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The impact of oil revenue fluctuations on inflation and unemployment in Iraq for the period (2005-2020)

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ABSTRACT

Iraq experienced a critical and turbulent period between 2003 and 2020, marked by political instability and emergency conditions that directly impacted the country's structure, performance, and economy. In light of this, this study aimed to analyze the effect of fluctuations in oil revenues on key macroeconomic variables in Iraq, specifically unemployment and inflation, during the period 2005–2020. The research employed the Variable Regression (VAR) model and the Error Correction (ECM) model, based on official annual data analyzed using EViews 12 software. Reliability tests and cointegration techniques were applied to assess short-term and long-term relationships. The results indicate that the Iraqi economy is heavily dependent on oil revenues, which constituted more than 90% of total public revenues in most of the years included in the study. The study reveals that oil revenues peaked at 119.4 trillion Iraqi dinars in 2012, then declined to 54.4 trillion Iraqi dinars in 2016. Unemployment rose from 18% in 2005 to 30% in 2020, largely driven by lower oil prices and reduced fiscal capacity. Simultaneously, inflation fell significantly from 30.8% in 2005 to less than 1% between 2015 and 2020, reflecting government interventions and demand constraints. The VAR model results indicate a unidirectional causal relationship between oil revenue volatility and unemployment, highlighting the vulnerability of the Iraqi labor market to oil price shocks. Therefore, the study recommends diversifying the economy, investing oil revenues in other productive sectors, and adopting flexible budgeting practices to mitigate the impact of future oil price shocks.

Keywords: Oil Revenues, Iraqi Economy, VAR Model, Economic Fluctuations, ECM.

INTRODUCTION

This study focuses on the Iraqi oil economy from 2005 to 2020, specifically on oil prices, inflation, and unemployment, based on annual data for these variables. It examines the impact of fluctuations in oil revenues to highlight the importance of oil to the Iraqi economy. In addition to the general economic, social, and political effects of unemployment and inflation resulting from rising and falling oil prices, other vulnerabilities emerge that affect all economic sectors in the country. This phenomenon is also observed in global economies that are entirely dependent on oil revenues. The findings indicate a fluctuating impact, both upward and downward, due to the effect of oil prices on revenues. This suggests a need for genuine political will among the country's economic policymakers to transform the Iraqi economy to achieve balance in the real sectors and reduce its complete dependence on oil resources.

This research aims to analyze the relationship between oil price fluctuations and certain macroeconomic variables (inflation and unemployment) by presenting a strategic framework based on realistic and practical findings. The goal is to enhance and improve alternative funding sources in light of the challenges posed by oil price volatility. The analysis utilizes Variable Regression (VAR) and Error Correction (ECM) models, based on official annual data analyzed using the EViews 12 statistical software [1]. This is crucial for mitigating negative oil shocks and achieving sustainable development in the Iraqi economy. The surplus revenue generated from oil plays a vital role in improving development levels and enhancing the economic performance of all sectors, particularly the service and production sectors. Furthermore, the optimal utilization of oil revenues in establishing and developing the oil industry as a whole can bolster socio-economic development [2, 3].

THE RESEARCH METHODOLOGY

First: The research problem:

It is defined by a main question: what is the impact of oil revenue fluctuations on some macroeconomic variables in Iraq? Many secondary problems branch out from the main problem, which can be summarized in the following questions: What is the importance and role of oil and the extent of its impact on the Iraqi economy? What are the factors affecting oil revenue fluctuations? Is there a statistically and economically significant relationship indicating the impact of these economic variables on oil price fluctuations in Iraq?

Iraq is one of the oil-producing countries whose economy depends mainly on its revenues, and oil fluctuations gain their importance at the level of the global economy as they are linked to economic activity in general, so it is necessary to shed light on the reality of the oil sector in Iraq and the extent of its repercussions on the economic and financial side in it, and the importance of the study appears clearly in terms of the fact that the subject of the impact of oil revenue fluctuations has taken a global trend, in addition to that, this study attempts to search for the best solutions to benefit from the oil sector and its revenues in light of revenue fluctuations and employ them in an ideal way that serves the Iraqi economy.

Secondly, the importance of the research can also be divided into:

Deepening the understanding and comprehension of the impact of oil revenue fluctuations on macroeconomic variables such as unemployment in Iraq during the period (2005-2020), to align with the studies and research that preceded it, with the aim of intellectual enrichment and accumulation of the cognitive impact of the research variables. Providing local and international libraries with simple scientific efforts that address important topics in revenue, in particular. The research

deals with topics that have a significant impact on oil revenues and macroeconomic variables in Iraq, which have become a major and effective role in the country's economic stability. The contribution of the current research is to deepen and clarify the vision towards oil revenues and the extent of their contribution to macroeconomic variables (unemployment) in Iraq. The benefit of government institutions and economic organizations will come from the conclusions and recommendations that will emerge from the research.

The research aims primarily to study the impact of oil revenue fluctuations on macroeconomic variables (unemployment) in Iraq for the study period (2005-2020) through the following sub-objectives:

1- Clarifying the importance of oil in the Iraqi economy and the extent of this economy's dependence on oil revenues.2- Clarifying the impact of oil revenue fluctuations on some macroeconomic variables.
3- Clarifying the most important factors affecting oil revenue fluctuations.
4- Identifying some macroeconomic variables in addressing economic problems and imbalances, and how to employ these tools in Iraq to ensure economic and financial stability and balance.
5- Attempting to link oil revenues and macroeconomic variables (unemployment) during the specified period of study.
6- Applying some statistical measures to indicate the type of relationship and the strength of the association between oil revenue fluctuations and some macroeconomic variables.

Third: Time limits:

Refer to the period during which the researchers conducted the research, with its theoretical and practical aspects. The time limits of the study are represented during the years (2005-2020), which is the period during which the researchers were able to obtain all the information, data, and statistics necessary for the study. Spatial limits: The spatial limits are represented by studying the case of the country of Iraq. To understand the different aspects of the study and try to test the objective hypotheses, the study relied on the analytical and descriptive approach in describing and analyzing the study variables, especially in the third chapter of the study, to measure the impact of oil revenue fluctuations on some macroeconomic variables in the country of Iraq by using modern standard models, including stability, the vector autoregression model (VAR) and the error correction model (ECM) to test the equilibrium in the long term and report the dynamics in the short term using statistical analysis programs (Eviews-12). The study is based on a main hypothesis that the macroeconomic variables in Iraq are affected by fluctuations in oil prices, as the Iraqi economy depends to a large extent on the financial revenues generated from oil, and this is evident from the decline and rise that occurred in its oil revenues, the general federal budgets in the country of Iraq throughout the study period (2005-2020)

Fourth: Research Tools

Theoretical Aspect: The theoretical aspect was covered based on Arab and international sources and references from books, theses, university dissertations, periodicals, and scientific research. The international information network via the Internet was also extensively used, which played a major and important role in providing a large part of modern Arab and international foreign studies.

Applied aspect: This aspect was based on the following:

Data: Due to the nature of the research, the researchers relied on covering this aspect by referring to the annual digital data related to the oil revenues of the country of Iraq and showing the extent of their impact on the macroeconomic variables in Iraq during the study period (2005-2020).

Methods used in data analysis

1- Testing the research measurement tool: The following set of models and statistical methods was used.

2- Autoregression: (VAR).
3- Standard deviation model: Used to know the dispersion of answers from their arithmetic mean, which is the square root of the variance.
4- Simple correlation coefficients (Pearson): Used to determine the type of relationship between the independent variable and the dependent variable.
5- Simple linear regression coefficients: Used to measure the effect of the independent variable on the dependent variable.
6- Error Correction Model (ECM): To test long-term equilibrium and report short-term dynamics
7- The researchers used a set of special programs to implement these methods, namely Excel 2010, SPSS V.23, and Eviews 12.

Theoretical aspect:

First Axis: Variable of Fluctuations in Oil Revenues

By oil revenue volatility, we mean the instability of the annual revenues received from oil sales by oil-producing and exporting countries. These revenues rise and fall periodically, and this annual fluctuation is attributed to the rise and fall of oil prices in global oil markets. Oil price volatility is considered the primary source of economic imbalances in the economies of producing countries [4]. Some governments believe that the increased contribution of the oil sector to national income growth has led to a decline in the role of non-oil sectors in most oil-producing and exporting countries. Oil revenues are defined as the proceeds or funds generated from oil sales by oil-producing and exporting countries in global oil markets [5]. These countries rely on this source to secure foreign currency and finance the majority of public spending [6]. Oil revenues are also defined as the revenues received by some oil-producing and exporting countries in exchange for producing and exporting depletable natural resources. Oil revenues can also be defined as representing the financial returns that oil-producing and exporting countries (crude oil or its derivatives) receive as part of the real value of this depleting resource [7-9].

First: The importance of crude oil

The importance of crude oil is an extension of the importance of energy as a whole in the economic field, due to the great importance of oil in the political, military, and social fields, and can be summarized as follows:

1- The importance of oil in the industry:

The industrial process cannot continue regularly without the need for oil, and therefore, it is an important source of heat and mobile energy, as well as a basis for petrochemical industries. In addition, oil is the primary fuel for operating industry and moving machines in factories and laboratories [10].

2- The importance of oil in transportation and communications:

The oil sector is considered the main artery of modern transportation, as the quantities used in the transportation and communications sector are estimated at 35% of the total oil consumed in the world, and therefore, it is the best fuel in terms of cost.

3- The importance of oil in trade:

This is represented in the fact that oil products constitute an international trade commodity with great financial value. Therefore, foreign companies buy from global markets the majority of oil extracted from developing countries and follow the manufactured products from more than 100 countries in the world, thus achieving high profits [11].

4- The importance of oil from a political perspective:

The importance of oil lies in its being a tool for political pressure, as some producing countries use it to influence other countries, especially those consuming it, to change their political positions [6].

Second: Oil Theories

There are numerous theories about the origin of crude oil, each based on hypotheses primarily related to the composition of this

"black gold," as some call it. One theory posits that oil originated from the formation of underground deposits at some point in time, where chemical reactions similar to those observed in laboratories occurred. This process transformed organic matter into petroleum or natural gas, as seen today in the form of rocks found in cities, serving as evidence of these reactions and supporting this theory. These theories have been the most prevalent for decades, gaining traction during crises such as supply disruptions, sudden surges in demand, or price hikes (Zhijun et al., 2021).

The origin of crude oil is attributed to two basic theories, which are [12]:

1-The organic theory: It is sometimes called the modern theory, and it is a group of multiple theories that explain the origin and formation of crude oil, depending on the interaction of various organic elements (plant and animal) with the formation of elements.

This theory consists of two parts:

A- The organic plant theory:

This theory depends on plants from different herbs and trees as an organic source. This theory is that these plants have disappeared and been buried deep in the earth over thousands of years, which led to the existence of the analysis as a result of heat and pressure underground, the oil that we see today, as is the case in parts of America and Europe, or coal regions in many parts of the world.

B- The organic animal theory:

This theory depends on organic animal sources such as fish and shellfish that disappeared in the depths of the seas or the earth and disintegrated and decomposed as a result of heat and pressure, as well as terrestrial organisms (microbial organisms).

2- The Inorganic Theory:

Also known as Kuhn's theory, it is the first and oldest of these theories, along with Humboldt's theory in 1804 and Marx's theory in 1965. All these theories interpreted oil as a product of a reaction, such as the combination and reaction of hydrogen and carbon, or the reaction of iron with water, among others. This theory is supported by theoretical and experimental results in the preparation of some hydrocarbon products, such as benzene, acetylene, and methane. However, this theory remains limited in its reliability, especially since its assumptions are mostly based on theoretical aspects, and its support is limited. Furthermore, there are conflicting theories regarding its theoretical explanation.

Third: Factors affecting oil price fluctuations:

Global oil demand indicates the extent of the need to obtain oil at a specific price and at a specific time to meet human needs. This oil demand is not created directly, but it means that demand is driven by demand through the repetitive process, and human demand has increased with the development of the oil industry, and the increase in global demand for oil at different rates between rise and fall [13].

There are other factors affecting oil price fluctuations, including:

A-Economic Growth Rate:

High oil prices are a source of danger for Western industrialized countries, especially the United States of America, and whatever the price of oil and its risks, they remain the cheapest source compared to other alternatives. What can replace the volume of oil and what affects the global demand for crude oil are the changes that occur in the levels of the real gross national product of the country [14].

B-Oil speculation:

Oil speculation is one of the main factors affecting the fluctuations in crude oil prices, and therefore, it is based on expectations of future prices, as it focuses on a set of macroeconomic, political, and climate variables. Expectations of rising oil prices, speculators begin to buy oil, oil prices will rise, and the opposite may happen [15].

C-Population Growth Rate:

Population growth is a major factor in global crude oil consumption, and while population growth is important, its impact on global demand for crude oil can be relative and integrated with other factors, especially production and national income [16].

D-Alternative energy sources:

The presence and availability of alternative forms of energy to crude oil at a price that competes with oil prices is an influential factor in the oil demand, and thus the great dependence of oil-consuming countries on these sources. Additional and permanent sources to meet local consumption requirements in the best possible way and at a lower price.

E- Multiple uses of petroleum energy:

The price of crude oil is classified as one of the main factors affecting the oil demand, so a decrease in the price of oil leads to an increase in demand and vice versa in the case of an increase in the price of oil, whether it is related to crude oil or its refined products, and since the oil demand is a demand derived from the demand for products because the prices of these products will have an impact on the prices of crude oil [16].

The size of the oil inventory

The major oil-consuming countries have commercial inventory, which is one of the most important means of balancing the oil market in light of the fluctuations in oil prices from time to time. South Africa tends to build new strategic oil inventories due to the increase in daily consumption of crude oil, as the amount of oil inventories depends on the current and expected level of prices, storage costs, and other trade factors [17].

G- The purchasing power of the dollar:

Global markets deal in the US dollar, and the price of crude oil depends on the value and stability of the dollar. And for this reason, there is a close relationship between the price of the dollar and the price of oil, and therefore, all oil exchanges are conducted in the dollar currency. Therefore, the decrease or increase in the price of the dollar will directly affect the price or value of crude oil in global markets [18].

Second Axis: Unemployment

1- The Concept of Unemployment

Unemployment has emerged as a phenomenon in all human societies, both ancient and modern. Hardly any society is free from this phenomenon, and both developing and developed countries struggle under its weight. Unemployment is considered one of the obstacles that cause imbalances in economic activity, which directly or indirectly affects the economic structure of any country, in addition to threatening social peace (Al-Aisiri et al., 2024). Unemployment is a topic that has received considerable attention from economists and researchers. Research has been in-depth, and numerous economic theories have been developed that attempt to explain this phenomenon, as countries strive to increase the size of the workforce and thus reduce unemployment rates (Janowski, 2024).

2 - Causes of unemployment:

The fact that unemployment is considered one of the most serious problems that threatens the security, political, and economic stability of countries, and several reasons lead to the spread of the phenomenon of unemployment, including:

A- Population Growth Rate: Developing countries are characterized by high population growth rates, which constantly lead to the entry of a new number of workers into the labour market [19], and the emergence of unemployment as a result of the lack of new job opportunities for newcomers. High unemployment rates are linked to poor economic planning and overcrowding, especially poor workforce planning, firstly, low skill levels among people of working age, and weak educational planning, and secondly,

the inability of the private sector to absorb jobs [20].

B- Political Reasons: Rapid events and developments, instability in countries, the emergence of political, security, and military crises, and the squandering of wealth are factors that have led to the spread of unemployment, as some governments have failed to formulate development programs that have led to the emergence of new job opportunities for individuals, in addition to illegal immigration, which prompts individuals to search for job opportunities in other countries [21].

C- Technological development at the expense of the worker: The continuous increase in the use of machines and the increase in productivity requires reducing working hours and laying off workers, and thus unemployment is one of the most dangerous threats to the stability and cohesion of societies, and its causes vary from one society to another. The intensive use of machines, which requires reducing the number of workers, in turn, contributes to the increase in unemployment rates, which leads to an increase in the number of unemployed workers [22].

3: The effects of the unemployment phenomenon:

Unemployment is considered an undesirable phenomenon in any society, due to the risks it leaves behind and the negative effects it has on individuals and society alike. These effects include:

A- Economic effects: Unemployment leads to an increase in the burden on the state due to the decrease in producers and the increase in consumers, including the unemployed, which reduces the standard of living and leads to a decrease in the ability to save and invest, and thus a decrease in productive capacity and a decrease in production and national income and a decrease in employment, and unemployment shows many problems associated with it and derived from it [23].

B- Social and political effects: Unemployment also has social and political effects that are no less bad and dangerous than the economic effects. These effects are then reflected in the form of dangerous economic effects. Among the social and political effects, we mention the high crime rates among the unemployed, as statistical studies have shown that unemployment has a direct relationship and impact on crime rates in society [21].

Fourth: The relationship between oil revenues and some macroeconomic variables according to economic theory:

By following up on economic activity in all sectors of global economies, it was noted that oil revenues play an important and fundamental role in the economies of rentier countries, as these countries depend on this source to provide foreign currency and finance the largest part of government operating expenses, and thus these revenues affect the size of all economic variables in these countries [24].

1- The Relationship Between Oil Revenues and Unemployment:

The most common theoretical explanation of this relationship aims to explain the effects of oil revenues, whether rising or falling, on unemployment rates in oil-exporting countries. Despite achieving recovery and growth, unemployment has become a structural problem. Economic unemployment has continued to rise, affecting fiscal policy and its instruments. This is one way in which countries, whether capitalist or developing, influence economic activity. This influence varies, whether in terms of achieving general equilibrium or reducing unemployment. Thus, the prevailing view among economists is that there is a strong relationship between unemployment and oil revenues, and between oil revenues and their vulnerability to oil shocks. This means that adjustments among many energy-consuming sectors lead to an overall loss in production. This loss will exacerbate economic contraction when oil prices rise and will limit economic expansion

when oil prices fall, leading to asymmetric effects for these reasons.

The stability of oil revenues is closely linked to the environment in which it is produced and consumed, so fluctuations in oil prices from one period to another result from changes in oil revenues that occur in oil-exporting and oil-importing countries, regardless of whether these changes are positive or negative, and the political, security and economic conditions of these countries contribute to influencing global oil revenues, whether they fall or rise, they affect inflation, and certainly these changes have economic effects on oil-producing and oil-consuming countries, The rise in oil prices should be seen as good news for oil exporting countries and bad news for importing countries. When oil prices fall, the opposite is expected [25]. Since oil revenues are the main cause of inflation, a decline in oil revenues reduces inflationary pressures. When fiscal policy aimed at achieving economic stability includes a change in revenue levels, the results of income distribution are also strong. Monetary policy is not prepared to deal with the damage caused by rising oil prices [26]. These countries must make significant reductions in the real exchange rate and establish a strong monetary framework to avoid provoking currency devaluation. The difficulty of managing the monetary policy of an oil country is due to the inflow of a large amount of foreign currency, which encourages an increase in the money supply in its broad sense, which leads to high inflation rates [27].

2- Inflation:

Inflation refers to the continuous rise in the rate or level of prices in general. Inflation leads to a decrease or decline in the purchasing power of currencies, which is reflected in the exchange rate of the currency against other currencies. When the currency depreciates, it pushes exports towards imports, resulting in the effect of inflation. This occurs according to the economic situation, where production is at its lowest level, and the effects of inflation occur at high rates as a result of the increased demand for domestic goods.

Inflation is also an economic phenomenon that is familiar to many individuals working in institutions, whether in oil or others sectors. Inflation is a common economic term with diverse uses, but there is no consensus among economists or thinkers on defining a concept or definition that is generally accepted in economic jurisprudence. This is due to the division of opinions and ideas about defining the meaning and concept of this term and describing it in multiple cases.

Section Three/ Development of Oil and General Revenues in the Iraqi Economy during the Years (2005-2020)

First: Development of Oil Revenues in Iraq during the Period (2004-2020)

Oil revenues are of great importance to the Iraqi economy due to its high oil potential, i.e., there is a direct relationship between oil revenues and prices, as the oil sector controls the largest share of the gross domestic product, as well as revenues and exports to varying degrees. Iraq is considered one of the countries with great oil potential, and therefore, Iraq is considered the main source of oil revenues, as shown in Figure (1), an important source of financing the general budget, and the revenues from the aforementioned resources dominate approximately 95% compared to other revenues [28].

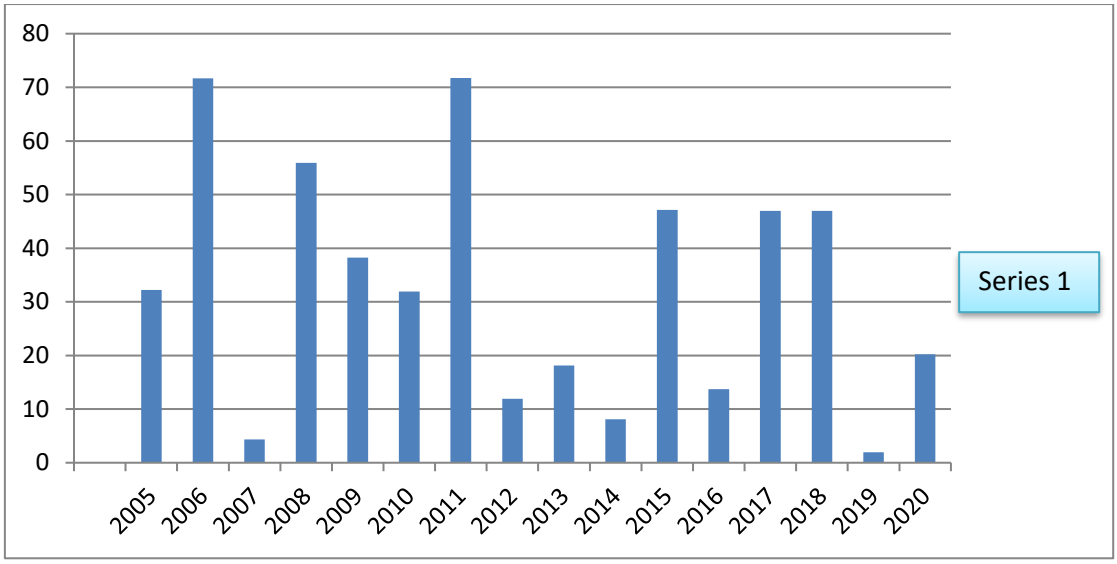

Fig. 1: Developments in oil revenues in Iraq for the period (2005-2020)

Source: Prepared by the researcher based on data from the Central Bank of Iraq. Department of Statistics and Research, Annual Statistical Bulletin, Ministry of Finance, for various years.

Second: The development of public revenues in Iraq during the period (2005-2020)

Public revenues mean the total money that the state collects from various sources of taxes to finance public expenditures and meet public needs. Public revenues are an important component of fiscal policy [29]. Public revenues have developed in their goals, purposes, and types with the development of the state's role in economic and social life. To obtain money, the state began to impose taxes and fees and obtain grants from citizens. In addition to state income, at the state's disposal is an amount of money that helps it carry out its basic functions. Public revenues in Iraq also consist of oil revenues, tax revenues, fees, and domains. The Iraqi economy expresses a one-sided rentier economy in that it depends entirely on oil revenues, as the economy is affected by fluctuations in oil prices [30]. As Table 1 indicates, public revenues in Iraq witnessed significant and noticeable increases during the study period. This is a result of the significant increase in the prices of petroleum products. Since oil revenues constitute a large percentage of public revenues, reaching more than 90% in most years, the impact of these revenues on the size of annual spending was clear.

Table (1) Development of public revenues in Iraq for the years (2004-2020)

Annual growth of public revenues	General revenues	years	n
33.27	2 8958608	2005	1
70.1	4 9232349	2006	2
5.72	5 2046698	2007	3
54.19	7 1090953	2008	4
-33.72	4 7112600	2009	5
48.95	7 0178223	2010	6
42.49	100000000	2011	7
19.46	119466000	2012	8

-4.77	**11376395**	**2013**	**9**
-7.36	**105387000**	**2014**	**10**
-36.92	**6 6470000**	**2015**	**11**
18.14-	**5 4409270**	**2016**	**12**
42.13	**7 7335900**	**2017**	**13**
37.84	**106569900**	**2018**	**14**
0.90	**107567000**	**2019**	**15**
-1.64	**105802000**	**2020***	**16**

Source: Central Bank of Iraq, Department of Statistics and Research, Annual Statistical Bulletin, various issues, Ministry of Finance, General Budget, various years.

Third: The development of some macroeconomic variables in Iraq for the years (2005-2020)

1- The development of the inflation rate in the Iraqi economy for the years (2005-2020)

Inflation means the continuous general rise in the prices of goods and services for a long period, and this phenomenon may be the result of an increase in the amount of money in the market [31], and the phenomenon of inflation in the Iraqi economy is due to the inability of the total supply to meet the demands of the increasing total demand as a result of the inflexibility of the Iraqi economy, and the lack of optimal use of economic resources, which led to the failure of the economy to reach full employment and the failure of the total supply to respond to increases in total demand, which led to rising prices, an imbalance between the amount of money required and supplied, an imbalance in the structure and nature of the elements of production, and the weakness of the productive sectors, especially agriculture and industry, which led to high inflation rates within the economy in addition to other factors , as the annual inflation rate was extracted according to the following equation [32].

$$\text{Rin} = \frac{Cp1(this\ year)\_\ CP1(last\ year)}{CP1(last\ year)} \qquad (1)$$

1- Laspeyres Formula

$$I = (\sum P_1Q_0 / \sum P_0Q_0)\ 100 \qquad (2)$$

2-Paasche Formula

$$I = (\sum P_1Q_1 / \sum P_0Q_1)\ 100 \qquad (3)$$

3-Marshal- Edgourth Formula

$$I = [\ \sum P_1(Q_0+Q_1)/ \sum P_0(Q_0+Q_1)\ ]100 \qquad (4)$$

4- Fisher Formula

$$\sqrt{(\sum p1q0lp0qo)(\sum p1q1lp0q1)100} \qquad (5)$$

- (p_0): Base year price.

- (p_1): Comparison year price.

- (Q_0): Base year quantity.

- (Q_1): Comparison year quantity.

The rates and data for the study years (2005-2020) show that there is a difference in inflation rates from one year to another, depending on the government procedures and controls issued by the state, as shown in Table (2) below.

Table (2) shows the development of inflation rates in the Iraqi economy for the years (2005-2020)

Inflation rate%	years	n
30.8	2005	1
31.7	2006	2
19.3	2007	3
11.7	2008	4
7.1	2009	5
3.1	2010	6
6.5	2011	7
5.6	2012	8
2.4	2013	9
1.6	2014	10
1.7	2015	11
1.5	2016	12
0.6	2017	13
0.2	2018	14
-0.1	2019	15
0.5	2020 *	16

Source: Central Bank of Iraq and Ministry of Finance/Annual Economic Report for various years

Fourth: The development of the unemployment rate in the Iraqi economy for the years (2005-2020)

Unemployment is one of the complex problems facing the Iraqi economy as a result of the structural imbalances resulting from the successive wars that the country has suffered from, especially the wars that occurred during the past thirty years until the year 2003. Unemployment also began to rise after the decline in oil prices. The inefficiency and ineffectiveness of the economic programs implemented by successive Iraqi governments also contributed to confusion and chaos in the management of the national economy, not to mention the destruction of most of the components of the Iraqi economy after the American occupation of the country of Iraq in 2003 [33]. There is no doubt that analyzing unemployment in Iraq is not easy due to the lack of sufficient data. The unemployment rate can be measured by official bodies as the ratio of the number of unemployed to the labor force P in society, the active category (at a specific point in time, using the following formula) [34] :

$$\text{Unemployment rate} = \frac{\text{Number of unemployed}}{\text{Active category}} * 100$$

Table (3) Development of unemployment rates in Iraq for the years (2005-2020)

Unemployment rate %	years	n
18.0	2005	1
17.5	2006	2
11.7	2007	3
15.5	2008	4
14	2009	5
12	2010	6
11	2011	7
12	2012	8
12.1	2013	9
17.7	2014	10
18.6	2015	11
20	2016	12
18	2017	13
18	2018	14
21	2019	15
30 *	2020	16

Source: Based on data from the Iraqi Ministry of Planning, Central Bureau of Statistics and Research, 2020

The researcher's data in Table (3) indicate that unemployment rates in Iraq fluctuated between high and low during the period from (2005 to 2020), and this is due to several reasons, the most important of which is (the American occupation of Iraq in (2003) and what it caused in terms of dissolving a large number of military and civilian institutions and

dismissing thousands of military and civilian personnel from their jobs, in addition to the cessation of economic activity and the decline in demand for labor, in addition to opening the door to appointment in security institutions (such as the army and police) or in other ministries' institutions, employing some unemployed and opening small projects, the instability of the security and economic situation following the entry of terrorist groups into Iraq (ISIS), the poor security and health conditions that the country faced as a result of the Corona pandemic in 2019 and beyond) [35].

Fourth Section / The Applied Aspect of the Research

First: Description and formulation of the standard model

The measurement tool for the current research includes two variables, and below is a description of each of them:

1. Description of the standard model:

In this requirement, we will address how to build standard models to measure the impact of oil revenue fluctuations on some macroeconomic variables (inflation and unemployment) in Iraq for the years (2020-2005), by testing the various financial policy tools represented by (oil revenues) as independent variables that can indicate the size of the effects they leave on some macroeconomic variables by adopting multiple linear regression to reach the best results by distinguishing between the different forms of functions and choosing the best of them according to economic, statistical and standard tests.

2. Determining the variables included in the standard model:

A group of economic variables was chosen as an independent variable (oil revenues) and their impact on the dependent economic variables (unemployment), which is what the following table will show us:

Table (4) Standard Model Variables and their symbols

Its type	Symbol	Variable in English
Independent	OL R	Oil Revenue
Follow	UN E	Unemployment

Source: Prepared by the researchers based on the aforementioned literature.

3- The relationship between economic variables according to economic theory:

One of the main tasks of econometrics is to develop effective methods aimed at quantitatively estimating the relationships between economic variables. The accumulated knowledge about economic phenomena or economic laws can be reformulated quantitatively by describing the mathematical relationship between two variables or between some variables. These economic variables included the following:

A- Oil revenues:

Oil revenues are considered the independent variable that affects the macroeconomic variables dependent on it, according to the economic conditions that affect them, whether negatively or positively.

B- Unemployment:

The model assumes that there is an indirect inverse relationship between crude oil prices and unemployment rates because the rise in crude oil prices leads to an increase in oil revenues and then an increase in government spending, which in turn leads to a decrease in unemployment rates, and that the decline in crude oil prices leads to a decrease in oil revenues and thus a decrease in government spending and thus an increase in unemployment.

OLR=a +b1 INF+ +b2 UNE (6)

Since:

- OLR: Oil revenues (independent variable)

- a: the constant term of the parameter

- b2: b1, the marginal slope of the parameters of the independent variables

- INF: Inflation

- UNE: unemployment

Second: The theoretical framework of the standard model:

1- Stability of time series

The time series stability test is a means by which standard unification is diagnosed in time series analysis applications, as well as knowing the statistical properties of time series for research in terms of their degree of integration.

2- Joint integration

The joint integration technique appeared in the mid-eighties by Garringer (1983) and Engel (1987), and its development was mainly based on the validity of the hypothesis of the stability of time series, which was the result of the process of merging the Jenkins technique and the dynamic (dynamic) convergence, error correction models. This technique is based on unstable time series, while the linear structures between them are stable و and the presence of joint integration is linked to unit root tests to verify the stability of the series, and these tests also ensure the presence of joint integration, i.e., convergence between time series processes, and the most important characteristics of joint integration.

3- Autoregressive Model (VAR)

This model was proposed by Sims in 1981 and the concept of autoregression indicates that each variable depends on the previous values (time interval) of the same variable and other variables included in this model which means that the future values of the variable depend on the weighted values of the past and present of the variables, assuming the presence of some errors due to the influence of external variables [36].

RESULTS

1 - Results of the time series stability test: (Stationary)

Through Table No. (2), which shows the results of the (Extended Dickey-Flor) test for the stability of time series, we note from the table below that the dependent variable (INF) has stabilized at the level and without a cutter or a general trend and at the significance level (1%), and the independent variable (OLR) has stabilized at the level as well and with only a cutter and at the significance level (5%), while the variable The dependent (UNE) was stable at the first difference, without a categorical or general trend, and at the significance level (5%) as well.

Table (5) Results of the time series (stationarity test):

UNIT ROOT TEST RESULTS TABLE (ADF)				
Null Hypothesis: The variable has a unit root				
	At Level			
		INF	OLR	UNE
With Constant	t-Statistic	-2.4748	-3.0286	-0.2999
	Prob.	***0.1264***	***0.0376***	***0.9185***
		n0	**	n0
With Constant & Trend	t-Statistic	-1.7928	-3.1126	-1.0876
	Prob.	***0.6965***	***0.1124***	***0.9228***
		n0	n0	n0
Without Constant & Trend	t-Statistic	-2.7217	-0.7198	0.9478
	Prob.	***0.0072***	***0.4009***	***0.9071***
		***	n0	n0
	At First Difference			
		d(INF)	d(OLR)	d(UNE)
With Constant	t-Statistic	-2.7289	-2.7606	-2.4189
	Prob.	***0.0748***	***0.0698***	***0.1407***
		*	*	n0
With Constant & Trend	t-Statistic	-3.2297	-2.8467	-3.1010
	Prob.	***0.0881***	***0.1868***	***0.1150***
		*	n0	n0
Without Constant & Trend	t-Statistic	-2.5662	-2.7810	-2.4013
	Prob.	***0.0110***	***0.0061***	***0.0169***
		**	***	**
Notes:				

Source: Prepared by the researchers based on Eviews12 outputs.

2-Testing the stability of homogeneity of variance

Through Table No. (6), which measures the problem of the stability of homogeneity of variance, we notice that the value of significance appeared at (0.0192), which is less than (0.05), which indicates that the model is free from this problem.

Table (6) Testing the stability of homogeneity of variance

VAR Residual Heteroskedasticity Tests (Levels and Squares)					
Date: 05/27/22 Time: 20:16					
Sample: 2005Q1 2020Q4					
Included observations: 60					
Joint test:					
Chi-sq	df	Prob.			
832.3656	750	0.0192			

Source: Prepared by the researchers based on the outputs of Eviews12

3- Testing the stability of the model as a whole:
-

From Figure No. (2), we notice that all the roots lie within the unit circle, which indicates the stability of the model as a whole.

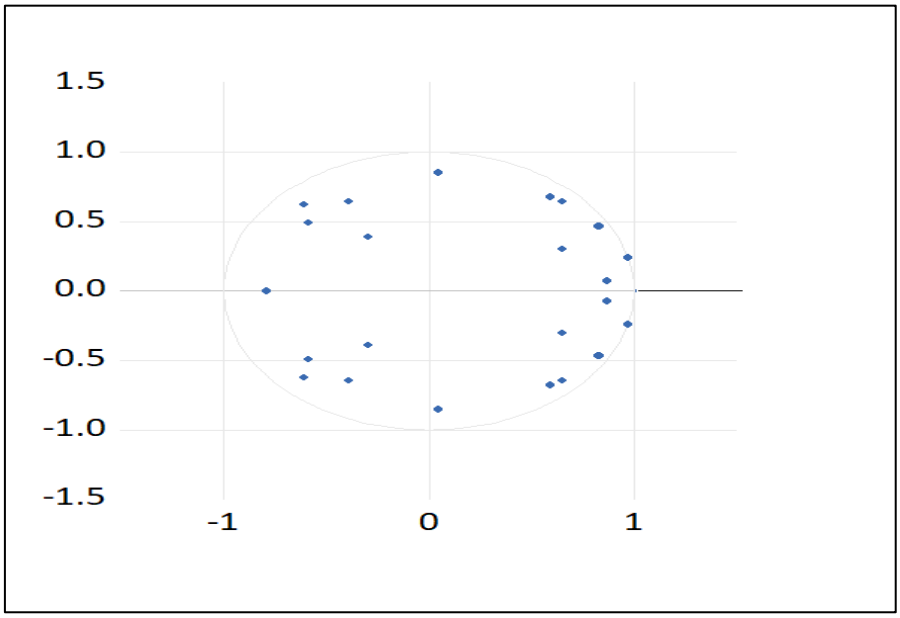

Fig. (2) Testing the stability of the model as a whole

Source: Prepared by the researchers based on the outputs of Eviews12

CONCLUSIONS AND RECOMMENDATIONS

First: Conclusions

This paragraph embodies a set of conclusions that were reached and represent an explanation for some of the results that appeared through the research based on data analysis, which contributes to guiding researchers and specialists to new areas worthy of research and investigation.

1- The role of crude oil in general economic life has become more influential than being the main source of energy because it plays a broader role today through its impact on global economic activity, which has appeared as a clear impact on financial markets and the general level of prices.

2- From the results obtained in this research, it appears that the Iraqi economy depends heavily on oil revenues because it is a rentier economy, as the model used indicates that the impact of oil revenues on economic growth is much higher than that of other oil revenues in the period covered, and this leads to fluctuations in economic growth.

3- Iraq did not exploit the natural resources it possesses, so Iraq relied mainly on natural resources, for example, oil, which gave Iraq a unilateral rentier nature

4- The results of the study concluded that there is a fluctuating effect of the independent variable oil revenues (OLR) on the dependent economic variables (unemployment UNP) as a result of the rentier nature of the Iraqi economy and the continuous increase in current expenditures at the country level.

Second: Recommendations

This section includes the main recommendations related to the research that make it rise to a better reality, overcoming all obstacles and negatives in the process, which leads to achieving and accomplishing the required goals as follows:

1- The will of the country must be real for economic decision-makers in the country to change the state of the Iraqi economy to achieve balance in the real sectors and not rely completely on the oil resource, to avoid the occurrence of negative oil shocks

2- Directing oil revenues toward productive areas, such as establishing or rehabilitating factories, or using specialized companies to reclaim land, or the possibility of increasing it in the long term. This will enhance the mechanism of economic diversification, create job opportunities, and reduce unemployment in society.

3- Activate a balanced policy through customs tariffs, and work to reduce random spending on the one hand, and on the other hand, not to affect the purchasing power of the Iraqi consumer, in addition to encouraging small and medium industries and crafts by providing appropriate support to increase local competitiveness against foreign ones. This leads to increasing job opportunities and then reducing unemployment rates in the country.

4- Work to increase the contribution of revenues to other non-oil economic sectors to reduce the negative effects resulting from oil price shocks due to the nature of the rentier economy in the country.

5- Work to adopt advanced and accurate methods to provide more accurate data on economic variables in Iraq to reach more accurate study results that can be used to improve the economic situation in Iraq.

6- Adopt a budget that is consistent with the imbalance in global oil prices and that will adapt to the decline in oil revenues.

7- Increasing the incentive for non-oil products and protecting local products to stimulate and expand other non-oil export goods, and focus on developing comprehensive plans to rebuild the economic infrastructure, as it is the basic pillar for providing a suitable climate for private investment, whether local or global.

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(2005-2020) تأثير تقلبات عائدات النفط على التضخم والبطالة في العراق للفترة

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ملخص

مر العراق بفترة حرجة ومضطربة بين عامي 2003 و2020، اتسمت بعدم الاستقرار السياسي وظروف الطوارئ التي أثرت بشكل مباشر على هيكل البلاد وأدائها واقتصادها. في ضوء ذلك، تهدف هذه الدراسة إلى تحليل تأثير تقلبات عائدات النفط على المتغيرات الاقتصادية الكلية الرئيسية في العراق، وتحديداً البطالة والتضخم، خلال الفترة 2005-2020. استخدمت الدراسة نموذج ، استنادًا إلى البيانات السنوية الرسمية التي تم تحليلها باستخدام (ECM) ونموذج تصحيح الأخطاء (VAR) الانحدار المتغير تم تطبيق اختبارات الموثوقية وتقنيات التكامل المشترك لتقييم العلاقات قصيرة الأجل وطويلة الأجل. تشير .EViews 12 برنامج النتائج إلى أن الاقتصاد العراقي يعتمد بشكل كبير على عائدات النفط، التي شكلت أكثر من 90٪ من إجمالي الإيرادات العامة في معظم السنوات المشمولة في الدراسة. وتكشف الدراسة أن عائدات النفط بلغت ذروتها عند 119.4 تريليون دينار عراقي في عام 2012، ثم انخفضت إلى 54.4 تريليون دينار عراقي في عام 2016. وارتفع معدل البطالة من 18% في عام 2005 إلى 30% في عام 2020، مدفوعًا إلى حد كبير بانخفاض أسعار النفط وتراجع القدرة المالية. وفي الوقت نفسه، انخفض التضخم بشكل كبير من 30.8٪ في عام 2005 إلى أقل من 1٪ بين عامي 2015 و2020، مما يعكس تدخلات الحكومة وقيود الطلب. تشير نتائج نموذج إلى وجود علاقة سببية أحادية الاتجاه بين تقلب عائدات النفط والبطالة، مما يسلط الضوء على ضعف سوق العمل العراقي VAR أمام صدمات أسعار النفط. لذلك، توصي الدراسة