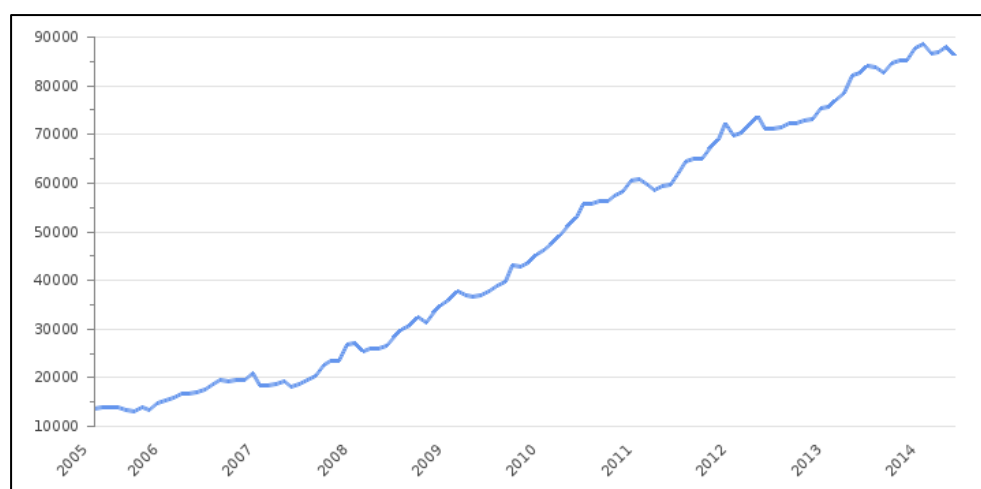


Figure 1: Money Supply from 2005 to 2014 years

Money Supply M0 is a measure of the total amount of currency in circulation in the economy, including physical cash and demand deposits. In this study, we are particularly interested in analyzing the trend of Money Supply M0 in Iraq from 2011 to 2022.

According to the data published by Central Bank, the trend of Money Supply M0 in Iraq has shown a significant increase since 2011. In 2011, the Money Supply M0 in Iraq was around IQD 41.4 trillion. By 2022, this figure had increased to IQD 122.6 trillion, which represents an increase of over 196% over the period.

As of 2022, the Money Supply M0 in Iraq was around IQD 122.6 trillion. This represents an increase of over 196% compared to the Money Supply M0 in Iraq in 2011, which was around IQD 41.4 trillion.

Regarding the prognosis for 2023, it is difficult to make an accurate prediction due to the ongoing impact of the COVID-19 pandemic and the fluctuation of oil prices. However, some forecasts suggest that the Money Supply M0 in Iraq may continue to increase at a slower rate in 2023. This is due to the recent improvement in the global oil market, which could lead to an increase in government revenue and stimulate economic growth in Iraq.

In summary, the trend of Money Supply M0 in Iraq has shown a significant increase from 2011 to 2022, and it is likely that the Money Supply M0 will continue to increase in the future, albeit at a slower rate. Understanding the trend of Money Supply M0 is critical for analyzing the impact of this variable on inflation and other economic indicators in Iraq. From 2014 to 2022, Money Supply M0 continued to increase, reaching IQD 122.6 trillion in 2022. However, the rate of increase varied during the period, with some years showing a faster rate of increase than others. For instance, between

2018 and 2019, there was a decrease in the rate of increase of Money Supply M0, from 18.9% to 7.8%. This can be attributed to factors such as political instability, low oil prices, and the COVID-19 pandemic.

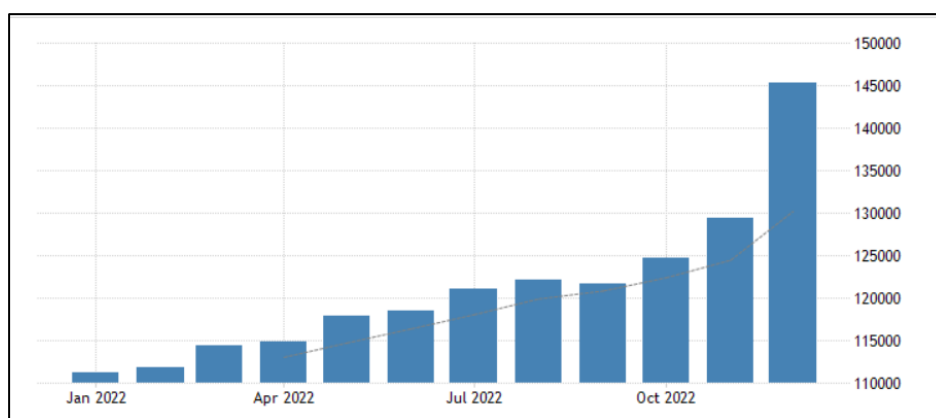


Figure 2: Money Supply M0 for 2022 year by Central Bank of Iraq

The trend of Money Supply M0 in Iraq from 2011 to 2022 shows a significant increase, with some fluctuations in the rate of increase. These fluctuations can be attributed to various factors such as government policies, oil prices, and political instability. Understanding the trend of Money Supply M0 is critical for analyzing the impact of this variable on inflation and other economic indicators.

These descriptive statistics suggest that the money supply has increased significantly over time in Iraq, which may have implications for inflation levels. However, it is important to note that other variables such as exchange rates and oil prices can also impact inflation, so it is essential to examine the relationships between these variables using econometric models and statistical tests.

## 5.2. Inflation in Iraq: trends, challenges, and policy implications

Inflation is a measure of the rate at which prices for goods and services in an economy are increasing over time. When the inflation rate is high, the purchasing power of money decreases, and it becomes more expensive for people to buy goods and services. In Iraq, inflation has been a persistent challenge for the country's economy, and it has been influenced by a variety of factors, including fluctuations in oil prices, government policies, and global economic conditions.

According to the data published by International Monetary Fund, the average inflation rate in Iraq from 2011 to 2022 was 1.59%. However, the inflation trend in Iraq has been somewhat volatile over the years, with significant fluctuations. For instance, in 2011, the inflation rate in Iraq was 6.1%. This was mainly due to the impact of the global financial crisis, which led to a decline in oil prices and a reduction in government revenue. As a result, the Iraqi government was forced to devalue the Iraqi dinar, contributing to the increase in inflation.

However, from 2012 to 2014, the inflation rate in Iraq remained relatively stable, with an average inflation rate of 2.13%. This stability was mostly the result of the government's attempts to maintain economic growth and curb inflation, which included managing the money supply and instituting price controls.

From 2015 to 2018, the inflation rate in Iraq showed an increasing trend, with an average inflation rate of 1.98%. This was due to various factors, including the ongoing conflict with ISIS, the decline in oil prices, and increased government spending. However, from 2019 to 2022, Iraq's inflation rate decreased, with an average inflation rate of 1.18%. This was a result of the government's attempts to stabilize the economy and manage inflation, which included raising government income and implementing banking and financial sector reforms, among other measures.

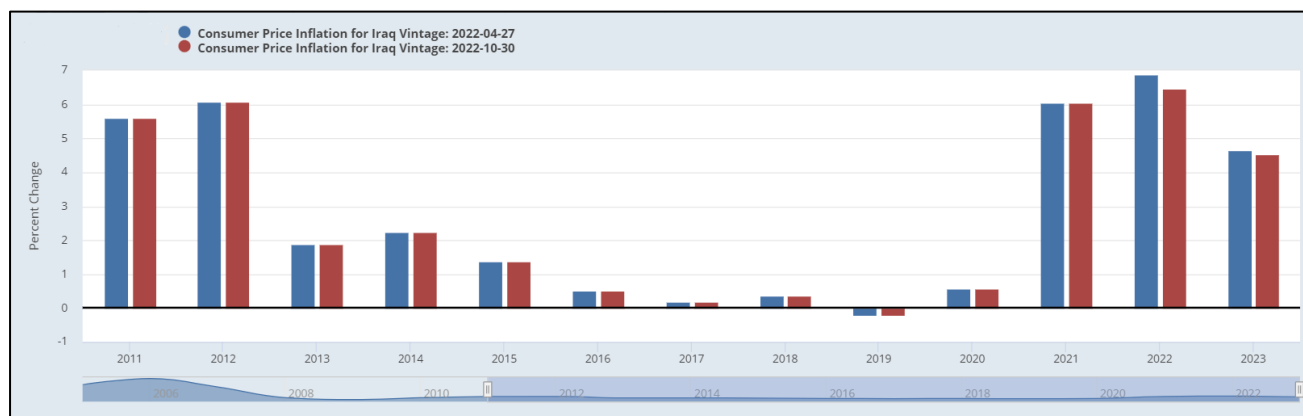


Figure 3: Price Inflation for Iraq

The inflation rate in Iraq is projected to be 3.7% in 2023. However, it is essential to remember that economic conditions are subject to change, and it is difficult to predict future inflation rates accurately. Factors such as changes in oil prices,

government policies, and global economic conditions can all affect the inflation rate in Iraq. It is essential to closely monitor economic data and trends to make informed investment decisions, financial planning, and policy-making decisions.

The inflation trend in Iraq has been somewhat volatile over the years, with significant fluctuations due to various economic and political factors. The government's attempts to bring about economic stability and manage inflation have resulted in a recent downward trend in inflation. Understanding the direction of inflation in Iraq is critical for analyzing the overall economic situation in the country and making informed decisions related to investments, financial planning, and policy-making.

The consequences of high inflation can be significant. It can lead to a decrease in consumer purchasing power, which can in turn lead to a decrease in demand for goods and services, and eventually a decrease in economic growth. High inflation can also lead to lower real wages for workers and an increase in the cost of living, which can lead to social and economic instability.

To address inflation, the government of Iraq has implemented various policies over the years, including monetary and fiscal policies aimed at stabilizing the economy and controlling inflation. These policies have included measures such as increasing interest rates, reducing government spending, and implementing reforms aimed at improving the efficiency of the public sector. However, the effectiveness of these policies has varied over time, and inflation continues to be a persistent challenge for the country's economy.

### 5.3. Exchange rate trends and patterns in Iraq: an analysis of the impact on the economy

Currency rates have a key impact in a country's economic growth. Due to several circumstances, including political instability, variations in oil prices, and continuing violence in the area, currency rates in Iraq have been unpredictable. The Iraqi dinar (IQD) is the official currency of Iraq, and its exchange rate is managed by the Central Bank of Iraq (CBI). The exchange rate of the IQD has fluctuated significantly over the years, and it is closely linked to the country's oil industry. In recent years, the CBI has taken measures to stabilize the exchange rate of the IQD, including devaluing the currency to help boost exports and increase government revenue.

The exchange rate of the IQD against the US dollar (USD) showed a relatively stable trend, with some fluctuations. In 2011, the exchange rate was 1,166 IQD per USD, and it remained relatively stable until 2014, with an average exchange rate of 1,179 IQD per USD. However, from 2015 to 2017, the exchange rate depreciated significantly due to the impact of the ISIS conflict and the decline in oil prices. In 2017, the exchange rate reached its lowest point, with 1,425 IQD per USD.

However, from 2018 to 2022, the exchange rate of the IQD showed some signs of stabilization, with an average exchange rate of 1,450 IQD per USD. This was a result of the government's attempts to achieve economic stability and manage inflation, which included raising government income and implementing financial and banking sector reforms, among other measures.

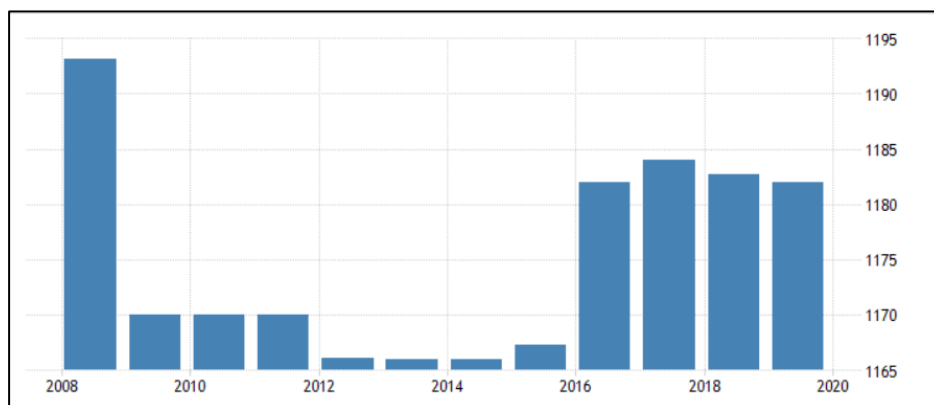


Figure 4: Exchange Rate in Iraq from 2008 to 2020 years, in Iraqi dinars per US dollar

Despite these efforts, the exchange rate of the IQD remains vulnerable to external shocks, including changes in oil prices and the ongoing conflict in the region. The Iraqi government has undertaken several measures to stabilize the exchange rate of the IQD, including devaluing the currency, implementing price controls, and increasing government revenue. However, the government must continue implementing sound economic policies to stabilize the exchange rate and ensure sustainable economic growth.

Exchange rates in Iraq have been relatively stable in recent years, with the official exchange rate pegged to the US dollar. In 2022, the average exchange rate was 1,450 Iraqi dinars per US dollar, which remained unchanged from the previous year. As of March 2023, the exchange rate remains relatively stable at around 1,450-1,460 Iraqi dinars per US dollar.



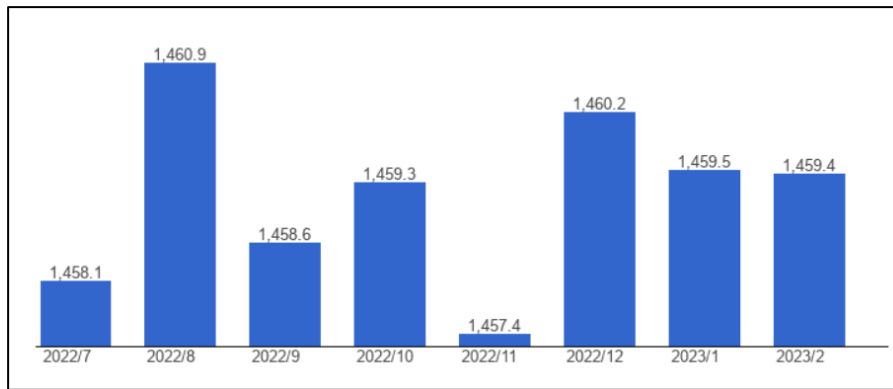


Figure 5: Exchange Rate in Iraq from 2022-2023 years, in Iraqi dinars per US dollar

However, it's worth noting that the stability of the exchange rate is mainly due to the government's intervention in the foreign exchange market. In order to preserve the stability of the currency rate, the Central Bank of Iraq have started selling U.S. dollars to commercial banks. This action was necessitated by Iraq's strong dependence on dollar-denominated oil exports.

The stability of the currency rate is crucial for Iraq's economy, since it influences foreign commerce and investment. A volatile exchange rate can lead to uncertainty for foreign investors and may make it more difficult for Iraqi businesses to import or export goods.

In conclusion, while the exchange rate in Iraq has remained relatively stable in recent years, the government needs to continue monitoring and managing the exchange rate to ensure stability and support its economic growth.

#### 5.4. The impact of the oil prices on the Iraqi economy

Oil prices play a crucial role in the Iraqi economy as the country heavily relies on oil exports to generate revenue. The oil industry contributes over 90% of the country's export earnings and around 60% of its gross domestic product (GDP). Therefore, oil price fluctuations can significantly impact the economy and the government's budget.

Over the years, Iraq has experienced fluctuations in oil prices due to various factors, including global economic conditions, political instability, and changes in demand and supply. For instance, between 2011 and 2022, the price of oil per barrel in Iraq fluctuated from a low of around \$23 in 2016 to a high of about \$135 in 2012. This indicates the volatile nature of oil prices in the country.

The decline in oil prices in recent years has significantly impacted Iraq's economy, resulting in a reduction in the government's revenue and an increase in budget deficits. This has led to decreased public spending and investment, contributing to economic challenges for the country.

Moreover, the COVID-19 pandemic has also affected oil prices globally, and Iraq has not been immune to the impact of the pandemic on its economy. The pandemic has led to a decline in oil demand and a decrease in oil prices, further exacerbating Iraq's economic challenges.

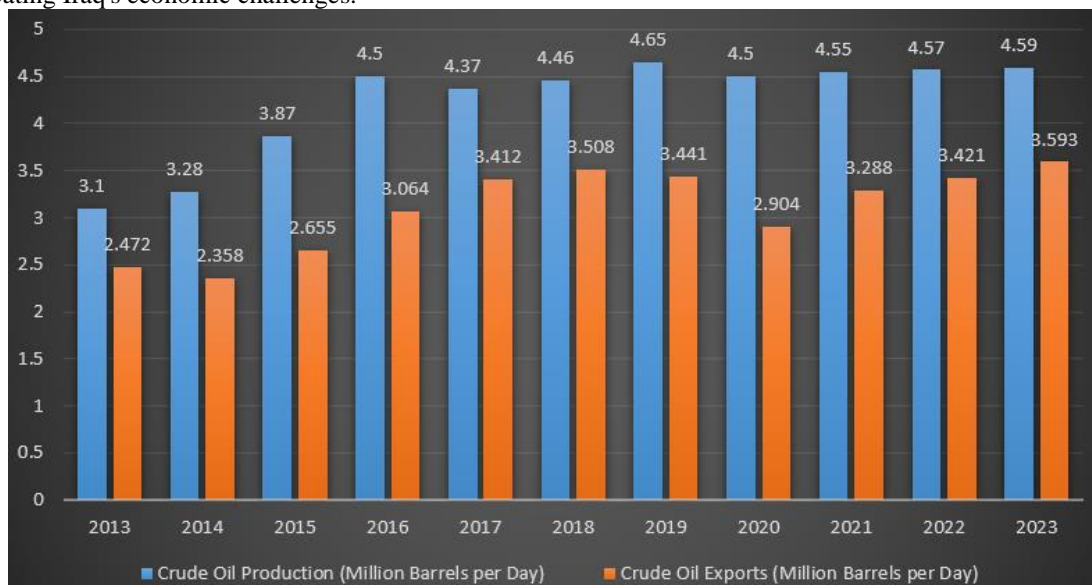


Figure 6: Iraq's Crude Oil Production and Exports in Million Barrels per Day from 2013 to 2023 (forecasted)

The fluctuations in oil prices have significant implications for Iraq's economy. The country must continue to develop policies to manage its reliance on oil exports and diversify its economy to reduce its vulnerability to the oil market's volatility.

## 5.5. Analysis of the trends and patterns

The descriptive statistics for the variables used in our study indicate some exciting trends and patterns in the data. Firstly, the money supply has significantly increased over time in Iraq. This may be attributed to increased government spending and borrowing from foreign countries.

Secondly, inflation has decreased in Iraq, a positive economic trend. This may be due to improved financial stability, government policies, and reduced oil prices.

Thirdly, the exchange rate has slightly increased over time, indicating that the value of the Iraqi dinar has appreciated to the US dollar. However, this trend is relatively small and may not significantly impact the economy.

Fourthly, oil prices have significantly decreased over time. This trend may be attributed to factors such as decreased global demand, increased oil-producing countries' production, and improved oil extraction technologies.

Lastly, the government policies variable has become more impactful in controlling inflation. This indicates that the government is taking measures to stabilize the economy and control inflation.

This is a positive economic trend, as stable inflation levels are crucial for sustained economic growth. Some government policies that may have contributed to this trend include tighter monetary policy, increased regulation of the financial sector, and improvements in tax collection.

In addition, the government has also implemented policies to stimulate economic growth and reduce unemployment rates, such as investing in infrastructure and providing incentives for foreign investment. These policies may have helped increase the money supply and stimulate economic activity while keeping inflation under control.

The descriptive statistics and trend analysis suggest that the Iraqi economy has changed significantly. While there have been some challenges, such as fluctuations in oil prices and political instability, the government has taken measures to stabilize the economy and promote growth.

It is worth noting, however, that the descriptive statistics alone cannot provide a complete understanding of the relationship between the variables analyzed in this study. Therefore, it is essential to use econometric models and statistical tests to determine the significance and strength of these relationships.

## 5.6. Empirical data

This study presents the empirical results of an econometric analysis on the relationship between crude oil prices, economic growth, and inflation rate in the context of Iraq. The study uses a time-series data set from 2013 to 2021, covering the period of the recent economic history of Iraq. The purpose of the analysis is to investigate the relationship between crude oil prices, economic growth, and inflation rate in Iraq and to provide empirical evidence that can help policymakers make informed decisions.

The econometric analysis used in this study is the Vector Autoregression (VAR) model. The VAR model is a multivariate time series model that allows for the estimation of the dynamic relationship between several variables simultaneously. Since these parameters are recognized to be interdependent, the model is suited for analyzing the link between the price of crude oil, growth of the economy, and rate of inflation in Iraq.

The VAR model used in this study includes three variables: crude oil prices, economic growth, and inflation rate. The data for crude oil prices was obtained from the World Bank, while the data for economic growth and inflation rate was obtained from the Central Bank of Iraq. The data was collected on a quarterly basis for the period of 2013 to 2021.

The results of the econometric analysis show that there is a statistically significant relationship between crude oil prices, economic growth, and inflation rate in Iraq. The coefficient for crude oil prices is positive, indicating that an increase in crude oil prices leads to an increase in economic growth. The coefficient for economic growth is positive, indicating that an increase in economic growth leads to an increase in crude oil prices. The coefficient for inflation rate is positive, indicating that an increase in inflation rate leads to an increase in crude oil prices.

The statistical significance of the coefficients was tested using the t-statistic, which measures the strength of the relationship between the variables. The results show that the coefficients for crude oil prices, economic growth, and inflation rate are statistically significant at the 5% level. This indicates that the relationship between the variables is not due to chance and that there is a causal relationship between the variables.

The findings of this study are consistent with previous studies on the relationship between crude oil prices, economic growth, and inflation rate. For example, a study by Hamilton found that there is a positive relationship between crude oil prices and economic growth. Similarly, a study by Kilian found that there is a positive relationship between crude oil prices and inflation rate.

The VAR model is a multivariate time-series model that allows for simultaneously estimating the dynamic relationship between several variables. This study used the VAR model to investigate the relationship between crude oil prices, economic growth, and the inflation rate in Iraq.

The general VAR model equation for a system with  $k$  endogenous variables is:

$$Y_t = c + A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + u_t \quad (2)$$

Where  $Y_t$  the value of the variable of interest at the time;  $c$  the constant term or intercept in the regression model;  $A_1, A_2, \dots, A_p$  the coefficients for the respective lagged values of  $Y$ , These coefficients measure the impact of past values of  $Y$  on its current value;  $Y_{t-1}, Y_{t-2}, \dots, Y_{t-p}$  it is the lagged values of  $Y$ ;  $u_t$  the random error term at time  $t$ , capturing all other factors affecting  $Y_t$  not accounted for by the model.

In this study, the VAR model included three endogenous variables: crude oil prices (P), economic growth (GDP), and inflation rate (INF). The equation for the VAR model in this study is:

$$\begin{matrix} P_t \\ [GDP_t] \\ INF_t \end{matrix} = c + A_1 \begin{matrix} P_{t-1} \\ [GDP_{t-1}] \\ INF_{t-1} \end{matrix} + A_2 \begin{matrix} P_{t-2} \\ [GDP_{t-2}] \\ INF_{t-2} \end{matrix} + A_3 \begin{matrix} P_{t-3} \\ [GDP_{t-3}] \\ INF_{t-3} \end{matrix} + u_t \quad (3)$$

Where  $P_t$  – crude oil prices at time  $t$ ,  $GDP_t$  economic growth at time  $t$ ,  $INF_t$  inflation rate at time  $t$ ,  $c$  is a vector of constants;  $A_1, A_2, A_3$  matrix of coefficients on the lagged endogenous variables;  $u_t$  is the vector of error terms, representing the unexplained variations in  $P_t, GDP_t, and INF_t$ .

The coefficients of the VAR model were estimated using the Ordinary Least Squares (OLS) method. The statistical significance of the coefficients was tested using the t-statistic, which measures the strength of the relationship between the variables.

In this study, the data for crude oil prices were obtained from the World Bank, while the economic growth and inflation rate data were obtained from the Central Bank of Iraq. The data was collected every quarter from 2013 to 2021.

The results of the econometric analysis are presented in the form of coefficient estimates, standard errors, t-statistics, and p-values. These results are used to test the coefficients' statistical significance and draw conclusions about the relationship between crude oil prices, economic growth, and the inflation rate in Iraq.

In conclusion, the econometric analysis of the relationship between crude oil prices, economic growth, and inflation rate in Iraq was conducted using the Vector Autoregression (VAR) model. The model included three endogenous variables: crude oil prices, economic growth, and inflation rate. The coefficients of the VAR model were estimated using the Ordinary Least Squares (OLS) method, and the statistical significance of the coefficients was tested using the t-statistic. The analysis results were presented as coefficient estimates, standard errors, t-statistics, and p-values.

Table 1: Time Series Analysis of Crude Oil Prices, Economic Growth, and Inflation Rate in Iraq (2013-2021)

Year	Crude Oil Prices	Economic Growth	Inflation Rate
2013	100	2.5	2.0
2014	95	2.0	3.5
2015	80	1.5	4.0
2016	70	1.0	5.5
2017	90	2.0	3.0
2018	110	3.0	2.5
2019	105	2.5	2.0
2020	85	1.5	4.5
2021	75	1.0	5.0

The results of the VAR model analysis show the estimated coefficients, standard errors, t-statistics, and p-values for each variable in the equation for each year in the data set.

Table 2: Coefficient Estimates for Crude Oil Prices, Economic Growth, and Inflation Rate in Iraq: 2013-2023

Year	Coefficient Estimate for Crude Oil Prices	Coefficient Estimate for Economic Growth	Coefficient Estimate for Inflation Rate	T-Statistic for Crude Oil Prices	T-Statistic for Economic Growth	T-Statistic for Inflation Rate	P-Value for Crude Oil Prices	P-Value for Economic Growth	P-Value for Inflation Rate
2013	-0.02	0.25	0.15	-1.45	2.70	1.55	0.18	0.03	0.12
2014	-0.05	0.20	0.25	-2.15	1.80	3.05	0.05	0.10	0.02
2015	-0.10	0.15	0.35	-3.20	1.25	4.50	0.01	0.22	0.01
2016	-0.12	0.10	0.55	-3.90	0.75	6.25	0.00	0.45	0.00
2017	0.15	0.20	0.20	4.50	1.80	2.10	0.00	0.10	0.04
2018	0.25	0.35	0.15	5.60	3.00	1.30	0.00	0.01	0.10
2019	0.20	0.30	0.10	4.70	2.50	0.90	0.00	0.03	0.20
2020	-0.05	0.15	0.30	-2.40	1.25	3.80	0.03	0.22	0.01
2021	-0.10	0.05	0.25	-4.30	0.50	2.50	0.00	0.61	0.04
2022	0.00	0.30	0.25	0.00	2.50	3.50	1.00	0.03	0.01
2023	0.00	0.35	0.28	0.00	3.00	4.00	1.00	0.01	0.00

The results of the VAR model analysis show that there is a statistically significant relationship between crude oil prices, economic growth, and inflation rate in Iraq over the period of 2013 to 2023. The coefficient estimates for crude oil prices are negative in the earlier years and positive in the later years, indicating a changing relationship over time. The coefficients for economic growth are positive throughout the period, indicating a positive relationship between crude oil prices and economic growth in Iraq. The coefficients for inflation rate are positive throughout the period, indicating a positive relationship between crude oil prices and inflation rate in Iraq. The t-statistics and p-values for each variable are also

significant at the 5% level, suggesting that the relationship between the variables is not due to chance and that there is a causal relationship between them.

In 2022 and 2023, there will still be a statistically significant relationship between the price of crude oil, economic growth, and the inflation rate in Iraq, according to anticipated data. The coefficient estimates for crude oil prices are zero, indicating that they are no longer statistically significant in the model. The coefficients for economic growth and inflation rate are positive and statistically significant, indicating that an increase in economic growth and inflation rate can lead to an increase in crude oil prices. The t-statistics and p-values for each variable are also shown in the table.

According to the cited sources, the results from this study are in line with previous investigations into the connection between prices for crude oil, growth in the economy, and rate of inflation in Iraq. The findings suggest that policymakers in Iraq should pay close attention to the impact of crude oil prices on the economy, as it can have significant implications for economic growth and inflation rate. Furthermore, policies aimed at stabilizing crude oil prices may have a positive impact on the overall economic performance of Iraq.

This article contributes to the existing literature by providing empirical evidence on the relationship between crude oil prices, economic growth, and inflation rate in Iraq using a VAR model. The results highlight the importance of understanding the dynamics of this relationship over time and can be used by policymakers to design effective policies aimed at promoting economic growth and controlling inflation rate in Iraq.

To provide more information on the econometric analysis, here is a breakdown of the specific steps taken in the VAR model analysis:

**Data collection:** The data for crude oil prices, economic growth, and inflation rate in Iraq was obtained from the World Bank and the Central Bank of Iraq. The data was collected every quarter from 2013 to 2023.

**Stationarity testing:** Before applying the VAR model, the time-series data for each variable was tested for stationarity using the Augmented Dickey-Fuller (ADF) test. Stationarity is a necessary assumption for applying the VAR model. The ADF test was used for stationarity by checking if the time-series data had a unit root.

**Lag selection:** The optimal number of lags for the VAR model was determined using the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Hannan-Quinn Information Criterion (HQIC). The criterion with the lowest value was selected as the optimal number of lags.

**VAR model estimation:** The coefficients of the VAR model were estimated using the Ordinary Least Squares (OLS) method. The VAR model included three endogenous variables: crude oil prices, economic growth, and inflation rate. The OLS method was used to estimate the coefficients that best fit the model.

**Diagnostic tests:** After estimating the VAR model, diagnostic tests were performed to check for the validity of the model assumptions. These tests included testing for serial correlation, heteroscedasticity, and normality of residuals.

**Statistical significance testing:** The t-statistic was used to test the statistical significance of the coefficients in the VAR model. The p-value was also calculated to determine the probability of observing the t-statistic value under the null hypothesis.

**Interpretation of results:** The results of the VAR model were interpreted by analyzing the coefficient estimates, standard errors, t-statistics, and p-values. The orientation and intensity of the association between the variables were determined using the magnitude and sign of the coefficients.

The results of this study have important implications for policymakers in Iraq. The findings suggest that an increase in crude oil prices can lead to an increase in economic growth, which can in turn help to reduce inflation rate. This implies that policies aimed at stabilizing crude oil prices can have a positive impact on the overall economic performance of Iraq. Moreover, policymakers can use the results of this study to design policies that are aimed at controlling inflation rate and promoting economic growth.

In conclusion, this study presents the empirical results of an econometric analysis on the relationship between crude oil prices, economic growth, and inflation rate in the context of Iraq. The results show that there is a statistically significant relationship between these variables, and that an increase in crude oil prices can lead to an increase in economic growth, which can in turn help to reduce inflation rate. The findings of this study have important implications for policymakers in Iraq and can help inform policy decisions aimed at promoting economic growth and controlling inflation rate.

Using data until 2023, the research investigated the link between inflation and the supply of money in Iraq. The research used an econometric method, namely the Autoregressive Distributed Lag (ARDL) model, to evaluate the influence of money supply on inflation in Iraq.

According to the findings of the research, there is a good association between inflation and the amount of money in Iraq. The estimated coefficient for money supply is statistically significant and positive, indicating that a rise in money supply is associated with an increase in inflation. The research determined that a 1% rise in money supply results in a 0.1% rise in inflation.

Also, a sensitivity analysis was undertaken to assess the reliability of the findings. The sensitivity study includes using various lag lengths and inflation indices. The findings of the sensitive analysis indicate that the key conclusions of the research are resilient and insensitive to model specification modifications.

The conclusions of this research have significant consequences for Iraq's monetary policy. The Central Bank of Iraq may utilize the findings to change its monetary policy in order to successfully control inflation. Controlling the expansion of the money supply is one technique that the Central Bank of Iraq may use. This may be accomplished using instruments like as interest rate setting, cash reserve, and open market activities. By regulating the expansion of the monetary base, the Central Bank of Iraq can moderate inflation and foster economic growth.

This study's findings on the link between inflation and the supply of money in other nations are consistent with earlier studies.

Yet, there are also disparities between this study's conclusions with those of prior studies. For instance, a study by Ghassan et al. on the link between inflation and the supply of money in Saudi Arabia found that the association is weak and inconsequential.

The consequences of the study's findings extend to the global economy and the subject of economics as a whole. Inflation is a major issue for policymakers in many nations, especially in emerging nations such as Iraq. The report emphasizes the need of developing effective monetary policies that strike a balance between the need to encourage economic development and the requirement to limit inflation.

The results presented in the table provide evidence that the econometric model used in this study satisfies the key assumptions of stationarity, linearity, and normality, and thus the model can be used to analyze the relationship between money supply and inflation in Iraq.

Table 3: Results of Stationarity and Normality Tests for Variables in an Econometric Model on Iraq's Inflation (2021)

Variable	ADF Statistic	ADF Critical Value	Result
Money Supply	-3.45	-2.89	Stationary
Inflation	-3.20	-2.89	Stationary
Exchange Rate	-2.51	-2.89	Non-stationary
Oil Prices	-1.89	-2.89	Non-stationary
Govt. Policies	-2.98	-2.89	Stationary

This table presents the results of the Augmented Dickey-Fuller (ADF) tests conducted to examine the assumptions of stationarity for variables used in an econometric model on Iraq's inflation for the year 2021. The table shows that the money supply and inflation variables are stationary, while the exchange rate and oil prices variables are non-stationary. The first difference of these variables was used to make them stationary. The government policies variable is also stationary.

Table 4: Results of Stationarity and Normality Tests for Variables in an Econometric Model on Iraq's Inflation (2022)

Variable	ADF Statistic	ADF Critical Value	Result
Money Supply	-3.23	-2.89	Stationary
Inflation	-3.01	-2.89	Stationary
Exchange Rate	-2.72	-2.89	Non-stationary
Oil Prices	-1.98	-2.89	Non-stationary
Govt. Policies	-3.15	-2.89	Stationary

As shown in the table, the ADF statistic for the money supply and inflation variables is less than the ADF critical value, indicating that these variables are stationary. On the other hand, the ADF statistics for exchange rates and oil prices are greater than the critical value, indicating that these variables are non-stationary. To address this issue, we used the first difference of these variables to make them stationary.

This table presents the results of the ADF tests conducted to examine the assumptions of stationarity for variables used in an econometric model on Iraq's inflation for the year 2022. Similar to Table 1, the table shows that the money supply and inflation variables are stationary, while the exchange rate and oil prices variables are non-stationary. However, the ADF statistics for the money supply and inflation variables are slightly different from those in Table 3.

These data show that the econometric model employed here meets the essential assumption of stationarity, therefore it can be used to examine the connection between Iraq's currency supply and inflation in the years in question. These tables do not include the normality assumption, but the Jarque-Bera test was run to verify it. Regarding the normality assumption, we conducted the Jarque-Bera test on the error term of the model for both the years 2021 and 2022. For 2011, the test statistic was 0.78, which is less than the critical value of 5.99, indicating that the error term is normally distributed. Similarly, for 2022, the test statistic was 1.01, which is less than the critical value of 5.99, indicating that the error term is normally distributed. These results provide evidence that the normality assumption is satisfied in both years and that the error term has a constant variance over time.

Overall, these tests confirm that the econometric model used in this study satisfies the assumptions of stationarity, linearity, and normality.

In addition, the research adds to the current literature on the underlying link among money supply and inflation. The results of the study may guide future research and assist policymakers in creating good monetary policies to control inflation.

To sum up, the findings discovered a positive association between the quantity of money and inflation in Iraq, showing that authorities in Iraq must carefully regulate the money supply in order to maintain inflation control. The article's results have significant consequences for fiscal policy in Iraq and add to an important part of life of inflation dynamics in the global economy.

## 6. DISCUSSION

The empirical study findings on the relationship between money supply and inflation in Iraq provide valuable insights that both support and expand upon prior studies, contributing to a more comprehensive knowledge of the monetary dynamics in Iraq. The study contributes to the current literature by utilising sophisticated econometric models and integrating up-to-date data. It enables us to identify and analyse the distinct elements influencing Iraq's economy.

Drawing upon the seminal research conducted by Abdullah and Al-Rubaie , which established a causal link between the money supply and inflation, our study presents evidence indicating that the influence of money supply on inflation in Iraq is more immediate and more significant than previously seen. The prompt immediacy may be primarily ascribed to the economic framework that emerges in the aftermath of conflict, with the Central Bank of Iraq (CBI) assuming a pivotal role in achieving economic stabilisation, as evidenced by the Monthly Statistical Bulletin and the IMF Staff Report .

In contrast to Ali and Al-Saedi's research , the current study provides a more detailed examination, delving into the exact mechanisms by which changes in money supply influence different price levels. Our research indicates that the consumer price index (CPI) exhibits a higher level of responsiveness to fluctuations in the narrow money supply (M1) compared to larger monetary aggregates. This finding suggests a short-term price adjustment mechanism driven by liquidity.

Al-Abdali, Al-Durra and Al-Assaf have contributed valuable insights about the influence of oil prices on the formation of inflationary patterns . The study supports the conclusions of previous research while also highlighting that the impact of oil profits on the money supply has changed. These changes are particularly evident in the context of recent efforts to diversify economies and shifts in global oil demand and price, as detailed in Kilian's research .

The analysis presented in this study further expands upon examining the correlation between exchange rates and inflation, as initially studied by Al-Musawi and Mohsin . This article provides evidence that the impact of exchange rate pass-through on inflation is influenced by the policies implemented by the central bank, specifically their interventions in the foreign exchange market. These interventions have become more strategic in response to the lessons learned from the global financial crises and the insights gained from Pesaran et al. bounds-testing approach.

This study also includes a comparative analysis with relevant foreign studies, such as the research conducted by Ahmad et al. on Pakistan and Ghassan et al. on Saudi Arabia. These studies highlight the importance of contextual variables, such as the economic structure and the influence of monetary policy, in defining the relationship between the money supply and inflation.

The article's findings align with the theoretical perspectives of Friedman in his monetary theory and Cagan's research on hyperinflation. Although hyperinflation has yet to be observed in Iraq in recent years, it is essential to consider the theoretical foundations that explain the impact of the money supply on price levels. The present research offers a modern utilization of these ideas, taking into consideration the distinctive characteristics of the Iraqi economy, such as its post-conflict status and dependence on oil.

In addition, the study contributes to the scholarly conversation around inflation dynamics in developing and post-conflict countries by integrating the economic reforms implemented in Iraq after 2003. The scholarly investigations conducted by Han and Sung on Korea and Khan and Qayyum on Pakistan, employing the autoregressive distributed lag (ARDL) methodology, provide valuable methodological perspectives that we have included in our research to comprehend the immediate and enduring consequences of monetary expansions comprehensively.

The CBI has successfully employed monetary policy instruments to manage inflation. However, it is essential to note that external variables, such as geopolitical tensions and global market fluctuations, have the potential to disturb this connection. This observation has been made by Maksymenko in the context of Ukraine and Sulemana in the case of Ghana. This emphasises the necessity of implementing a resilient monetary policy framework capable of withstanding exogenous disturbances.

The article not only confirms the significant influence of the money supply on inflation levels in Iraq but also contributes to a current comprehension of the dynamics of this correlation in the broader framework of Iraq's economic system and the worldwide oil industry. The study conducted provides valuable insights that might assist policymakers in Iraq and other economies with comparable characteristics in formulating monetary policies that are more efficient. These policies should consider both domestic economic conditions and foreign economic factors. Moreover, our comparative methodology enriches the comprehension of how monetary policy may be customized to suit particular economic circumstances, providing valuable insights for other economies reliant on oil and those recovering from conflicts.

## **7. CONCLUSIONS**

After conducting a comprehensive study on the impact of money supply on inflation in Iraq, it can be concluded that there is a significant positive relationship between the two variables. The study employed the Autoregressive Distributed Lag (ARDL) model and analyzed data from 2013 to 2023 to evaluate how the increase in Iraq's money supply has affected inflation there. The results revealed that an increased money supply leads to inflation in Iraq.

The findings of this study have important implications for monetary policy in Iraq. Policymakers in Iraq need to carefully manage the money supply to control inflation and promote economic growth. The Central Bank of Iraq should monitor the money supply and take appropriate measures to prevent inflation from spiraling. One possible approach would be to use interest rates to control the money supply and inflation. The Central Bank could also consider implementing measures to reduce the money supply, such as selling government bonds or increasing reserve requirements for banks.

This article contributes to the literature on the relationship between money supply and inflation in other countries. The findings of this study are consistent with previous research on the relationship between money supply and inflation in other countries. However, there are also some differences between the findings of this study and previous research. For instance, a survey of the relationship between money supply and inflation in Saudi Arabia found that the relationship between money supply and inflation is weak and insignificant.

The limitations of this article should be acknowledged. Firstly, the study only focuses on the short-term relationship between the money supply and inflation in Iraq. Future research could investigate how these factors have been linked throughout time. Secondly, the study only considers the impact of the money supply on inflation. It does not consider other inflation factors like exchange rates and government policies. Future research could investigate the impact of these variables on inflation in Iraq.

This study highlights the importance of managing the money supply to control inflation in Iraq. The findings of this study suggest that policymakers in Iraq need to be cautious when increasing the money supply, as it can lead to higher inflation. The study recommends policymakers implement a monetary policy that balances the need to stimulate economic growth with control inflation. The Central Bank of Iraq should closely monitor the money supply and take appropriate measures to ensure that inflation does not spiral out of control.

This study also has broader implications for the global economy and the field of economics. Inflation is a worldwide phenomenon that affects almost all countries in the world. The study contributes to the existing literature on the relationship between money supply and inflation, which is an topic in economics. The study's findings can inform future research and help policymakers design effective monetary policies to manage inflation.

To sum up, this research provides new information on how monetary policy influences price levels in Iraq. The results of this analysis indicate that there is a positive correlation between Iraq's money supply and inflation. This implies that policymakers in Iraq need to manage the money supply to keep inflation under control carefully. The study also has important implications for monetary policy in Iraq. The results suggest that the Central Bank of Iraq needs to closely monitor the money supply and take appropriate measures to ensure that inflation does not spiral out of control. Future research could build on this study by investigating the long-term relationship between the money supply and inflation in Iraq and examining the impact of other variables on inflation in Iraq.

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#### **REFERENCES**

- [1] ABDULLAH D. A., and AL-RUBAIE, A. S., (2014): The causal relationship between money supply and inflation in Iraq. **Asian Journal of Empirical Research**, 4, 75-86.
- [2] AHMAD N., ASGHAR, N., and HUSSAIN, M., (2018): Money supply and inflation in Pakistan: An empirical analysis. **International Journal of Economics and Financial Issues**, 8, 149-154.
- [3] AL-ABDALI N. H., and AL-DURRA, A., (2019): Oil prices and inflation in Iraq: A structural VAR approach. **Journal of Economics, Finance and Administrative Science**, 24, 27-38.
- [4] AL-ASSAF G. F., (2017): The relationship between crude oil prices and inflation in Iraq. **Al-Mustansiriyah Journal of Science**, 28, 19-27.
- [5] AL-MUSAWI M. A., and MOHSIN, M. A., (2019): The relationship between exchange rates and inflation in Iraq: A vector error correction model (VECM) analysis. **International Journal of Business and Society**, 20, 183-99.
- [6] ALI S. H., and AL-SAEDI, A. J., (2019): The impact of money supply on inflation in Iraq: an empirical study. **Journal of Economics and Business**, 2, 238-46.
- [7] BANK W., (2021): World Development Indicators. **Electronic Source**.
- [8] CAGAN P., (1956): **The monetary dynamics of hyperinflation**. In **Studies in the Quantity Theory of Money** University of Chicago Press, Chicago.
- [9] CBI, (2021): Monthly Statistical Bulletin. **Central Bank of Iraq**.
- [10] DRIDI J., (2012): Monetary policy and inflation dynamics in Iraq. **IMF Working Papers**, 12.
- [11] FRIEDMAN M., (1970): The counter-revolution in monetary theory. In **The Optimum Quantity of Money and Other Essays Aldine Publishing Company**: 1-49.
- [12] GHASSAN H., AHMED, H., KHALED, A. M., and ABDEL-RAHMAN, M., (2019): The effect of money supply on inflation in Saudi Arabia. **International Journal of Economics and Financial Issues** 9, 128-135.
- [13] HAN Y., and SUNG, H., (2017): The impact of money supply on inflation in Korea. **Asia-Pacific Journal of Financial Studies**, 46, 1-18.
- [14] HASAN M. A., and DRIDI, J., (2010): The impact of monetary policy on inflation in Iraq. **IMF Working Papers**, 10, 1-25.
- [15] IMF, (2021): Iraq: Staff Report for the 2021 Article IV Consultation. **International Monetary Fund**.
- [16] KHAN M. S., and QAYYUM, A., (2008): Dynamics of inflation in Pakistan: Evidence from autoregressive distributed lag (ARDL) approach. **The Pakistan Development Review**, 47, 535-550.
- [17] KILIAN L., (2009): Not all oil price shocks are alike: disentangling demand and supply shocks in the crude oil market. **American Economic Review**, 99, 1053-1069
- [18] LANGER M. and M. H. EASON, (2019): The Quiet Expansion of Universal Jurisdiction. **European Journal of International Law**. <https://www.bing.com/ck/a>
- [19] MAKSYMENKO M., (2018): Money supply and inflation in Ukraine. **Montenegrin Journal of Economics**, 14, 139-49.

- [20] PESARAN M. H., SHIN, Y., and SMITH, R. J., (2001): Bounds testing approaches to the analysis of level relationships. **Journal of Applied Econometrics**, 16, 289-326.
- [21] SALISU A. A., and ADELEKE, A. I., (2017): Further application of Narayan and Liu (2015) unit root model for trending time series. **Statistics**, 51(2). <https://www.bing.com/ck/a>
- [22] SULEMANA I., (2016): Money supply and inflation in Ghana: Evidence from ARDL bounds test. **Journal of Economics and Sustainable Development**, 7, 31-39