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USING THE DYNAMIC STOCHASTIC GENERAL EQUILIBRIUM (DSGE) MODEL TO MEASURE THE EFFECTIVENESS OF MONETARY POLICY IN THE FACE OF OIL SHOCKS - THE CASE OF IRAQ

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Abstract:
This study seeks to track the impact of monetary policy in Iraq on facing various oil shocks, through the use of the General Stochastic Dynamics Model (DSGE) for the economic variables of Iraq after those models achieved important successes due to the development they witnessed.
Econometric models developed significantly after the oil shocks of the 1970s, after the failure of traditional Keynesian models. One of the most important models that were developed to measure the impact of financial shocks is the dynamic general equilibrium (DSGE) models, which have become of great interest to most central banks in the world, which In its beginning, it was limited to measuring the effects of financial shocks on the economies of the industrialized oil-consuming countries, but today it is widely used by the rentier oil-producing countries.
And Iraq as one of the countries that depend on oil exports, and oil rent constitutes more than 95% of the composition of its financial revenues, and that oil shocks have a severe impact on its economy in general, and therefore monetary policy had to play a role in absorbing the impact of these shocks, benefiting from the positive, and mitigating The negative impact of them, especially after the year (2004), which witnessed new laws that gave the Central Bank its independence in decision-making.

Keywords: Model (DSGE), monetary policy, oil shocks, positive, negative

PREFACE:

The Iraqi economy is described as a rentier economy that depends mainly on one product, which is oil, to finance all its economic activities and development plans. Rather, it has become very difficult to separate development plans from oil revenue, knowing that Iraq has distinct components that will reduce the degree of dependence of the Iraqi economy on oil rent.

This trait became more extreme with the rise in oil prices in 1973, which deepened the problem of underdevelopment in Iraq after its dependence on the primary production sector increased, specifically the extraction and sale of crude oil, and the decline in the contribution of the secondary production sectors, namely industry, agriculture and third production, the services sector, and the result of these variables was the dominance of the services sector. Oil on the Iraqi economy for the period (1973-2019). The course of the role of oil in the Iraqi economy will be traced through the fiscal and monetary policies as follows:

FIRST: MONETARY POLICY IN IRAQ (2004-2019)

After 2003, the monetary authority in Iraq took a set of measures aimed at resolving the high inflation rates and the devaluation of the Iraqi dinar it inherited, achieving economic and monetary stability, as well as creating a competitive financial and banking system, and building an economic environment commensurate with the market system.

The general framework for monetary policy

In 2004 Law (56) was issued, which sets the frameworks for the Central Bank of Iraq's work and defines the purpose and objectives of its establishment, as stated in Section (1) of the Law (This order establishes a secure, strong and independent Central Bank in order to achieve the

World Bulletin of Management and Law (WBML)
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ISSN: 2749-3601

following purposes: Stabilization of stability in the country and the province On its stability and stability, working to find and nurture a financial system that depends on the market and competition and is stable, promoting sustainable development and sustainable employment and welfare in Iraq) (Central Bank Law 56, 2004, 2).
The law defines a set of objectives that came in Article (3) (the main objectives of the Central Bank of Iraq include achieving stability in local prices, and working to maintain a stable financial system based on competition in the market, and the ethnic Central Bank works in line with the above-mentioned objectives to: Promoting sustainable development, providing job opportunities and achieving prosperity in Iraq) (Central Bank Law, 14).

To achieve these goals, a set of tasks has been identified for the Central Bank of Iraq, including:
1-Formulation and implementation of monetary policy in Iraq, including foreign exchange rate policy.
2-Possession and management of all official foreign reserves of Iraq.
3-Possession of gold and management of the state's gold reserves.
4-Providing advisory and financial services to the government.
5-Liquidity died for commercial banks.
6-Issuing and managing the Iraqi currency.
This law gave the central bank complete independence from the government, meaning that the central bank is not subject to the government. It was also prohibited from lending to the government, whether directly, as stated in Article (26) (the central bank does not grant any direct or indirect credits to the government or any public body or state-owned entity).
The concept of independence can be defined by three points (Thuraya, Al-Khazraji, 2010, 8).
1-Not to lend directly or indirectly to the government.
2-Not receiving orders from the government in the conduct of monetary policy tools.
3-Submission of its accounts to the external auditor in accordance with international auditing standards for central banks.
However, the independence of the Central Bank does not exempt it from a major principle of governance in the country, which is the principle of participation, which means consultation and dialogue with the government, and doing work on its behalf. An essential principle upon which monetary policy is based in managing its tools, which is the principle of good governance, which means the best performance at the lowest costs in achieving the monetary policy objectives (Mazhar Muhammad, 2012, p. 20).
Monetary policy after 2004 also witnessed radical transformations against the background of the Central Bank taking several decisions and measures to lay the foundations for achieving economic stability and the transition towards a market economy, including:

-Currency exchange: On November 15, 2003, the Central Bank replaced the old currency with a new one, which had a direct positive impact on the value of the dinar, after the new dinar gained general acceptance in terms of security and the difficulty of counterfeiting it or manipulating the rights of its holders (Central Bank reports, 2004, 13).

-Liberalizing interest rates: After 2004, and in line with modern trends towards a market economy, the Central Bank decided to completely liberalize interest rates on deposits, loans, credit and financial instruments. This decision is a radical shift in the banking business in Iraq to move towards strengthening the role of price (signals) for interest rates according to the rules and efficiency of the market to reach the equilibrium price that narrows the gap between credit and debit interest rates, which is the best way to achieve the efficiency of the financial mediation process and increase competition between commercial banks (Central Bank of Iraq, 2004, p. 15).

- Granting licenses to foreign banks: Law No. (94) of 2004 allowed three foreign banks to open branches in Iraq, then the number of foreign banks in Iraq increased, bringing the year (2019) to 18 foreign bank branches, two of which are Islamic (Central Bank of Iraq, 2019, p. 2)

2. MONETARY POLICY DEVELOPMENTS IN IRAQ FOR THE PERIOD 2004-2019

a. Presentation of criticism and the factors affecting it

Managing the money supply and controlling it is one of the priorities of the Central Bank after 2003, and it is the main pillar of the monetary policy strategy in Iraq to stabilize the Iraqi dinar exchange rate and reduce inflation rates. One of the important measures taken by the Central Bank to control the money supply is issuing a new currency with specifications that make the process of counterfeiting it is a difficult process, which contributed to restoring confidence in the Iraqi dinar as a store of value and a means of exchange, and the Central Bank, as we mentioned, liberalized the

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interest rate, which directly contributed to the increase in current deposits.

The cash offer in Iraq consists of the following: -

Cash Issuance: It is the responsibility of the Central Bank entrusted to it by Law (56 of 2004)

Bank credit: It is the contribution of commercial banks to the formation of the money supply through credit. Loans represent the process of creating deposit money, and commercial banks are the qualified party to receive deposits and grant loans, and this leads to the creation of other means of payment that pump into the national economy. (Al-Hamdani, Nayef, Al-Hamdani, 2018, 3).

From Table No. (30), we note the development of the M2 money supply, as it reached in the year (2005) $14.5 billion, after it was approximately $11.5 billion in 2004, with an annual growth rate of 27%, and in (2006) it achieved an increase Remarkably, it reached (21 billion dollars) and a growth rate of 44%. This growth is due to the development witnessed by the oil markets and the increase in the price of a barrel, which in turn affected Iraq's financial revenues, and a noticeable increase in GDP. However, in 2008 we note the slowdown in the growth rates of money supply, affected by the drop in oil prices, as they fell to (25%) after it was in (2007) (33%). On oil prices, and in the years (2014 and 2015) M2 achieved its lowest level, as it fell to (3 and -9), respectively. The decline also occurred due to the drop in oil prices and the exposure of global oil markets to the oil shock of 2014, which caused a decrease in the gross domestic product, as it decreased in (2014) to (166) billion dollars, after it was (in 2013) (228) billion dollars, achieving negative growth rates for two years. (2014 and 205) (-3 and -27), respectively, due to the drop in oil prices and the exposure of global oil markets to the 2014 oil shock.

Table (30) money supply and the Iraqi dinar exchange rate for the period (2004-2019)

Year	net currency in exchanging		current deposits	M1		semi cash	M2		exchange rate
	cost	percentage of M1		cost	growth rate		cost	growth rate	
2004	7162	71	2985	10147		1349	11498		1453
2005	9112	80	2286	11399	12	3260	14659	27	1472
2006	10969	71	4491	15460	36	5590	21050	44	1475
2007	14500	67	7221	21721	40	6250	27971	33	1267
2008	18493	66	9697	28190	30	6730	34920	25	1193
2009	21781	58	15524	37305	32	8138	45443	30	1170
2010	24332	47	27421	51753	39	8643	60396	33	1170
2011	28296	45	34180	62476	21	9704	72180	20	1166
2012	30594	48	33161	63755	2	11731	75486	5	1166
2013	34995	48	38836	72692	14	13848	87679	16	1166
2014	36072	50	36620	72692	0	18036	90728	3	1166
2015	34855	53	30580	65435	10-	17435	82595	9-	1190
2016	42075	59	28658	70733	8	17349	88082	7	1190
2017	40351	57	30811	71162	1	18279	89441	2	1190
2018	40517	%5	37312	77829	9	17561	95390	7	1190
2019	47611	%55	39159	86770	11	16671	103441	%8	1190
the compound growth rate				15			15		

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
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Source: Central Bank of Iraq, annual statistical bulletins, for the years (2004-2019) scattered pages

Second: monetary policy tools
To achieve the objectives of monetary policy, the Central Bank has to use the appropriate monetary tools, whether traditional or modern, which enable it to build the pillars of economic stability, control inflation rates, stabilize the dinar exchange rate, and build an effective and sober financial and banking system.
When referring to the tools recently adopted by monetary policy, they are the indirect quantitative tools, which include (legal reserve, open market, discount rate, currency sale window) (Central Bank of Iraq, 2019, p. 27), these tools will be addressed with a focus on a tool The currency auction or (the currency sale window) is more significant as it has the greatest impact on the Iraqi economy, and it is one of the most tools that caused a clear controversy among economists in Iraq.
Added to it is a nominal fixed credit that is achieved by reaching the set goals, such as using the exchange rate indication of the Iraqi dinar and the interest rate indication (Thuraya Al-Khazraji, 2010, p. 8).

2. Legal Reserve
The legal reserve ratio is one of the indirect tools that the Central Bank of Iraq relies on to influence the amount of credit provided by commercial banks. Therefore, the law granted it the right to change the legal reserve ratio in a way that serves its intended directions and goals. Therefore, we note that this ratio has changed more than once. Between 1973 and 2019, and before 1976, the legal reserve ratio was (20%), which was approved by Law (97 of 1964) (http://iraqld.hjc.iq/), in 1976 it was reduced to (13%).
This percentage remained in place until 1996 when it was increased to become (20%) on current deposits in line with the bank's directions to reduce liquidity rates and reduce the money supply from them to improve the value of the Iraqi dinar (cbi.iq/documents/Annual_2003).
In Law 56/2004, the legal reserve ratio was raised to (25%), to be deposited (20%) with the bank and (5%) in the vaults of the same bank, in 2010 and after the Iraqi economy achieved an encouraging level of security and economic stability, After it succeeded in controlling the money supply and inflation rates, the bank turned towards encouraging commercial banks to take their role in improving the economic situation, and contributing to its reform. Therefore, it reduced the reserve ratio to (15%) to motivate it to move towards the market more, and as a second encouraging step, the Central Bank allowed Commercial banks may use (50%) of their reserves to invest in treasury transfers and deposit (50%) with the bank.

2. Open Market
The open market tool was not one of the tools affecting the movement of the Iraqi economy for several reasons, including the lack of the requirements of this tool from effective monetary and financial markets with financial depth, which the Central Bank was able to use in an efficient manner capable of influencing the overall variables of the Iraqi economy, in the sense of selling securities in the event that there are Inflation and its purchase in the event of a recession, and that most of the use of this tool was to provide funds in the event of a deficit in the current budget. For example, there was no financial issuance, which could be mentioned in the period between (1973-1980), due to the financial abundance that resulted from my shock The two positive aspects of oil. In the eighties, bonds worth (600) million dollars were issued (Sundus Hamid, 2009, p. 129), noting that this issuance does not amount to alleviating the deficit that Iraq experienced during that period, due to the two negative oil shocks and war spending. , In addition to the lack of a market for these issues, and here it can be mentioned that what was previously referred to, which is the strategic economic mistake committed by the Iraqi government in the seventies, when it proceeded to bind the hand of the private sector and cancel its important economic role.
In the 1990s, due to the unstable economic, security and political embargo, there was no significant publication.
After 2003, after the Central Bank set the goal of reducing inflation and monetary stability, it relied mainly on two main tools, namely the currency auction window and the Central Bank transfer auctions, which enable the bank to control public liquidity, by influencing the credit multiplier, as it absorbs Part of the liquidity of commercial banks by providing short-term investment opportunities, and these issuances.

Treasury Transfer Auctions: Transfers represent the short-term type of local public debt. These transfers are issued by the Ministry of Finance to finance the temporary deficit in the state's general budget, and they are for different periods, including:

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

a-Auction of remittances of the Ministry of Finance, including (Central Bank of Iraq reports):
1-An auction of (63) days and (28) days began to be applied at the beginning of 2006, and it was stopped in the same year.
2-Auction (91) days on 1/7/2006 until the end of 2009.
3Auction (182) days started in mid-2010.
b. Central Bank Transfer Auction:
1-Auction (91) days started in the beginning of 2010.
2-Auction (182) started in mid-2006 and ended in the first quarter of 2009.
Auction (365) which lasted for two years between 2006 and the end of 2008.
In 2004, issuances amounted to (3) billion dollars, increased in 2006 until they reached (6.3) billion dollars, and after 2007 they decreased to (600) million dollars and remained almost constant until 2012, after which they reached zero, meaning that all these bonds were called, but it in 2015, it issued a value of (5.2) billion dollars, and then made great leaps, in the years 2016-2017-2018-2019, to nearly (14) billion dollars.

3. foreign currency sale window

The process of buying and selling currency (the dollar) by the Central Bank and through the currency sale window is one of the most important monetary policy tools that directly affect the money supply, which was developed to counter inflationary pressures, and control the general level of prices, by stabilizing the value of the dinar The Iraqi currency, as a full cover of the currency is kept from foreign reserves, with the possibility of needing to finance the dinar into dollars to enable traders to finance their commercial transactions that provide the commodity supply necessary to meet the growing demand of the community.

a- The mechanism of the currency sale window

- The auction is opened on a daily basis (except on official holidays), where the offers of banks, money transfer companies and exchanges are presented in the form of a closed envelope, and the offers are represented in the quantities requested / or offered by the banks, (note that the quantities are determined by the submitted offers and not the Central Bank alone), As for prices, they are set by the Central Bank, which is usually a fixed price and fluctuates in limited levels. After that, offers are studied and quantities approved, and some offers may be rejected, or partially approved.
- The mechanism for selecting and distributing quantities, there is a committee of a group of people (up to 8) of general managers and other employees, who open these offers daily, and then study them, and usually most applications are accepted, and some of them are rejected as a result of not completing the legal papers, or they Requests for unwanted goods, or some papers were suspected as if they were forged. Because of the large number of requests submitted, and the procedures that verification needs, the accepted requests are distributed over several days, so that part of them receive their requests on this day, part on the second day and part on the third day.
Only government and private banks, money transfer companies and officially registered exchange companies are allowed to participate in the auction. (In the beginnings of the auction, only specific banks were allowed to enter the auction), but now transfer companies and registered exchanges are allowed to enter, and exchange companies sometimes submit their bids implicitly through the banks and not independently.

b- Objectives of the currency sale window

The Central Bank of Iraq chose the currency auction as a main tool for implementing the policy of inflation targeting, and it is one of the innovative indirect tools, as the bank built a strategy to reach this goal by supporting and increasing the value of the Iraqi dinar, a method that has not been dealt with before during the past years, and as a result of the continuation of the auction in practicing This has contributed to creating a state of openness in the local currency market, thus allowing traders to freely deal in foreign currency, with the aim of financing their commercial exchanges. Contributed to achieving stability in the local market. Proceeding from the foregoing, the most important objectives of the auction are (Abdulnabi: 2010):
1-A direct intervention tool to achieve stability in the value of the Iraqi dinar, by defending a equilibrium exchange rate, which will reflect positively on the general level of prices, especially the final imported goods and production inputs, and strengthens the export base.
2-A means of applying the indirect tools of monetary policies in managing the liquidity of the economy and controlling its levels. It is a case of applying the open market operations that are required on an ongoing basis in achieving balance in the monetary market and strengthening opportunities for financial stability.
3-A main source in financing the private sector trade for goods and services needed by the Iraqi market, and a main financier for it.
4-Consolidation of multiple exchange rates (official - parallel).
5-Raising the purchasing power of people with limited incomes, through the level of improvement reached by

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Volume-8 March-2022
ISSN: 2749-3601

the Iraqi dinar and its reflection on the real value of income.

6-Providing resources in foreign currency at banks for the purpose of enabling them to open documentary credits and letters of guarantee and to carry out transfers of amounts in foreign currencies.

7-Opening investment horizons to the public (bank customers), for the purpose of developing their investments and economic projects and providing the currency necessary to perform religious tourism, medical treatment, and study outside Iraq.

8-The auction contributed significantly to limiting the growth of the money supply and the printed currency, through the Central Bank's purchase of the foreign currency available at the Ministry of Finance, which the Central Bank purchases for the purpose of enabling the Ministry to pay the operating expenses of the state's general budget in Iraqi dinars without the need to issue an additional currency that increases the size of the monetary mass And contribute to raising the rates of inflation.

From Table (31) it is clear that this tool achieved monetary policy and one of its most important goals, which is stability in the exchange rate of the Iraqi dinar and thus.

The year	Central Bank Purchases		central bank sales		window sale dollar price //dinar	Parallel price	Inflation rate
	the amount Billion dollars	growth percentage%	the amount Billion dollars	Growth percentage %			
2004	10.3		6.1		1452	1453	40.5
2005	14.9	45	10.7	75	1469	1472	37
2006	16.8	13	11.2	5	1467	1475	53
2007	26.7	59	16	43	1255	1267	30.8
2008	45.5	70	25.9	62	1193	1203	2.7
2009	23	49-	34	31	1170	1182	2.8-
2010	41	78	36.2	6	1170	1182	2.4
2011	51	24	39.8	10	1170	1196	5.6
2012	75	47	48.6	22	1166	1233	6.1
2013	62	17-	55.7	15	1166	1232	1.9
2014	47	24-	54.5	2-	1166	1214	2.2
2015	32	32-	44.3	19-	1167	1247	1.4
2016	25.6	20-	33.5	24-	1190	1275	1.3
2017	40.4	58	42.2	26	1190	1258	2.3
2018	52.2	29	47.1	12	1190	1209	4.2
2019	59	13	51	8	1190	1196	1.9

Table (31) The volume of purchases and sales of the Central Bank from (2004-219)
Source: Central Bank of Iraq reports for the years 2004-2019

1-Interest rate:

In March 2004, the Central Bank took the decision to liberalize the interest rate, with the aim of creating a contemporary and efficient financial system that contributes to achieving the stated monetary policy objectives. Deposit, and thus increase the efficiency of capital in the Iraqi economy, but the Central Bank set a reference price (the policy price), to work with the mechanism of raising the Iraqi dinar exchange rate to equal the parallel price. Dollarization, and thus the basis of monetary policy in Iraq is the integration between the two signals of the interest rate and the exchange rate (appearance, cbi.iq/static/uplo).

In the period 2004/2019, the policy price differed clearly according to the objectives of the immediate monetary policy, and this can be observed in the two tables (32-33). In 2007, the inflation rate was 30.8%, and the rate of the policy price was (20%), but when the monetary policy succeeded In controlling inflation, we note that the policy price fell to (8.8%) in 2009

World Bulletin of Management and Law (WBML)
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Volume-8 March-2022
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and then was reduced to (6%), and the big reduction came after the double shock to Iraq (low oil prices and the attack of terrorism) it was reduced to (4%) with the aim of stimulating activity The economy and getting it out of the stagnation that occurred as a result of the political and security conditions in the country, the suspension of most public sector projects and the low rates of general government spending.

Table (32) Policy interest rate for the period (2004-2019)

2011	2010	2009	2008	2007	2006	2005	2004
6.3	6.3	8.8	16.7	20	16	7	6
2019	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**
4	4	4	4	6	6.3	6.3	6.3

Source: Central Bank Statistical (Bulletin 84)

Interest rates in the Iraqi banking system 2004-2019

The commercial banks in Iraq after 2004 worked in the new interest rate system, under the ceiling (policy rate), in the years 2004-2005, interest rates in commercial banks were close to (policy rate), and if we return to the two tables (32-33 We note that and at the same time we note that it moved away in the years (2006-2007) due to the unstable security situation, as is also clear from Table (33) the difference between deposits and loans, in some years, more than 300%, and this is abnormal.

Table (33) Interest rate for deposit and lending (2004-2019)

Years	2004	2005	2006	2007	2008	2009	2010	2011
Deposit interest rate	5.5	5.5	6	10	8.8	6.8	5.5	5.2
Lending interest rate	14.5	14.5	15.3	21	18.9	16.7	13.8	12.7
Years	2012	2013	2014	2015	2016	2017	2018	2019
Deposit interest rate	5	4.8	4	4.3	4.4	4.3	5.7	5.7
Lending interest rate	13	13.1	12.3	12.2	12.3	12.4	12.1	11.9

Source: Statistical bulletins of the Central Bank of Iraq for the period 2004-2019)

A decrease in the interest rate for deposit and a high interest rate for lending indicates the ineffectiveness of the Iraqi banking system, and this is evident from the analysis of the structure of deposits and loans for some years.

- In 2007, the total balance of deposits was $5.3 billion, most of the deposits were for the private sector (64%), then the public sector (30%) and the financial sector (6%).

As for credit, it amounted to $2.2 billion in 2007, of which (51%) were loans and advances to the private sector, of which (83%) were to individuals in the form of advances, mostly for banking sector employees and housing loans, and the remaining (17%) for the private company's sector.

- In 2010, the total balance of deposits was $29 billion. This year differed from 2007 in that most deposits were from the public sector at a rate of 64%, then the private sector (34%) and finally the financial sector (2%), and the increase in Deposits due to the increase in government deposits from (1.5 billion dollars) in 2007 to (22 billion dollars) in 2010.

The total credit for the year 2010 also achieved a total balance of (8) billion dollars, (90%) of which is for the private sector, (2%) for the public sector, and (7%) for the financial sector. The share of the private sector was divided as follows (86%) individuals and (14%) are companies, of which (77%) are in the form of consumer advances for sector employees and housing loans for citizens.

- In 2013, total deposits amounted to (59) billion dollars, of which (64.5%) to the public sector and (.535%) to the private sector.

The credit balance rose in 2013 to $25.7 billion (80%) of which was to the private sector in the form of consumer loans and housing loans, including (74.6%) to the trade sector (23.4%) to the real estate sector.

World Bulletin of Management and Law (WBML)
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Volume-8 March-2022
ISSN: 2749-3601

- In 2016, deposits decreased to (52) billion dollars, of which (48%) were deposits of the private sector and (52%) were government deposits.

In 2016, the total credit achieved $31 billion, but the credit structure differed clearly from previous years for the first time, as the government credit ratio increased from (2%) in 2013 to (48.9%) compared to (49.1%) for the private sector, due to The reason for the increase is the double shock that Iraq suffered in (2014-2015) (oil and security) that made it resort to internal borrowing.

Also, the private sector credit was in the form of consumer advances, which are often the case, and housing loans.

- In 2019, the total deposits amounted to (69) billion dollars, achieving a clear increase from 2016 due to the relative improvement in oil prices, as most deposits were from the public sector, at a rate of (62%).

The total credit granted to the public and private sector amounted to $35.2 billion, and in 2019 the two sectors shared credit equally (50%) for each, with regard to the private sector's share, as it was (84%) in the form of consumer advances and housing loans.

Through our reading on the deposit and credit structure, several observations can be made, including:

The big difference between deposit and credit and this is due to the difference between the low deposit interest rate and the high lending interest rate.

The government's contribution to the deposit structure increased in the years of positive shocks, and its share of the credit structure for the same year decreased. We noticed this in the years 2010 and 2013, and the exact opposite after the negative oil shock (2014-2015). This can be seen from the lending structure for the years (2016-2019).

The private sector loans were of a consumer nature, and some of them were housing loans

Investment and production increase did not have a clear share in the credit structure, which means that there was no clear credit policy to support growth.

These observations confirm the report of the Governor of the Central Bank in 2017, in which he criticized the Iraqi banking system. We summarize (most of the credit went to members of boards of directors and their families, and that the concentrations of assets were in monetary assets at the expense of investments, as cash assets amounted to (46%) mostly balances In the Central Bank, which indicates its concentration in the currency sale window, 60% of the credit granted to the private sector was from the share of the trade sector (https://cbi.iq/).

Chapter Two: Measuring the impact of oil shocks on some Iraqi macroeconomic variables using the General Stochastic Aggregate Equilibrium (DSGE) model.

Preface: -

In this chapter, the standard approach will be used to analyze the behavior of fiscal and monetary policies, in light of the oil shocks for the period (1973-2019), by formulating a dynamic stochastic equilibrium model for the Iraqi economy, using the Dynamic Stochastic General Equilibrium (DSGE) model.

The first topic: Modern econometric models: Autoregressive vector and general stochastic dynamic equilibrium

Introduction: -

Econometric models developed significantly after the oil shocks of the seventies, and after the failure of the traditional Keynesian models to explain the phenomenon of stagflation, which exposed them to many criticisms, the most important of these criticisms are criticism of (sims) and criticism of (Lucas), which contributed to finding two models that are among the most important Modern econometric models, namely, the Autoregressive Vector Model (VAR) and the Dynamic General Stochastic Keynesian Equilibrium Model (DSGE)

It is difficult to understand the factors and contributions that worked on the emergence and development of dynamic equilibrium models due to their rapid development and the large number of contributions in this field, which were the products of the intellectual debate between economic schools, especially between the pioneers of the rationalist school and the modern Keynesian school after the first oil shock 1973.

Dynamic stochastic equilibrium models are used by macroeconomists to model polynomial time series, these models are based on macroeconomic theory, as they are often used in shock analysis or economists' anti-shock measures, when the economy is exposed to an unexpected external change, economists try Knowing how macroeconomic variables respond to those changes (blog. Stata.com).

First: (DSGE models)

In the mid-seventies of the twentieth century, Robert Lucas criticized the methodology of Keynesian models, which are based on macroeconomic variables and the relationships that govern them (such as

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Volume-8 March-2022
ISSN: 2749-3601

unemployment, inflation, production and consumption). Partial, as he mentioned that the Keynesian models' expectations of individuals as a fixed external variable, one of the most important errors of the macroeconomics in general and the standard Keynesian models in particular, and it is one of the most important reasons for their inability to analyze the phenomenon of stagflation, as well as contribute to its solution, as Lucas emphasized that The expectations of individuals (consumers and the private sector) must be affected by macroeconomic policies, and therefore it is not possible to analyze the impact of these policies without referring to the foundations and microeconomic variables and including the expectations of individuals as a dependent variable.

Contributions of Lucas' criticism to the development of macroeconomics in general. It is natural that econometric models evolve with this development. Lucas' criticism had a two-way effect (Glenn D. Rudebusch, 2002, p2).

The first: Reorienting macroeconomics to models that include rational expectations, in a clear and direct way, and these models are concerned with new variables such as technology and the shocks that can occur because of them.

Second: Lucas's criticism contributed to changing the monetary policy assessment according to the alternative paths of the monetary policy tool to focus on the rules of alternative monetary policy (frbsf.org)

In 1975, after the first oil shock, Lucas published a working paper in response to the call of the Organization for Economic Cooperation and Development, stressing the importance of monetary shocks. The course as a model for equilibrium (conspecte.com/en/). This paved the way for the emergence of the DSGE model, which developed over two generations, the first being the Real Business Cycles (RBC) model, and the second being the DSGE model.

a- Real Business Cycle (RBC) model

Real business cycle models are the first generation of general dynamic stochastic equilibrium models, which were neutral with respect to money and therefore called real, as they attribute fluctuations in total output to real shocks, and therefore stagnation and prosperity occur due to external changes, and therefore the government should focus on structural changes In the economy in the long run instead of interfering with financial estimates or monetary policy, in the real business cycle theory, when changes occur in the growth of output there will be changes in the growth of money supply and not vice versa, that is, there is a one-way causal relationship between production growth and money supply , extending from output to money (Al-Janabi, 2017, 259), (RBC) consists of a simple and real business cycle that was used to study the extent to which shocks affect some macroeconomic variables such as production, consumption and investment, but this model emphasized the neutrality of money and therefore It did not include monetary policy, based on their belief that monetary policy has no effect on the real economy, and therefore it is not possible to develop a coherent model in which monetary policy has the right effects. (Midrigan, 2018, 140), but the question that has been raised about these models, why are they neutral with respect to money?

Economists have justified this with three reasons (Midrigan, 2018, 144):

First: The goal of the work is to develop a model that can be built on a coherent set of variables such as (production, consumption, and investment).

Second: Because of technical limitations imposed on the methods of calculating these models, statisticians lack computational techniques to solve models with heterogeneous factors, multiple frictions, and unreal effects.

The third: the loss of confidence in the Keynesian models, which were based on policy publications, which deepened the problem of stagflation.

From 1982, Kydland and Prescott published a paper in which he proposed a theory of fluctuations in the business cycle away from the traditional Keynesian approach.

Kydland and Prescott combined analyzes of long-term economic growth and short-term macroeconomic volatility, by sustaining long-term standards of living, through growth in technology that can generate short-term cycles, and by relying on standard microeconomic mechanisms. Prices, wages and interest rates, according to their opinion, the markets from liquidation. Thus they argued that periods of temporarily low production growth should not be the result of market failures, but could simply follow from temporarily slow improvements in production techniques. Kydland and Prescott showed that many qualitative features of real business cycles, such as the combined movements of central macroeconomic variables and their relative variable correlations, can be generated by a model based on supply shocks (www.nobelprize.org).

In contrast to the criticisms leveled at the Keynesian models, the supporters of the Keynesian school did not stand idly by in front of these changes and criticisms.

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

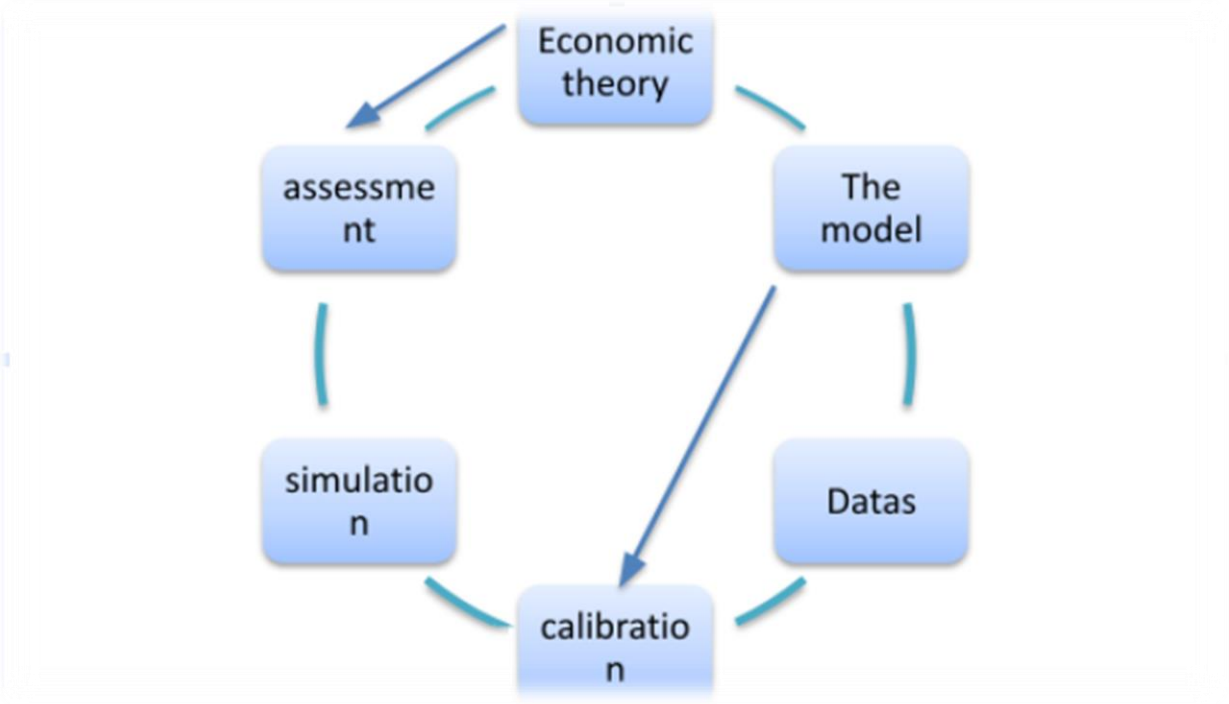
Both Smits and Walters presented a working paper at the beginning of the third millennium that includes the development and estimation of the dynamic stochastic equilibrium model in the euro area. This paper is considered the first official appearance of DSGE models.) In the context of the New Keynesian school, the model included seven macroeconomic variables (GDP - consumption - investment - prices - real wages - employment - and the interest rate). The impact of shocks on the business cycle in the Eurozone and Eastern Europe.

This paper paved the way for DSGE models to become one of the most important modern models to enable economists to analyze the impact of shocks on these variables. Therefore, it became one of the basic pillars of modern macroeconomics, and it became called the new econometrics, as it played an important role in formulating monetary policies for many of the world's central banks (Valdivia, Daney, 2015, p4).

b-Model (DSEG)

General dynamic stochastic equilibrium models are widely used by financial and monetary authorities for the purposes of analyzing the impact of policies and forecasting, as these models contain many variables, and an expanded set of macro-financial links, and their advantage is their ability to derive approximate linear equilibrium conditions, from problems The constraining improvement facing the economy, so the development of these models has been driven by the desire of central banks around the world to find an alternative to traditional Keynesian models, that money has real effects and be sophisticated enough that it can be used for forecasting (Vitek, Francis, 2017, 5), and (DSGE) models were distinguished by the calibration method, which is defined as "a strategy through which a set of numerical values for the parameters in the model is found, through its reliance on economic theory and historical data" (TF, Cooly, 1997, 57), which made it different because it depends on calibration. Estimation (Hansen, J. Heckman, 1996, p91) and this is what makes it different from econometric models, and calibration has become a common method in the macroeconomic literature, as the parameters of for a model with previous criteria from other previous studies, and the rationale behind this approach is that some parameters are difficult to obtain from the available data (Nikolay, Iskrev. (2018)),

The solution to the calibration method can be summarized as shown in the following figure:
Figure (16) Steps for solving the DSGE model



Source: From the researcher's work based on:

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

Favero, Carlo A. (2003) APPLIED MACROECONOMETRICS, UK: Cambridge University, P 268.

Some of the features of DSGE models that have undergone a great development and have become the focus of economists' interest mainly can be identified as follows (Valdivia, Daney, 2015, p4):

1-DSGE models are distinguished from the rest of the traditional macro models in that they have the ability to clarify the impact of microeconomic decisions on macroeconomic variables and vice versa, which made it possible to link development to macroeconomic theory with development and progress at the micro level.

2-These models are characterized by comprehensiveness and temporal consistency, due to their inclusion of rational expectations as an endogenous variable

3-The model helps to choose the appropriate model.

4-The model can answer the most important questions related to economic policy such as .

1 Which variable contribute the most to instability?

2- What is the impact of a shock on the future course of a particular variable or group of variables.

3- What policy makers should choose from the tools that fit the impact of external shocks.

5-(DSGE) models are distinguished from (SVAR) models in that they follow a clearly defined economic model based on accurate foundations that includes rational expectations of individuals and seeks theoretical coherence, while (SVAR) models follow a statistical approach as it deals with all variables as internal and seeks empirical coherence (Refets, 2017, p23) DSGE models can also estimate a model that includes a large number of variables, unlike (VAR), which does not prefer to increase the variables to more than five, because it deals with all internal variables and therefore the system of equations is very large because each variable It descends on itself and on other variables, and the number doubles with each deceleration period.

6-The DSGE model can help us find a single and complete equilibrium for a given economy, and support it with its changing structure and foundation.

7-It can help us distinguish between momentary influence and between the present and the future, for example the decision between hours to work and consumption and the path of consumption.

8-One of the most important features of the model is that it has a small number of equations, and therefore a small number of variables. It depends on integrating many correlative links using the principles of economics in modeling the behavior of economic agents (government - families - companies), and therefore the lack and accuracy of data that formed the most important challenges in the application of the traditional standard models, it is no longer presented in the (DSGE) models" (Hassan, Chukchi, 2019, 91).

9-Few solving steps, and they can be summarized by calibration, simulation, and finally conclusions.

Because of these features, there is almost unanimity that DSGE models, as well as their absorption of the essence of modern fluctuations in the macro economy, but because of their novelty, they are still under development, and therefore there is disagreement over the components of the model, which prompted many researchers to resort to other models, and merging it with the model, and this is due to the adherence of these models to economic theory, which is affected by the disagreement between scholars, especially between the pioneers of the neoclassical school and the Newkinsian school. While the neo-Knesian school sees the necessity of merging money, and thus the intervention of fiscal and monetary policies, because prices, according to neo-Knesin, are determined by competitive monopoly markets, and therefore prices cannot be adjusted instantaneously, and therefore they need to be relaxed by the tools of financial and monetary policy.

The fact of the matter is that the two views constitute the fundamental difference between the (RBC) and (DSGE) models (Romer, David, 2012 p189, p312).

The second research: Using the DSGE model to measure the effectiveness of fiscal and monetary policies in Iraq in light of the oil shocks:

First, describe the model variables:

In this search, a dynamic general equilibrium model (DSGE) for the Iraqi economy is formulated, as oil revenues (OILR) are used to explain oil shocks, provided that the response (GP) of government spending and (GR) of government revenues is simulated to clarify the behavior of fiscal policy in light of Oil shocks, and monetary policy is represented by the money supply (Md), the nominal exchange rate (PIQ1) and the parallel exchange rate (PIQ2), and it should be noted here that the researcher replaced the exchange rate, the place of the interest rate, which is usually a reliable monetary policy tool in industrial economies Interest-based, as these countries have a solid financial system that consists of active money markets, and developed secondary markets for government debt, as well as an effective banking system, which the Iraqi economy and most developing

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

countries in general do not possess, and that must be researched that a tool that represents policy Cash replaces the interest rate in sending monetary signals efficiently across the market, and this is what we were exposed to in the second topic of the first chapter, which was confirmed by a group of studies, including the study of (Paolo Vitale), in which he emphasized that (intervention in foreign currencies usually It leads to economic stability, and the monetary policy itself can be responsive to exchange rate developments (Vitale, Paolo, 2003, p842).

And household consumption (CO), which is one of the model variables, which shows the level of well-being, and that with investment (I) they directly affect the level of production and employment, and thus indicate the growth of companies' business, while imports (IMP) and exports (EXP) are two From the indicators of foreign trade with the trade balance (BOT), and the trade balance without oil (BOTnon oil), and through it the oil shocks are drawn, and thus the path of the fiscal and monetary policy variables becomes clear. With five periods, each period includes more than one shock, provided that it is the same type, i.e., negative or positive. The duration also includes the time period to clarify the course of the variables of the shock and its time range, according to the OILR movement, as the shocks were identified with (1973-1980) and (1981-1987).) and (1990-2003), (2007-2013) and finally (2014-2019).

The GDP in Iraq consists of two main components, namely, oil production, which is the largest contributor, the non-oil output, which is greatly affected by the size of what Iraq obtains from oil revenues, through government spending, both investment and consumer, and therefore the change in the volume of oil revenues has a significant impact. On growth rates in particular and on the development process in general in Iraq, they affect the components of total spending, or the domestic product by the way of spending, which consists of:

Household spending on final goods and services + investment spending on capital goods + government spending + spending on the outside world, which is represented in the model in the trade balance.

Description of the structure of the model: assuming that the Iraqi economy consists of a group of sectors, namely (the household sector, the government sector, the central bank, the trade sector, the oil sector, the non-oil sector, the investment sector)

The family sector consumes the various goods and services it obtains from the trade sector. In return, families offer work to all government and private sectors. The trade sector contains a large number of import companies that use part of the workforce and oil.

In the competitive oil sector, companies seek to maximize their profits from trading in local and international oil.

Oil revenues are owned by the Ministry of Finance, which is transferred to the Central Bank, to obtain the Iraqi dinar through the currency sale window, which is used by the Central Bank as a tool to control inflation rates and stabilize the Iraqi dinar exchange rate. As for the financial policy, in which oil is more than 95% of its revenues and 2% taxes Therefore, the volume of expenditure moves directly with the volume of oil revenues.

The process of solving the model After transferring the special symbols from (gEon) to (R), the model has been SOLVED

It shows the pulse response functions, through which the effect of oil shocks on the variables of the study becomes clear.

1- household consumption:

(1)

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{c_t^{1-\frac{1}{\sigma}} - 1}{1-\frac{1}{\sigma}} - \frac{L_t^{s1+}}{\sigma_L} \right]$$

(2)

$$C_t + \frac{B_t}{R_t P_t} \leq \frac{B_{t-1}}{P_t} + \frac{W_t}{P_t} W_t L_t^s + \frac{T_t}{P_t}$$

Where:

O': Elasticity of substitution between time periods.

O'L: the reciprocal of the elasticity of labor supply to the real wage.

W $_t^1$: Nominal wage level.

Bt: bonds owned by the household sector.

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

R_t: the nominal interest rate.
P_t: the general level of prices.
T_t: net transfers.
L_{st}: The number of hours worked in both the oil and non-oil sectors.
C_t: private consumption, which is a composite of foreign goods CF,t and domestic goods and is given by the CFS function.

(3)

$$C_t = \left[(1 - \alpha_c)^{\frac{1}{\eta_c}} (C_{H,t})^{\frac{\eta_c - 1}{\eta_c}} + \alpha_c^{\frac{1}{\eta_c}} (C_{F,t})^{\frac{\eta_c - 1}{\eta_c}} \right]^{\frac{\eta_c}{\eta_c - 1}}$$

ϵ [1,0] a_c :Trade openness index.
$\eta_c > 0$ It measures the degree of substitution between domestic and foreign goods.
The level of spending on domestic and foreign goods is determined according to the following two relationships:
(4)

$$C_{H,t} = (\alpha - \alpha_c)\left(\frac{P_{H,t}}{P_t}\right)^{-\mu_c} C_t, \; C_{F,t} = \alpha_c \left(\frac{P_{F,t}}{P_t}\right)^{-\mu_c} C_t$$

Hence, the consumer price index is expressed as follows:
(5)

$$P_t = [(1 - \alpha_c) P_{H,t}^{1-\mu_c} + \alpha_c P_{F,t}^{1-\mu_c}]^{\frac{1}{1-\mu_c}}$$

The two conditions of the first degree that allow families to maximize their benefit are determined (Equation No. (1) in the shade of a constraint
their budget (Equation No. 2 is as follows:
(6)

$$C_t^{\frac{1}{\sigma}} L_t^{s^{\sigma} L} = \frac{W_t}{P_t}$$

(7)
Companies (calvo, Guillermo,1983, P383)
There are two possibilities that determine the behavior of companies, the first is the stability of prices, and the second is to reach the ideal level.
(θ) installation parameter
(θ-1) Possibility of a price change

$$1 = E_t R_t \beta \left\{ \left(\frac{C_t + 1}{C_t}\right)^{-\frac{1}{\sigma}} \left(\frac{P_t}{P_{t+1}}\right) \right\}$$

(8)

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

$$max_{PH,t} \sum_{K=0}^{\infty} \theta^K E_t\left\{Q_{t,t+k}\left[Y_{H,t+K}\left(\overline{P}_{H,t} - MC_{t+k}\right)\right]\right\}$$

This is under the following restriction:

(9)

$$H_{H,t}(j) = \left(\frac{\overline{P}_{H,t}}{\overline{P}_{H,t}}\right)(C^*_{H,t+k})$$

where M_{Ct} is the nominal marginal cost and is given as:

(10)

$$MC_t = \frac{1}{\alpha^{\alpha}(1-\alpha)^{1-\alpha}} \frac{W_t^{\alpha}(P_t^*)^{1-\alpha}}{A_t}$$

Oil sector (Romero, Roman ,2008, p10)
Oil companies operate in a competitive environment as they produce oil, and work to maximize their profits by reaching the optimum employment limit $P_o{}^1{}_t$ $_{Wt}$

(11)

$$max\ L_{o,t}\ (P_{o,t}Y_{o,t} - W_t L_{o,t})$$

(12)

$$s.t: Y_{o,t} = A_{o,t} L^{\mu}_{o,t}$$

$L_{o't}$: Represents the number of working hours in the oil sector
$Y_{o't}$:It represents the total supply of oil, which is determined by the production function with diminishing returns to scale.
$\mu \in [0.1]$: Represents the contribution of labor to the output of the oil sector.
$A_0{}^1{}_t$:Total factor productivity in the oil sector, determined according to the autoregressive equation VAR (1):

(13)

$$\log log\ A_{o,t} = \rho_{\alpha} \log log\ A_{o,t-1} + \varepsilon_{ao,t} \qquad \varepsilon_{ao,t} \sim (0, \sigma_{ao})$$

(14)

$$A_{o.t} P_{o.t} (L_{o.t})^{\mu-1} = W_t$$

trade sector
Assuming that foreign economies have the same structure as the domestic economy, the foreign demand for domestic goods can be written as:

(15)

$$C^*_{H,t} = \left(1 - \alpha^*\right)\left(\frac{P^*_{H,t}}{P}\right)^{-\eta^*} C^*_t$$

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

Where:
$C^*_{H.t}$: Foreign demand for domestic goods
$(1-a^*)$: Contribution of local goods to the consumption of foreign families
η^*: The elasticity of foreign demand

By compensate $C^*_t = Y^*_{H.t}$,$P_{H.t} = \epsilon_t P^*_{H.t}$ In relationship 15, the foreign demand for domestic goods can be written by the following relationship

(16)

$$C^*_{H.t} = \left(1 - \alpha^*\right)\left(\frac{1}{RER_t}\frac{P^*_{H.t}}{P_t}\right)^{-\eta^*} Y^*_t$$

Where the RER_t represents the real exchange rate and is determined by the following relationship:

(17)

$$RER_t = \frac{\epsilon_t P^*_t}{P_t} = \frac{P_{F.t}}{P_t}$$

ϵ_t: nominal exchange rate
P_t :The general level of domestic prices
$P_{F.t}$:The general level of prices of foreign goods expressed in local currency
As for the domestic price of oil, it is given by the following relationship:

(18)

$$\frac{P_{o.t}}{P_t} = \frac{\epsilon_t P^*_t}{P_t} = RER_t \frac{P^*_{o.t}}{P^*_{F.t}}$$

monetary policy:
as follows:

(19)

$$\frac{1+R_t}{1+R} = \left(\frac{1+R_{t-1}}{1+R}\right)^{\rho i}\left(\frac{P_t}{P_{t-1}}\right)^{(1-\rho i)\varphi\pi}$$

ρiϵ: Indicates the degree of smoothing the nominal interest rate.
Measures the degree of responsiveness of monetary policy to changes in the general inflation rate.
The next rule is to fix the nominal exchange rate directly as follows:

(20)

$$\Delta\epsilon_t = 0$$

financial policy:

(21)

$$TAX_t + FRR_{t-1} + B_t = FRR_t + PG_t + R_{t-1}B_{t-1}$$

(22)

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

$$FRR_t = FRR_{t-1} + \varepsilon_t P^*_{ot} O^*_{H,t}$$

(23)

$$\frac{G_t}{G} = \left(\frac{G_{t-1}}{G}\right)^{\rho g} \left[\left(\frac{FRR_{t-1}}{FRR}\right)^{\varphi rrf} \left(\frac{B_{t-1}}{B}\right)^{-\varphi b}\right]^{(1-\rho g)} exp(\varepsilon_{g,t})$$

general balance
The equilibrium of the market for goods and services requires that the sum of the non-oil sector output and oil export revenues equal the total private consumption, government spending and net exports.

(24)

$$CA_t + C_t + Y_{H,t} + \frac{p_{o,t}}{pt} O_{H,t} = C_t$$

The market equilibrium of goods and services in the non-oil sector requires that the output of the non-oil sector be equal to the total domestic and foreign consumption of locally produced goods:

(25)

$$Y_{H,t} = C_{H,t} + C^*_{H,t}$$

In the oil market, the supply of oil must be equal to the domestic and foreign demand for it

(26)

$$Y_{H,t} = O_t + O^*_{H,t}$$

Labor market
Labor supply by households = oil and non-oil sector demand for labor

(27)

$$L^s_t = L_t + L_{o,t}$$

Net exports

(28)

$$CA_t = P_{x,t} X_t - P_{M,t} M_t$$

7- Calibrate Equations

$$-Y_{SS} + r_{ss} K^S_{SS} = 0 \qquad (7.1)$$

8- Parameter settings

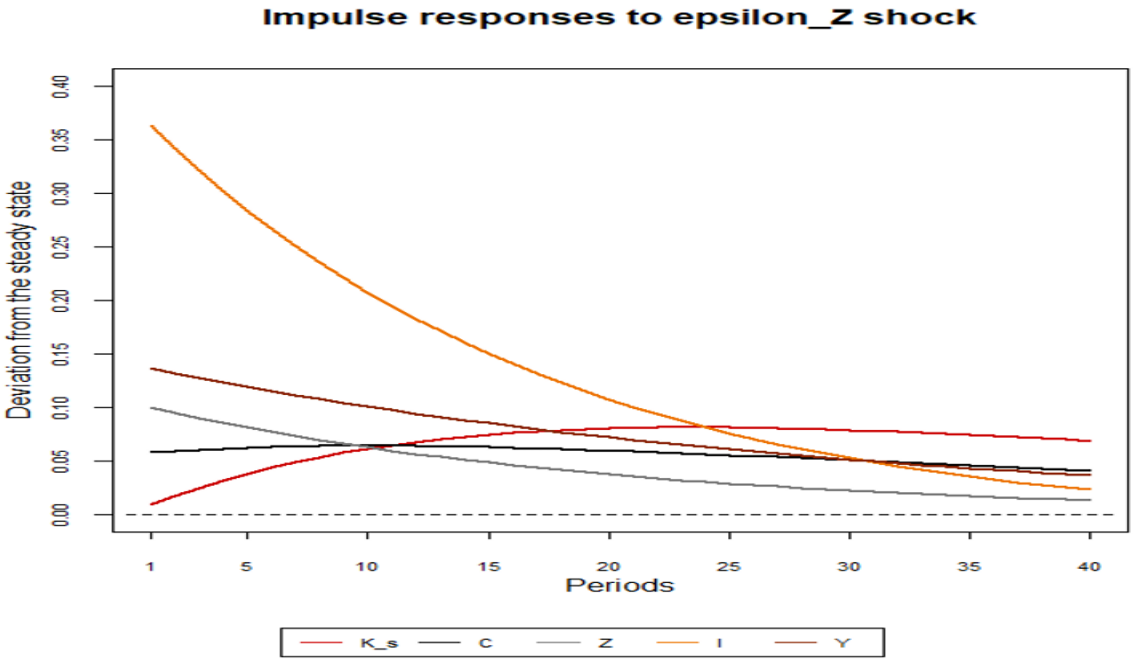
The parameter	*value*
a2	0.011011011011
All . variable	TRUE
	0.33
b	0.63
β	0.99
δ	0.025

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

The parameter	*value*
e	0.8
	2
	1
	0.3
	1.45
φ	0.95
	1.75
	0.08
verbose	TRUE

9- Steady_ state value:

	Steady_ state value
PIQ1= pi	0.00000
OILR= r	0.0351
CO= c	0.7422
I= i	0.2559
Md= K_s	10.2369
GP= L_s	0.2695
PIQ2= PI	0.00000
BOT= U	-136.2372
BOT non-oil= W	2.3706
GR= Y	0.9981
Shock= Z	1.0000



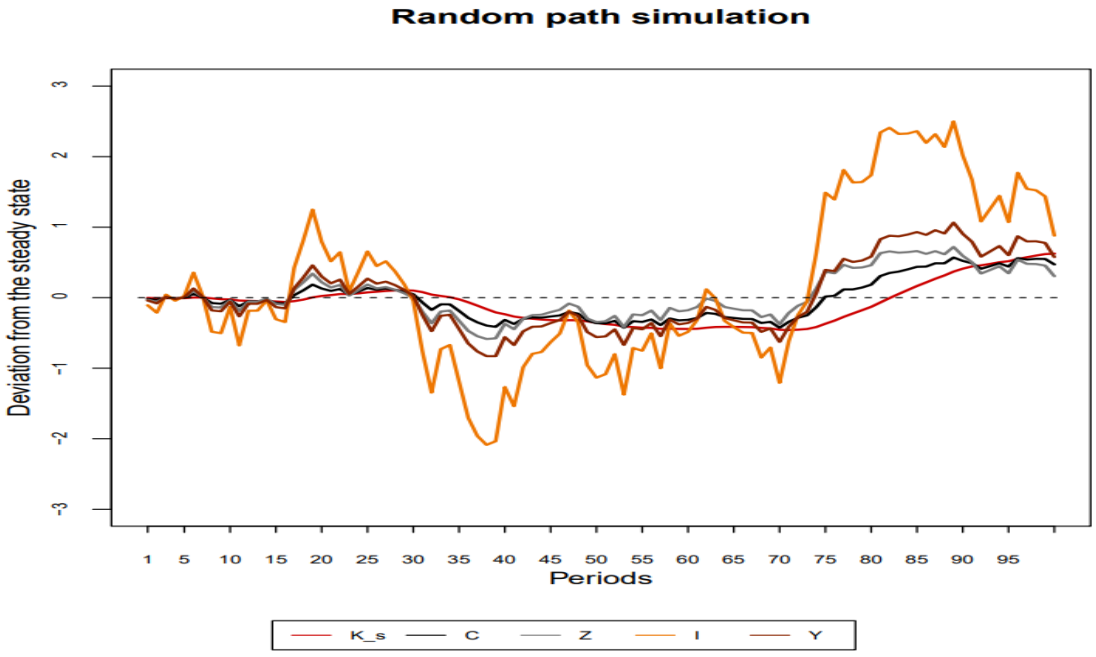
From Figure (16) it is clear that the impact of the shock, which appeared to be high, then began to descend to the bottom, and became stable.

Next step (**compute-model-stats: Computation of model statistics)**

This function calculates model statistics using Fast Fourier Transform (FFT) spectrum or simulation

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

methods. The constant stable values show the covariance matrix, from which the system excluded two variables, namely (p and PI), which are represented in the basic model (BNON OIL and IRQD1), and the correlation matrix, which shows the extent of the large correlation between the variables, which is shown by the values of (R), which most of them are more than (90%). The program produced a value (R^2), which represents the changes explained by the explanatory variables on the dependent variable. What is the impact of the change in oil revenues?
Figure (17) shows the effect of shocks on the selected variables



Through the simulation process, it is possible to monitor the impact of oil shocks on the Iraqi macroeconomic variables, which are represented by the following figures

In Figure (17) we find the following

GDP: Positive monetary shocks show growth in GDP, and vice versa in the case of negative monetary shocks. Through the movement of government spending levels, it becomes clear that fiscal policy was in line with the economic cycle and that government spending is a channel for transmitting the impact of the shock to the rest of the model variables.

Family consumption: by drawing the pulse response functions for this variable, the volume of family consumption increases, with the increase in the volume of oil revenues and vice versa if it decreases, which means that the level of social welfare in Iraq is closely linked to the oil sector, and this is due to the state's dominance of economic activity, And the absence of an active private sector.
Investment: Investment spending did not differ much from consumption, and investment in Iraq, both private and public, is closely dependent on government spending, because most of the private sector works in the services and contracting sector, which is linked to the government.
The exchange rate: We note that the exchange rate was affected by the volume of oil revenues. In the event of positive shocks (the decade of the seventies) the official value of the Iraqi dinar rose, while in the eighties and nineties, a decrease in the parallel value of the dinar was noted with its departure from the official value significantly, especially during the Iraqi shock (from 1990-1997).

Exports and Imports:
Figure 17 shows the simulation of the random shock path, which the program identified with five shocks in terms (1973-1980), (1981-1987), (1990-1997), (2004-2008) and finally (2014-2019).
The figure clearly shows the effect of those variables on oil revenues and their keeping up with the increase and decrease of those revenues. In the case of

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

positive oil shocks, we note the appropriate increase in government spending and money supply with the significant rise in oil revenues for the period (1973-1980), which is followed by an increase in family consumption, investment, exchange rate and imports, which It caused an imbalance in the balance of payments, and this was confirmed by the high R^2 values.

And to clarify the effect of oil shocks, which is represented by (OILR) on each variable separately, the impulse response graph (IRF) was found.
From Figure (18), which shows the response of the model variables to the five shocks that were identified in the program, as follows:
1-Government spending (GP): The first shock, which included the period (1973-1980), the response of government spending (GP) was positive and in the same direction as the shock (Z), which represents oil revenues, while in the second shock (1981-1987), which was negative, we notice the fluctuation between Positive and negative area and government consumer spending was consistent with the direction of the negative shock, and in the third shock, which witnessed a significant decrease in oil revenues, followed by a decrease in government spending, but in the post-2003 period, which the Iraqi economy was subjected to two oil shocks, the fourth shock, which was positive, we note that the trend was positive Also, in the same direction as the shock, and the matter is not much different in the fifth shock, which was negative, in which the conduct of government spending was also parallel to the shock, and therefore government spending, which is the main fiscal policy tool, was in line with the economic cycle by keeping pace with the oil shocks.

2-Investment (I): It is also clear that investment was moving in the same direction, and now its response was weak, except for the first shock. It was in the negative region because the spending was mostly consumer spending.
3-Money supply (MD): We note that the money supply did not have a clear response to the first shock, but rather went in the opposite direction at the end of the shock period, and this is consistent with what was achieved by the growth rate MD for the period (1973-1980), which was (19%), which is few if It was compared to the compound oil revenue growth rate, which achieved (35.8%), and in the second and third shocks, we note that the money supply increased, due to the deficit financing operations that monetary policy forced upon, which is evidence of its dependence on fiscal policy.

4-Household consumption (CO): It is clear that the flow of (CO) was consistent with the flow of (GP), which in turn was in line with the oil shocks. -18- -1) If we compare it with the growth rates of oil revenues that have achieved their values (24% - -4% - 2% - 15% - 0%), we find that they are consistent with them, and this is evidence of the dependence of Iraqi society on the government, and the absence of a sector Effective private, meaning that the level of well-being is closely linked to government spending, meaning that the well-being of Iraqi families is linked to oil shocks.
5-The nominal exchange rate of the dinar (PIQD 1): It did not show a clear response except in the fourth positive shock, and this is due to the fact that the official Iraqi dinar rate remained constant from 1980 to 2003, but after 2004 a new exchange rate was set by the Central Bank.

6-Parallel Dinar Exchange Rate (PIQD2): It is clear that its response was clear to the first, third and fourth shocks.

7-Trade Balance (BOT): The largest response to the trade balance was in the shadow of the first shock. Its response was also clear at the beginning of the second shock, until it was gradually decreasing. As for the third shock, it did not show a clear response, in contrast to the fourth shock.
8-As for the trade balance without oil (BOTNON OIL): it did not show any response that could be mentioned

SOURCES:
First: Arabic sources:
1.Books:
1-Hamid Musa, Sundus: (2018), Central Banks and Economic Balance, 1st Edition, Jordan: Dar Al-Ayyam for Publishing and Distribution
2-Al-Khazraji, Soraya (2010), Monetary Policy in Iraq between Past Accumulation and Present Challenges, Journal of Baghdad College of Economic Sciences, Issue 23. Iraq: Baghdad College of Economic Sciences.
3-Al-Rafi'i, Iftikhar (2007), general liquidity and the effectiveness of monetary policy on it with an applied reference to Iraq, PhD thesis, College of Administration and Economics, University of Baghdad, Iraq
4-Zainy, Muhammad Ali. (2009), The Iraqi Economy, Past, Present, and Future Options, 3rd Edition, Iraq: Dar Al Malak for Arts, Letters and Publishing.

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

5-Saleh, Mazhar Muhammad (2012), Monetary Policy of Iraq, 1st Edition, Iraq: House of Wisdom.
6-Saleh, Mazhar Muhammad. (2011), Monetary and Financial Policy and Control of Inflation and Exchange Rate Variables, Iraq: Hammurabi Center for Research and Studies
7-Tabaqli, Ahmed. (2018), Iraq's debts, an overview of the status of debts, their inception, 1st edition, Iraq: Al-Bayan Center for Studies.

2: Research and Studies
1-Abdulnabi, Walid. (2018). The role of the Central Bank of Iraq in facing the economic crisis and developing the Iraqi economy and the banking sector, Iraq, Central Bank of Iraq: Research and Studies Department.
2-Musa, Sundus Hamid. (2009), The Central Bank and its Role in Achieving Economic Balance with Special Reference to Iraq, (Master's Thesis), College of Administration and Economics, University of Kufa.

c. Bulletins and reports
1-Republic of Iraq, Ministry of Planning, Central Statistical Organization, Annual Statistical Collection for the Years 1980-2019, Baghdad, Central Statistical Organization.
2-Republic of Iraq, Central Bank of Iraq, Annual Economic Report, for the years (1980 to 2019)
3-Republic of Iraq, Central Bank of Iraq, Statistical Bulletins for the Years (from 1973 to 2019)
4-Republic of Iraq, Ministry of Finance, Budget Department, Iraq's budgets for the years (1973 to 2019)
5-Republic of Iraq, Ministry of Justice, Iraqi Gazette, prepared (2004-2005-2006-2007-2008-2009-2010-2011-2012-2013-2014-2015-2016-2017-2018-2019).

2: English sources
A-books
1. Ramey, Valerie. (2016). Macroeconomic Shocks and Their Propagation,USA: University of California . Retrieved from
2. Vitek, Francis. (2017). Policy, Risk and Spillover Analysis in the World Economy: A Panel Dynamic Stochastic General Equilibrium Approach,USA : Authorized for distribution by Ulric Eriksson von Allmen
3. Iskrev, Nikolay. (2018). Calibration and the estimation of macroeconomic models, Lisbon,:Banco de Portugal
4. Favero, Carlo A. (2003) APPLIED MACROECONOMETRICS, UK: Cambridge University.
5. Romer, David. (2012). ADVANCED MACROECONOMICS, Fourth Edition,USA: McGraw-Hill Companies.

B- -Periodical:
1. Sbordone,Argia.(2010), Policy Analysis Using DSGE Models Volume 16, Number 2 JEL classification: E31, E52
2. Valdivia, Daney (2015): Handbook on DSGE models: some useful tips in modeling a DSGE models. https://mpra.ub.uni-muenchen.de/
3. Glenn , Rudebusch.(2002), Assessing the Lucas Critique in Monetary Policy Models, Federal Reserve Bank of San Francisco:https; Retrieved from https://www.frbsf.org/economic-research/files/wp02-02bk.pdf
4. Tovar, Camilo.(2008).DSGE models and central banks. Germany .Retrieved from http://www.economicsejournal.org/economics/discussionpapers
5. 5.Sergi, Francesco.(2018). DSGE Models and the Lucas Critique. A Historical Appraisal, England: University of the West of England (UWE), Bristol, Retrieved from https://www2.uwe.ac.uk/faculties/BBS/Documents/1806-%20DSGE%20Models%20and%20the%20Lucas%20Critique%20(WP).pdf
6. Kehoe, Patrick& Midrigan, Virgiliu.(2018). Evolution of Modern Business Cycle Models: Accounting for the Great Recession, The Journal of Economic Perspectives, Volume 32 • Number 3,USA: American Economic Association Publications. Retrieved from https://www.aeaweb.org/
7. Sbordone, Argia& Tambalotti, Andrea. (2010), policy analysis using DSGE. Volume 16, Number 2 JEL classification: E31, E52: Retrieved from https://www.newyorkfed.org/medialibrary/media/research/epr
8. Christiano, Lawrence. (2012). Christopher A Sims &Vector Autoregressions,jornal of economic ,USA. Retrieved from
9. 9.Bernanke, Ben.(2003).Measuring effects of monetary policy :Afactor- Autoregressive (FVAR) Approach, The Quarterly Journal of Economics, Volume 21, Issue 1,Columbia university USA. Retrieved from https://academic.oup.com/qje/article-abstract/120/1

World Bulletin of Management and Law (WBML)
Available Online at: https://www.scholarexpress.net
Volume-8 March-2022
ISSN: 2749-3601

10. 10.TF, Cooly.(1997). CALIBRATED MODELS, Oxford Review of Economic Policy, Vol. 13, No. 3, Autumn 1997: Oxford University Press.
11. Hansen, Lars. J. Heckman, James. (1996). The Empirical Foundations of Calibration. Journal of Economic Perspectives—Volume 10, Number 1—1996—Pages 87–10: Technium
12. 12- calvo,Guillermo.(1983). Staggered prices in a utility-maximizing framework, Journal of monetary policy economicsVolume 12, Issue 3, September 1983, Pages 383-398, USA: C.E.M.A. and Columbia University
13. C. Report
14. OPEC, Annual Statistical Bulletin, Vienna, Austria (1973-2019)
15. Federal Reserve Bank of St. Louis, One Federal Reserve Bank: Retrieved from https://fred.stlouisfed.org/searchresults/?st=iraq
16. 9. International Energy Agency,iea: Retrievedfrom https://www.iea.org/data-and-statistics/data-products
17. 10. Laurel Graefe. Oil Shock of 1978–79, Federal Reserve History. Retrieved from
18. https://www.federalreservehistory.org/essays/oil-shock-of-1978-79
19. 11. Organization for Economic Co-operation and Development,OCED
20. Retrieved from https://stats.oecd.org/index.aspx?queryid=60702