

The Impact of Oil Price Fluctuations on Economic Growth in Iraq: A Dynamic Econometric Analysis Using the Vector Autoregression (VAR) Model

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abstract

Abstract: the study aims to analyze the impact of oil price fluctuations on economic growth in Iraq during the period (2005-2024), using a self-directed regression model, in light of the high dependence of the Iraqi economy on oil revenues as the main source of financing the general budget and stimulating economic activity. To achieve this goal, a set of macroeconomic variables were adopted, including oil prices, economic growth, the exchange rate, the money supply (M2), and government spending, and the study relied on the dynamic normative approach, as it began with a descriptive analysis of the data, and the research has reached the most important findings that oil price fluctuations affect economic growth in Iraq indirectly, as their effects are transmitted through the channels of fiscal and monetary policy, especially through government spending and the supply of cash, the research recommended strengthening economic diversification policies and improving coordination between fiscal and monetary policies to reduce the effects of external shocks and achieve greater of economic stability..

Keywords oil prices, economic growth, VaR model, Iraq, oil shocks, dynamic analyse

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Introduction :Oil price fluctuations are one of the most prominent factors affecting the performance of

rentier economies, especially economies that rely mainly on oil revenues to finance the general budget and stimulate economic activity, and the Iraqi economy is one of the most affected by these fluctuations due to its heavy dependence on the oil sector as the main source of public revenues and foreign exchange, which makes economic growth vulnerable to fluctuation depending on the changes witnessed by the global oil markets, the Iraqi economy has witnessed during the period (2005-2024) many economic shocks resulting from frequent declines and rises in the prices of oil, which was directly reflected And indirectly on economic growth rates, government spending levels, monetary policy, the exchange rate, as well as their impact on macroeconomic stability. Therefore, the analysis of the nature of the relationship between oil prices and economic growth has become an important topic in modern economic studies, because of its role in explaining economic changes and determining the extent to which the economy is affected by external shocks.

The problem of the research lies in the lack of clarity on the nature, size and speed of the transition of oil price fluctuations to economic growth in Iraq, in light of the large Iraqi economy's dependence on oil revenues and the constant fluctuations in the world oil markets, which are directly reflected on the overall economic performance.

Based on the above, the research problem is embodied in the following question: to what extent oil price fluctuations affect economic growth in Iraq, what is the nature of the dynamic relationship between economic variables during the study period.

The importance of the research stems from the fact that it contributes to clarifying the nature of the relationship between oil price fluctuations and economic growth within a dynamic normative framework based on the self-directed regression model, which enhances the theoretical and practical understanding of the mechanisms of transmission of oil shocks within the Iraqi economy.

The research seeks to achieve a set of goals, the main of which are: Analysis of the development of oil prices and economic growth rates in Iraq, And measure the dynamic relationship between oil price fluctuations and economic growth.

As well as the analysis of interactive relationships between economic variables using the VAR model.

As for the hypothesis of the research , there is a dynamic relationship with a significant impact between oil price fluctuations and economic growth in Iraq, as high oil prices enhance economic growth by increasing oil revenues, government spending and cash liquidity.

1- the concept of oil prices and their fluctuations

Oil is one of the most important strategic commodities affecting the global economy, being the main source of energy and a key element in the processes of production, transportation and International Trade(World Bank, 2016 : 3) oil prices mean the monetary value of a barrel of crude oil on world markets,

which is determined according to the interaction of supply and demand forces, as well as a set of economic, political and geopolitical factors affecting the world oil markets(Mohammed, et al., 2025: 42) The price of oil was marked Severe and persistent disruptions in recent decades as a result of global economic crises, political tensions, changes in production and consumption levels, in addition to technological developments and shifts in the policies of oil-producing and consuming countries .these fluctuations are directly reflected on the economies of oil-producing countries, especially rentier economies that rely heavily on oil revenues to finance the general budget and stimulate economic activity(Abdul Majid, 2019: 326).

Oil price fluctuations are defined as continuous or sudden changes in crude oil prices over a certain period of time, whether rising or falling, as a result of shocks to the global oil markets.these fluctuations often lead to a state of economic instability due to their direct impact on public revenues, government spending levels, cash liquidity, inflation rates and the exchange rate, which makes rentier economies more vulnerable to oil shocks compared to diversified economies(Abdul Hussein, 2025: 345).

1.2- factors affecting oil prices

Crude oil prices are affected by a set of economic, political and technological factors that contribute to the occurrence of constant fluctuations in the world oil markets, the most prominent of these factors can be explained as follows: (Daoud, 2001: 108)

A-the size of oil reserves

The size of oil reserves is one of the main factors affecting oil prices, as the discovery of new oil reserves often leads to an increase in the global oil supply, which contributes to the decline in oil prices, as a decrease in the size of reserves or a decrease in the rates of new discoveries leads to a reduction in supply and higher prices on world markets(Nashou, 2012:245).

B-the global economic growth rate

There is a close relationship between global economic growth rates and oil prices, as high economic growth rates lead to an increase in demand for energy and crude oil, which contributes to higher prices as a result of increased global consumption, but in cases of recession or economic crises, a decrease in economic activity leads to a decrease in demand for oil and then lower prices(Abdullah, 2000: 33).

C- Technological development

Technological development in the oil and energy sector contributes to influencing oil prices by improving exploration, production, refining and transportation processes, leading to increased production efficiency and reducing extraction costs, as the development of alternative and renewable energy technologies may contribute to reducing dependence on crude oil, and thus affect global price levels.

D-political unrest and tensions

Political crises, wars and geopolitical tensions in oil-producing or exporting countries lead to disruption of global oil supplies, which is directly reflected in oil prices, and these disruptions often lead to higher prices as a result of fears related to a decline in production or disruption of oil supplies..

1-3: the concept of economic growth

Economic growth is one of the basic economic phenomena that has received great attention from economists, as it is an essential element in the process of economic development, and even an essential part of it. Economists usually call the term economic growth a positive development of a quantitative nature in the total output of goods and services in developed countries over a specific period of time (abdijman, 1999:455), since this concept focuses on increasing the volume of production without necessarily addressing structural changes in the economy (ajmiya, Nasif, 2008: 77-81), economic growth is defined as the sustained increase in the real GDP of a country over a specified period of time, and this indicator It is considered one of the most prominent indicators adopted in assessing macroeconomic performance, as it reflects the ability of the economy to produce larger quantities of goods and services on a continuous basis, as well as indicates an improvement in living standards and high levels of income and employment in the economy, and is seen as evidence of the development of economic activity and its relative stability (Mankiw, 2014: 25).

The term economic development is used to refer to positive changes of a qualitative nature in developing countries, which include profound structural transformations in various economic and social sectors, which are reflected in improving the standard of living and enhancing the efficiency of economic performance in general (Jadallah Mahmoud, 2003, p.129).

1-4: the importance of economic growth

The importance of economic growth is manifested in its fundamental role in achieving progress and economic development of countries, as it contributes to improving the Living, Social and economic conditions of society through a set of positive effects, most notably the following:

1-economic growth contributes to raising living conditions of individuals by providing new employment, reducing unemployment rates, and helping to address the problem of poverty, which leads to improving the level of well-being of society in general (Shara, 2015: 25).

2-it helps to develop and improve the goods and services provided by the state to citizens, through increasing public revenues and taxes, which allows the government to provide the necessary funding for the development of education, health care, social and public services, as well as the development of human capital.

3-economic growth leads to enhancing the performance of the national economy through increased production, higher wages and profits, and improving the incomes of individuals resulting from the rise in GDP, but achieving societal well-being requires, in addition to growth, a fair distribution of the proceeds of this growth among members of society.

4-it contributes to improving the financial situation of the state by reducing the deficit in the general budget, as well as supporting the balance of payments and improving the current account, which enhances financial stability and raises the efficiency of future economic forecasts.

5-economic growth is directly related to human development, as no tangible improvement in human conditions can be achieved without sustainable economic growth, as it reflects the continuous increase in the real output of goods and services, and is also related to achieving economic efficiency and optimal

utilization of scarce economic resources to achieve economic sufficiency and Comprehensive Development (Abbas, 2021: 54).

2- analysis of the relationship between variables

This axis dealt with the presentation and analysis of data related to the study variables represented by economic growth, oil prices, exchange rate, cash supplyA and government spending in Iraq during the period (2005-2024), in order to indicate the nature of the relationship and developments witnessed by these variables over time, as this analysis helps to clarify the extent of economic growth affected by changes in oil prices and monetary and financial policies, as the Iraqi economy is a rentier economy that relies heavily on oil revenues, and Table (1) shows the development of economic variables in Iraq for the period (2005-2024).

The study data show that there is an interrelated relationship between oil prices, economic growth and monetary and financial variables in Iraq during the period (2005-2024), as the Iraqi economy reflects a rentier nature that relies heavily on oil revenues as the main source of financing government spending and driving economic activity, as economic growth (GDP) represents the dependent variable in this analysis, as the data in Table (1) indicate that periods of high oil prices were often associated with an improvement in economic growth rates and an increase in government spending and the money supply, as the years(2011-2013) witnessed a significant increase in oil exceeded (100) dollars per barrel, this coincided with a clear rise in Government spending from (78757.6) to (119127.5), as well as the expansion of the money supply from (72177.9) to (87679.1), which contributed to achieving positive economic growth rates, to reflect the decline in oil prices negatively on economic performance, as happened during the years (2009) and(2015-2016), as oil prices fell to relatively low levels, which led to a slowdown in economic growth and reduced government spending, in 2009 the price of the economy recorded a negative growth rate of (-2.8%), as a result of the impact of the economy on the global financial crisis and the decline in oil revenues, and the data show a close relationship between oil prices and government spending, as it depends This is evidenced by the continuous increase in government spending during periods of improvement in oil prices, while it declined significantly during periods of decline, especially in (2015) and(2020).

As for the money supply (M2), it has tended to rise continuously during the study period, as it increased from (14684.0) in 2005 to more than (174076.7) in 2024, which reflects the monetary expansion and increased liquidity in the economy, as a result of the increase in government spending and the expansion of monetary policy, and with regard to the exchange rate, the data indicate a state of relative stability during most of the study years, especially between (2010-2020), as it stabilized near the level of (1190) dinars to the dollar, and in general, these results confirm the existence of a dynamic correlation between oil prices and macroeconomic variables in the Iraq, as it appears that oil price shocks are transmitted to economic growth indirectly through the channels of fiscal policy (government spending) and monetary policy (money supply), which reflects the rentier nature of the Iraqi economy and its heavy dependence on the oil sector, and based on the rentier nature of the Iraqi economy and the close relationship between oil revenues

and economic activity, the analysis of the dynamic relationships between oil prices and economic growth requires the use of standard models capable of explaining the mutual interactions between economic variables over time, which is provided by the self-directed regression model (var).

3- the standard framework and model analysis

This axis aims to present the standard framework used in analyzing the dynamic relationship between oil price fluctuations and economic growth in Iraq during the period (2005-2024), based on the self-vector regression model (VAR), which is one of the modern standard models suitable for analyzing the interactive relationships between macroeconomic variables without imposing prior restrictions on the trends of causality between variables.

1-3 characterization of the standard model

The self-directed regression model (VAR) expresses the dynamic relationships between a set of economic variables, treating all variables as internal variables that depend on their lag values and the lag values of the rest of the variables in the system.

The model takes the following general formula:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \varepsilon_t$$

Since the:

Y_t : the vector of economic variables includes: oil prices (OIL), economic growth (GDP), exchange rate (EX), money supply (M2), and government spending (GOV).

A_p matrices estimated parameters.

ε_t is the vector of random errors.

The VAR model is characterized by its ability to analyze dynamic relationships and the transition of economic shocks between variables over time, which makes it suitable for studying the nature of the Iraqi economy based largely on oil revenues and its impact on external shocks.

2-3: testing the stability of time series

Stability tests of time series were carried out to confirm the validity of the variables used in estimating the standard model and to avoid the problem of Spurious Regression, using the extended Dickey–Fuller test(ADF), the Phelps-Peron Test (p.p). As shown in the table (2)

indicate that the study variables do not have the same degree of integration, as it turned out that some variables were stable at Level (I(0), while other variables needed to take the first difference to achieve stability I(1), and the results showed that the variables of oil prices (OIL), economic growth (GDP) and the exchange rate (EX) were stable at the level in some statistical formulas, while the variables of money supply (M2) and government spending (GOV) remained unstable at the level, but they the first, which shows their integration of the first order i(1). As shown in the table (3)

The results of the Phillips-Peron Test (P.P) as shown in Table (3), it came close to the results of the ADF test, as it showed that most of the variables were unstable at the level, while they became stable after taking the first

difference, especially the variables of oil prices, economic growth and the exchange rate, as well as the stability of government spending at the first difference, while the money supply showed a relatively slower degree of stability compared to the rest of the variables, and these results confirm that the study variables.

3-3: descriptive statistics of the study variables

Table (4) descriptive statistics shows the basic statistical characteristics of the study variables during the period (2005-2024), with a number of observations (77), The data in Table (4) show that average oil prices reached (73.73) dollars per barrel, with a standard deviation of (20.00), reflecting the presence of obvious fluctuations in oil prices during the study period as a result of changes in world markets and economic shocks, while GDP (GDP) recorded an average of (7.55), with a deviation a relatively high standard reached (13.50), which indicates a clear fluctuation in economic growth rates, and reflects the fragility of economic performance and its heavy dependence on the oil sector, as the variable showed With respect to the exchange rate (EX), it averaged (1250.73) dinars to the dollar, with a standard deviation (106.14), which reflects the presence of noticeable changes in the value of the local currency during the study period, especially in periods of economic pressures and various monetary policies, as for the money supply (M2), it averaged (88649.78), with a relatively high standard deviation (46302.61), which indicates a significant monetary expansion during the study period, reflecting expansionary monetary policies and increased liquidity in the economy, and for government spending (gov), it recorded an average of (84721.23), with Standard deviation (31026.66), reflecting the high level of public spending and its close correlation with oil revenues and their fluctuations, and regarding the Jarque-Bera test, the results showed that both GDP (GDP) and the exchange rate (EX) do not follow the normal distribution, as the probability values were less than (0.05), while the rest of the variables turned out to follow a distribution close to normal because the probability values are greater than (0.05). These results indicate that there is a clear discrepancy and noticeable fluctuations in research variable, which reflects the nature of the Iraqi economy based largely on oil revenues, and the accompanying fluctuations in monetary and financial variables during the study period. As shown in the table (4)

4-3: the choice of periods of slowing down

The optimal deceleration period was determined depending on the information parameters (AIC, SC, HQ, FPE), and (Lag = 2) was chosen as the optimal period for the model, choosing a suitable deceleration period ensures the capture of the temporal dynamics between the variables without losing information or introducing unnecessary interferences. As shown in the table (5)

5-3: estimation of the VAR model

The self-directed regression model (VAR) was estimated using annual data converted to quarterly data based on the EViews program for the period (2005-2024), and with two periods of slowdown (Lag = 2), The results showed the existence of correlations between the research variables, as well as the existence of mutual effects between economic variables, reflecting the nature of the correlation between oil prices, monetary and financial policies and economic growth in the Iraqi economy, and the high explanatory capacity of the model, as the determination coefficients (R2) recorded high levels in all equations, and as well as the continuation of the

subjective impact of economic growth (GDP), the presence of a strong and delayed impact of oil prices on These results indicate that the Iraqi economy is characterized by a high degree of dependence on internal interactions between economic variables, with an indirect impact of oil shocks. As shown in the table (6)

6-3: analysis of shock response functions (IRF)

Shock response functions (IRF) were used using Cholesky disassembly, according to an economic arrangement reflecting the nature of the Iraqi economy: $OIL \rightarrow GOV \rightarrow M2 \rightarrow EX \rightarrow GDP$

The results shown in Figure (1) indicate that the oil price shock indirectly affects economic growth, and the impact appears through the channels of fiscal policy (government spending) and monetary policy (money supply), and the effects of oil shocks continue for several periods of time before gradually fading, and these results reflect the rentier nature of the Iraqi economy and its dependence on oil revenues as a major determinant of economic activity. As shown in the form(1)

7-3: analysis of variance segmentation: The analysis results showed that oil prices represent the main source of their fluctuations in the short term, and the role of fiscal and monetary policy is increasing in explaining economic fluctuations in the medium term, as the exchange rate is greatly affected by the supply of cash and economic growth, while government spending shows the highest degree of correlation with oil shocks, and these results indicate that the transmission of oil shocks within the Iraqi economy is indirectly through financial and monetary channels. As shown in the table (7)

8-3: for diagnostic tests of the form

A.LM test for self-Binding of buffers (LM Test)

The results of the LM test showed that there was no self-correlation in the model buffers at all slowdowns, where the probability values were greater than 5%, and this confirms the independence of random errors and the correctness of the dynamic characterization of the model. As shown in the table (8)

B. Testing the normal distribution of residues

It is clear from the results of Table (8) that some components of the residuals came in line with the normal distribution, as the probability values were greater than the moral level (5%), as in the components (1 ,3 ,4 ,5 (,component (2) showed a probability value of (0.0000), which indicates that it does not follow the normal distribution. The overall results of the joint Test also showed that the probability value reached (0.0000), which is lower than the moral level (5%), which leads to the rejection of the nihilistic hypothesis that the residuals follow the multivariate normal distribution, however, the non-fulfillment of the normal distribution condition is not a fundamental problem in self-vector regression models (VAR), especially when relying on dynamic analysis such as shock response functions (IRF) and variance segmentation analysis (FEVD), as the explanatory results remain the model is valid as long as the model is stable and free from the problems of self-correlation and structural instability. As shown in the table (9)

C.Autocorrelation testing of vesicles

From Table (9), it becomes clear that the value of the chi-square teste (Chi-sq) reached (514.1889) at a degree of freedom (300), with a probability value of (0.0000), which is lower than the moral level (5%), and this result indicates the rejection of the nihilistic hypothesis that states the homogeneity of variation, which means that there is a problem of heterogeneity of variation in the rest of the model, and this can be explained by the nature of economic and oil data in the Iraqi economy, which is characterized by the presence of frequent fluctuations and economic shocks during the study period, which leads to the variation of errors over time, however, the presence of heterogeneity of variation is not a fundamental obstacle to the use of the VAR model in dynamic analysis, especially under the conditions of Stability and lack of autocorrelation of the remainders, as well as the functions of shock response (IRF) and analysis of variance segmentation (FEVD) remain able to provide reliable explanatory results of dynamic relationships between economic variables. As shown in the table (10)

9-3: VAR model stability test

Testing the inverse roots of the VAR polynomial showed that all roots lie within the unit circle, which confirms the stability of the model statistically, therefore the model is suitable for use in the analysis of economic shocks without the problem of time series explosion. As shown in the form(2)

4- Results and their discussion

1-the results of the study showed the existence of an interrelated dynamic relationship between oil prices, economic growth and monetary and financial variables in Iraq during the period (2005-2024), which reflects the rentier nature of the Iraqi economy and its heavy dependence on oil revenues.

2-the data showed that the rise in oil prices had a positive impact on economic growth rates by increasing government spending and expanding the money supply, as happened during the period (2011-2013), while the decline in oil prices led to a slowdown in economic activity and a decline in growth rates, as in (2009) and(2015-2016).

3-the results of the analysis revealed a close correlation between oil prices and government spending, as public spending is highly dependent on oil revenues, which makes fiscal policy vulnerable to fluctuations in the global oil markets.

4-the results of descriptive statistics showed that there are clear fluctuations in the variables of the study, especially oil prices and economic growth, which reflects the fragility of the Iraqi economy and its impact on external shocks.

5-the results of the VAR model showed the existence of mutual effects between economic variables, with the continued subjective impact of economic growth and the presence of an indirect impact of oil prices through the channels of fiscal and monetary policy.

6-the results of the shock response functions (IRF) confirmed that oil price shocks are transmitted to the Iraqi economy gradually through government spending and the supply of cash, and their effects continue for several periods of time before gradually fading.

The study found that the Iraqi economy still lacks economic diversity, as the oil sector remains the main engine of economic activity, which increases the sensitivity of the economy to external oil shocks.

4- Conclusion

1-the need to diversify the economic base and reduce excessive dependence on the oil sector, by supporting other productive sectors such as industry, agriculture and services.

2-adopting more flexible fiscal policies aimed at reducing the impact of oil price fluctuations on government spending, through the establishment of stabilization funds or sovereign funds to absorb oil shocks.

3-enhancing the role of monetary policy in achieving economic stability and controlling liquidity and inflation levels, in order to limit the negative effects of external shocks on the local economy.

4 directing government spending towards productive investment and development projects instead of focusing on operational spending, which contributes to achieving sustainable economic growth.

5-developing the industrial sector and encouraging manufacturing industries to increase added value, reduce dependence on imports and enhance employment opportunities.

6-supporting the investment environment and improving the economic and institutional infrastructure to attract local and foreign investments and activate the private sector.

7-the need to strengthen economic risk management and develop proactive strategies to deal with oil price fluctuations and global crises that may affect the Iraqi economy.

Supplement of Tables and Charts

Table 1. Development of the Study Variables in Iraq for the Period (2005–2024)

Years	Economic Growth	Oil Prices	Exchange Rate	Money Supply	Government Spending
2005	37	56.6	1469	14684.0	26375.2
2006	53.2	57.97	1467	21080.0	38806.7
2007	30.8	66.40	1255	26956.1	39031.2
2008	2.7	92.08	1193	34919.7	59403.4
2009	-2.8	60.50	1170	45437.9	52567.0
2010	2.4	76.79	1170	60286.1	70134.2
2011	5.6	106.17	1170	72177.9	78757.6
2012	6.1	107.96	1166	75466.9	105139.6
2013	1.9	103.60	1166	87679.1	119127.5
2014	2.2	94.45	1188	90728.8	113473.5
2015	1.4	47.87	1190	82595.3	70397.5
2016	0.5	39.53	1190	90466.4	67067.4
2017	0.2	51.87	1190	92857.0	75490.1
2018	0.4	68.62	1190	95380.7	80873.2

2019	-0.2	63.64	1190	103441.1	111723.5
2020	0.6	41.47	1192	119906.3	76082.4
2021	6	69.95	1460	139885.9	102849.6
2022	5	95.64	1460	168291.4	116959.6
2023	4.5	90.37	1324	180976.3	142435.7
2024	2.6	78.37	1324	174076.7	150527.3

Source: - The Central Bank of Iraq, the General Directorate of Statistics and research, the annual bulletin (sporadic years)
 - The Central Bank of Iraq, Financial Stability Report, sporadic years.

Table (2)Results of the Augmented Dickey-Fuller (ADF) Unit Root Test for the Stationarity of the Study Variables

At Level						
	At Level	OIL	GDP	EX	M2	GOV
With Constant	t-Statistic	3.268374-	3.383351-	3.074315-	1.250068-	1.340598-
	.Prob	0.0199	0.0150	0.0328	0.6486	0.6063
		**	**	**	no	no
With Constant & Trend	t-Statistic	3.278995-	3.319548-	3.430279-	3.147264-	2.655222-
	.Prob	0.0777	0.0719	0.0550	0.1033	0.2581
		*	*	*	no	no
Without Constant & Trend	t-Statistic	0.723360-	2.431439-	0.508433-	0.164007	0.646224
	.Prob	0.4000	0.0156	0.4930	0.7309	0.8535
		0.4000	**	no	no	no
At First Difference						
With Constant	At First Difference	d (OIL)	d (GDP)	d (EX)	d (M2)	d (GOV)
	t-Statistic	3.079734-	6.915387-	3.034027-	2.011037-	2.319955-
	.Prob	0.0324	0.0000	0.0363	0.2816	0.1686
		**	***	**	no	no
With Constant & Trend	t-Statistic	3.072176-	6.948574-	3.221147-	1.890918-	2.319020-
	.Prob	0.1205	0.0000	0.0882	0.6494	0.4183
		no			no	no
Without Constant & Trend	t-Statistic	3.101657-	6.968499-	3.041383-	1.638334-	2.023402-
	.Prob	0.0023	0.0000	0.0028	0.0953	0.0420
		***	***	***	*	**

Source: table prepared by the researcher based on the outputs of Eviews 12 The results of Table (2)

Table (3)Results of the Phillips–Perron (P.P) Unit Root Test for the Stationarity of the Study Variables

At Level						
	At Level	OIL	GDP	EX	M2	GOV
		2.072878-	2.220487-			

With Constant	t-Statistic			2.193227-	0.115061	0.944225-
	.Prob	0.2561	0.2009	0.2104	0.9649	0.7688
		no	no	no	no	no
With Constant & Trend	t-Statistic	2.079346-	1.847679-	2.380753-	1.475129-	1.753437-
	.Prob	0.5486	0.6715	0.3865	0.8297	0.7174
		no	no	no	no	no
Without Constant & Trend	t-Statistic	0.284094-	2.413685-	0.602987-	3.497826	1.319435
	.Prob	0.5804	0.0162	0.4530	0.9998	0.9518
		no	**	no	no	no
At First Difference						
With Constant	At First Difference	d (OIL)	d (GDP)	d (EX)	d (M2)	d (GOV)
	t-Statistic	3.373078-	3.184638-	3.310042-	2.164211-	3.705115-
	.Prob	0.0151	0.0248	0.0178	0.2210	0.0059
		**	**	**	no	***
With Constant & Trend	t-Statistic	3.365136-	3.392815-	3.447938-	2.038423-	3.689478-
	.Prob	0.0640	0.0601	0.0528	0.5709	0.0292
		*	*	*	no	**
Without Constant & Trend	t-Statistic	3.390954-	3.062988-	3.313506-	1.688975-	3.504444-
	.Prob	0.0009	0.0026	0.0012	0.0862	0.0006
		***	***	***	*	***

Source: table prepared by the researcher based on the outputs of Eviews 12

Table (4) Descriptive Statistics of the Study Variables for the Period (2005–2024)

	OIL	GDP	EX	M2	GOV
Mean	73.72656	7.545455	1250.734	88649.78	84721.23
Median	69.95000	2.600000	1190.000	88441.53	80873.20
Maximum	107.9600	53.20000	1469.000	180976.3	150527.3
Minimum	39.53000	-2.800000	1166.000	14684.00	26375.20
Std. Dev.	20.00489	13.50021	106.1400	46302.61	31026.66
Skewness	0.158837	2.237827	1.108710	0.403946	0.172716
Kurtosis	1.884428	6.618553	2.621500	2.483166	2.356716

Jarque-Bera	4.316549	106.2774	16.23486	2.951044	1.710484
Probability	0.115524	0.000000	0.000298	0.228659	0.425180
Sum	5676.945	581.0000	96306.50	6826033.	6523535.
Sum Sq. Dev.	30414.86	13851.44	856193.9	1.63E+11	7.32E+10
Observations	77	77	77	77	77

Source: Researcher's work based on the results of the Eviews 12

Table (5) shows the results of selecting the optimal lag period for the VAR model according to the information criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2621.059	NA	1.21e+25	71.94682	72.10370	72.00934
1	-1984.853	1167.829	6.49e+17	55.20146	56.14275	55.57658
2	-1815.084	288.3753*	1.24e+16*	51.23518*	52.96087*	51.92290*
3	-1808.135	10.85251	2.09e+16	51.72972	54.23981	52.73003
4	-1797.624	14.97408	3.25e+16	52.12668	55.42118	53.43960

Source: Researcher's work based on the results of the Eviews 12

Table (6) findings of the Vector Autoregression (VAR) Model Estimation

	GDP	OIL	EX	M2	GOV
GDP(-1)	1.691723	0.240115	0.312895	-112.7128	222.2900
	(0.07854)	(0.20325)	(0.82585)	(70.5769)	(189.834)
	[21.5398]	[1.18138]	[0.37887]	[-1.59702]	[1.17097]
GDP(-2)	-0.796879	-0.073042	0.394373	79.02055	-41.13546
	(0.07582)	(0.19620)	(0.79722)	(68.1297)	(183.252)
	[-10.5107]	[-0.37228]	[0.49469]	[1.15985]	[-0.22448]
OIL(-1)	0.009052	1.605596	-0.521185	-40.20940	-33.28613
	(0.04644)	(0.12017)	(0.48828)	(41.7277)	(112.237)
	[0.19493]	[13.3612]	[-1.06740]	[-0.96361]	[-0.29657]
OIL(-2)	-0.013161	-0.593125	0.611777	28.51386	179.2764
	(0.04962)	(0.12842)	(0.52181)	(44.5931)	(119.944)
	[-0.26522]	[-4.61862]	[1.17242]	[0.63942]	[1.49467]
EX(-1)	-0.000401	-0.006025	1.678544	16.71345	-3.005334
	(0.00908)	(0.02350)	(0.09548)	(8.15997)	(21.9483)
	[-0.04420]	[-0.25638]	[17.5794]	[2.04822]	[-0.13693]
EX(-2)	0.007348	-0.016738	-0.820550	-12.64208	-25.23140
	(0.00961)	(0.02486)	(0.10101)	(8.63200)	(23.2179)

	[0.76495]	[-0.67334]	[-8.12368]	[-1.46456]	[-1.08672]
M2(-1)	-5.25E-05	0.000434	0.001982	1.837100	0.255632
	(9.4E-05)	(0.00024)	(0.00099)	(0.08418)	(0.22643)
	[-0.56058]	[1.79143]	[2.01251]	[21.8229]	[1.12897]
M2(-2)	3.51E-05	-0.000337	-0.001580	-0.848523	-0.060861
	(9.1E-05)	(0.00024)	(0.00096)	(0.08213)	(0.22091)
	[0.38443]	[-1.42349]	[-1.64387]	[-10.3312]	[-0.27550]
GOV(-1)	-9.91E-07	-4.49E-05	-0.000289	0.019239	1.480684
	(4.5E-05)	(0.00012)	(0.00047)	(0.04016)	(0.10801)
	[-0.02217]	[-0.38809]	[-0.61527]	[0.47908]	[13.7081]
GOV(-2)	7.59E-06	-8.20E-05	-7.91E-05	-0.018095	-0.766403
	(4.4E-05)	(0.00011)	(0.00046)	(0.03962)	(0.10656)
	[0.17207]	[-0.71907]	[-0.17065]	[-0.45674]	[-7.19218]
C	-6.701644	27.65569	156.9553	-2805.079	30414.82
	(4.23533)	(10.9605)	(44.5352)	(3805.94)	(10237.0)
	[-1.58232]	[2.52322]	[3.52430]	[-0.73703]	[2.97106]
R-squared	0.992155	0.979199	0.986498	0.999508	0.991866
Adj. R-squared	0.990930	0.975949	0.984389	0.999431	0.990595
Sum sq. resids	92.63392	620.3740	10242.40	74803165	5.41E+08
S.E. equation	1.203081	3.113414	12.65059	1081.110	2907.913
F-statistic	809.4370	301.2803	467.6118	12993.72	780.4316
Log likelihood	-114.3392	-185.6517	-290.8005	-624.4035	-698.6120
Akaike AIC	3.342378	5.244045	8.048014	16.94409	18.92299
Schwarz SC	3.682276	5.583943	8.387912	17.28399	19.26289
Mean dependent	6.706000	74.17870	1244.920	90600.88	86235.69
S.D. dependent	12.63225	20.07570	101.2487	45313.53	29985.16

Source: table prepared by the researcher based on the outputs of EvIEWS 12

Table (7) Results of the Variance Partitioning Analysis (FEVD) for the Study Variables

Variance Decomposition of OIL: Period						
	S.E	OIL	GDP	EX	M2	GOV
1	3.113414	100.0000	0.000000	0.000000	0.000000	0.000000
10	19.71923	71.94597	0.601928	4.299054	15.37092	7.782126
Variance Decomposition of GDP: Period						
	S.E	OIL	GDP	EX	M2	GOV
1	1.203081	1.150023	98.84998	0.000000	0.000000	0.000000

2	7.316908	0.784569	88.60362	8.868194	1.592109	0.151513
Variance Decomposition of EX :Period						
	S.E	OIL	GDP	EX	M2	GOV
1	12.65059	4.962914	34.37348	60.66360	0.000000	0.000000
2	76.07813	3.998613	34.08839	40.22720	19.42234	2.263461
Variance Decomposition of M2: Period						
	S.E	OIL	GDP	EX	M2	GOV
1	1081.110	14.85261	0.041198	1.674585	83.43161	0.000000
2	13166.38	2.824246	0.366256	6.608355	90.15792	0.043220
Variance Decomposition of GOV: Period						
	S.E	OIL	GDP	EX	M2	GOV
1	2907.913	36.15022	2.280810	0.351740	0.065896	61.15134
2	15908.27	45.56967	2.265971	7.842327	26.60766	17.71438

Source: table prepared by the researcher based on the outputs of Eviews 12

Table (8) Results of the Autocorrelation Test of Residues (LM Test) for the VAR Model

VAR Residual Serial Correlation LM Tests						
Date: 05/19/26 Time: 14:47						
Sample: 2005Q1 2024Q4						
Included observations: 75						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	11.07357	25	0.9926	0.430375	(25, 205.8)	0.9926
2	4.928379	25	1.0000	0.188836	(25, 205.8)	1.0000
3	11.71302	25	0.9887	0.455903	(25, 205.8)	0.9888

Source: Researcher's work based on the results of the Eviews 12

Table (9)Results of the Normality Test for Residuals

Residual normality tests var		
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Orthogonal: cholsky (lutkipol)				
Null hypothesis: the residuals are multivariate normals				
Date: 05/19/26 time: 14: 47				
Sample: 2005 Q1 2024 Q4				
Notes included: 75				
Component	Skewness	Chi-sq	df	Prob.*
1	-0.331837	1.376450	1	0.2407
2	-1.735745	37.66013	1	0.0000
3	0.177308	0.392978	1	0.5307
4	-0.119840	0.179520	1	0.6718
5	0.251237	0.789002	1	0.3744
Joint		40.39808	5	0.0000

Source: based on the results of 12 observations

Table (10) Results of the Heteroskedasticity Test for VAR Model Residuals

Source: based on
 observations

Figure (1) shock
 (IRF) among the



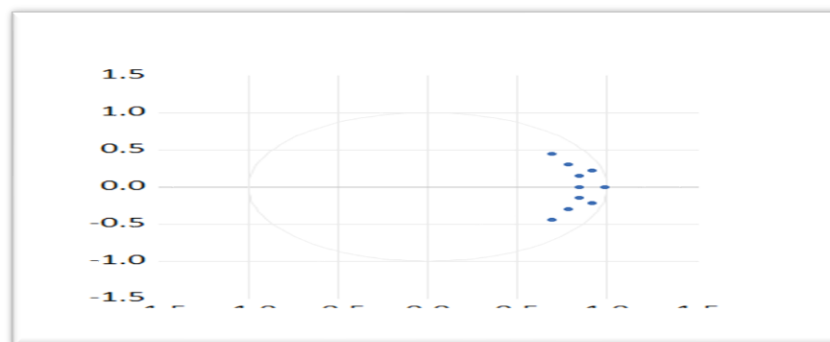
VAR Residual Heteroskedasticity Tests (Levels and Squares)		
Date: 05/19/26 Time: 14:48		
Sample: 2005Q1 2024Q4		
Included observations: 75		
Joint test:		
Chi-sq	df	Prob.
514.1889	300	0.0000

the results of 12

response functions
 study variables

Source: table prepared by the researcher based on the outputs of Eviews 12

Figure (2) VAR Model Stability Test Using the Inverse Roots of the Polynomial



Source: Researcher's work based on the results of the Eviews 12

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