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Measuring the Relationship Between The Indicators of The Optimal Level of Foreign Reserves and The Window for Selling Foreign Currency in Iraq for the period (2004-2021)

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Abstract:

Foreign reserves are important in supporting the local currency, as the Iraqi economy maintained an optimal level of foreign reserves and the(CB) contributed to sterilizing the money supply, confronting the increasing spending of the Ministry of Finance, and maintaining the stability of the local currency exchange rate, as the study aimed to analyze the impact The window on inflation rates, which is one of the direct tools used by monetary policy. The problem of the study is that rentier economies suffer from weak transmission and effectiveness of traditional channels, so the window for selling foreign currency must be followed. The study concluded that the (CBI) maintained an optimal level of foreign reserves, The monetary sterilization mechanism achieved positive and acceptable results despite the many increases in government spending, and the Central Bank was able to eliminate the pluralism in exchange rates and gradually reduce inflation rates. After inflation was recording an increase of 53.1% in 2006, the Central Bank was able To reduce it to (6%) in (2021) And the results of the econometric analysis showed that there is a direct relationship and cointegration between foreign reserves and the window for selling foreign currency, as the value of (Bounds test) reached (8.1621).

Paper type: Research paper.

Keywords: Foreign reserves, Window for selling Foreign currency (WSFE), Inflation, Monetary sterilization, Exchange rate of the Iraqi dinar.

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1. Introduction:

Foreign reserves are important in stabilizing prices in Iraq, Foreign reserves in monetary systems also serve as a safety barrier from internal and external crises that have occurred or are expected to occur, so they have received a lot of attention from governments and specialists. In this field, especially with the global openness of countries, and the expansion of trade and service exchange, foreign reserves play a role in confronting the imbalance of payments of countries in the event of an imbalance, so the monetary authorities of countries work to strengthen the elements of these reserves of foreign currencies, gold and special drawing rights, on Despite their different exchange rate systems, they have received great interest among countries that follow fixed exchange rate systems.

(WSFE) is one of the direct monetary tools used by monetary policy in rentier countries. that suffer from the weakness of traditional channels for transmitting the impact of monetary policy to the real sector, the imbalance of their economic structure, and dependence on the outside to finance domestic demand. It is also a means of achieving stability in the value of the local currency through the mechanism of monetary sterilization, which means the intervention of the (CBI) to withdraw increasing government spending, in addition to the window for selling foreign currency as a means of stabilizing inflation levels. In the context of the research, criteria were adopted to measure the optimal level of foreign reserves (commercial, and cash) as it was shown from these indicators that the Iraqi economy maintained an optimal level during the study period (2004-2021).

(WSFE)played a role in sterilizing the money supply resulting from increased government spending and achieving monetary sterilization, as the Central Bank relied on the foreign currency selling window in following The monetary sterilization mechanism is to maintain the stability of the exchange rate, and meet the local market's requirements for the dollar, as well as the stability of inflation levels, as it is reflected in the stability of the level of prices, the stability of the value of the currency, and the reduction of the gap between the official and parallel exchange rates. Iraq also seeks to optimally exploit its reserves of foreign currencies in order to Increasing the rate of economic growth, achieving economic diversification, and not relying on oil as the sole source of national income, especially in light of the fluctuations in global oil prices. The Iraqi dinar was able to gradually recover its value, especially since the Iraqi economy had gone through financial and security crises, the most recent of which was health, and the (CBI) was able to eliminate the pluralism in prices. Exchange rate and to gradually reduce inflation rates. After inflation was recording a high of (53.1%) in (2006), the Central Bank was able to reduce it until it reached (6%) at the end of the year (2021). Below are some of the optimal level indicators as selected indicators.

1.1. Literature Review:

In order to take note of some results and applied evidence about measuring the optimal level of foreign reserves and their relationship to the window for selling foreign currency in Iraq, we will look at some studies, including what was conducted in developing or developed countries, as follows:

Belkacem (2009) proved that the level of international reserves in Algeria, like other Arab oil countries, has increased increasingly in recent years. The study concluded that international reserves in Algeria far exceed the rate that is considered sufficient for the purpose of economic stability. Some may see that forming reserves in a way that exceeds the safe and sufficient rate is something required to attract foreign investments within Algeria. It has not been proven that there is a relationship between the state's ability to attract foreign investments and the level of its cash reserves. The study recommended investing a portion of the surplus reserves in the form of longer-term and higher-returning foreign assets, and investing the rest of them profitably and cautiously in short-term and lower-returning foreign assets. Accordingly, the authorities can Cash can be resorted to this part of the reserves whenever the need arises, provided that the proceeds of these investments are used to finance the local private sector.

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Abayomi et al (2014) concluded from the hypothesis that government spending significantly affects foreign reserves in Nigeria, and the study aimed to assess the fiscal deficit and its impact on foreign reserves in Nigeria during the period 1988-2012 using econometric methods for modern time series, and the study concluded that the foreign reserves It is determined in the long run by operating and capital expenditures, as expenditures greatly affect the level of foreign exchange reserves in Nigeria during the study period. The study recommended that there be a sustainability of the fiscal deficit file, in order to stimulate the desired growth in the Nigerian domestic economy.

Jared (2018) suggested the value of the US dollar is determined by the increase in bank deposits, the higher the interest rates on deposits, the higher the exchange rate of the US dollar. Other global currencies, and the study concluded that the value of the US dollar is determined by the increase in bank deposits, the higher the interest rates on deposits, the higher the exchange rate of the US dollar, as the theory (Fisher's global index) was adopted as one of the theories for determining currency rates, which summarizes (that currency prices are measured On the basis of the interest rate on bank deposits) The study recommended setting an interest rate that contributes to the evaluation of the dollar at levels that are compatible with the economic situation and monetary goals.

Faraj (2018) interpreted the economic stability in Iraq financial discipline according to financial rules that suit the Iraqi economy, and that the most important conclusion reached by the research is the existence of a state of financial instability that led to the occurrence of a state of instability in economy, and that the attempts of the (CBI) have partially worked to limit Of the negative effects, the researcher recommended the work of more financial discipline in the fiscal policy in order to reduce the state of economic instability.

Beda et al (2021) suggested the flow of foreign reserves to Iraq and achieving the optimal size of it is considered a basic goal and an important source towards financial crises, but this flow may have undesirable effects represented by increasing the cash basis and thus the money supply and the general price level. Therefore, it has become imperative to use the monetary sterilization policy to limit the undesirable effects of foreign reserves. As a result of the rentier nature of the Iraqi economy and its large and sole reliance on cash flows resulting from crude oil exports, there comes the binding role of reserves to use monetary sterilization, which is what the research found in order to neutralize expansions in the inflationary monetary mass that may exceed the ability of monetary policy to confront it in achieving Its goals, in addition to the preference for partial rather than total sterilization The study also recommends the need for the central bank to set target rates for monetary sterilization as well as target inflation rates and to find developmental alternatives that limit the depletion of foreign reserves and invest the surplus part of it in low-risk foreign investments, or build a sovereign fund.

Karima et al (2021) provened Bank of Algeria practices a policy of monetary sterilization to limit monetary expansion and contain inflation rates when faced Liquidity surpluses, and the aim of the research is to try to get acquainted with the concepts related to monetary policy, including the monetary sterilization policy, and to know the tools used by the Bank of Algeria in light of the fluctuations in international oil prices. The researcher recommended that the authorities should diversify the sources of income to avoid the impact of the disturbances that occur on the level of oil prices and exchange markets, as well as the necessity of coordination between the traditional tools of monetary policy and the new tools of monetary sterilization.

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Hussein et al (2022) Proved there is a relationship between in Investing the surplus of international reserves owned by the (CBI)and its impact on the budget of the (CBI)and the extent of its impact on the Iraqi economy. the budget deficit negatively affects the foreign reserves due to the decrease in the sales of the Ministry of Finance to the (CBI), where the sales of the (CBI) in the Foreign currency selling window were greater than its purchases, which led to the withdrawal of those reserves. Therefore, investment is one of the main tools to achieve the goals of economic development. Foreign investment is one of the most important methods of increasing foreign reserves as it attracts foreign currency, especially the US dollar. Khudhair et al (2023) registered It was proven that foreign reserves decreased in 2020 as a result of the health crisis and the decline in oil prices in the year, which led to a decline in Iraq's credit rating, according to Fitch International, and the researcher recommended diversifying the sources of foreign exchange income and activating customs revenues and the religious tourism sector especially since Iraq enjoys a comparative advantage that does not exist in... In most countries, the Corona virus has proven that one should not rely on one source of income.

The problem of the research that the weak efficiency of fiscal policy, the absence of a state of financial discipline, the absence of a specific trend for increasing government spending, the dominance of oil revenues, and the relationship of that to monetary sterilization prompt the researcher to measure the indicators of the optimal level of foreign reserves that maintain monetary stability and provide an element of safety against internal and external shocks.

The objective research of the studied find the optimal level of foreign reserves and to know the effective monetary policy tools that the Central Bank entered into and led to the process of monetary sterilization in the Iraqi economy.

2.Material and Methods:

The study relied on the inductive approach and a statistical program was used Eviews10 on the Iraqi economy was used for (2004-2021).

2.1. Hypotheses:

Foreign reserve indicators contribute positively to the monetary sterilization mechanism in Iraq.

2.2. Conceptual framework of foreign reserves(WSFE) and monetary sterilization

Concept of foreign reserves and indicators for measuring their optimal level, The International Monetary Fund (IMF) defines foreign reserves as liquid or easily traded assets denominated in foreign currency (Kazzar, 2021), subject to the control of monetary policy, and permanently disposable (Al-Khafaji, 2016), In addition, these assets must be kept in the form of entitlements to the authorities over non-residents (Al-Ghaish, 2017), denominated in foreign currency and convertible until... It is liquid and can be used in settling external transactions (Al-Alaq , 2022).

2.2.1. Indicators of the optimal level of foreign reserves:

In the economic literature, there are many indicators that measure the adequacy of foreign reserves or their optimal level, which are commercial indicators and monetary indicators) (Khudhair et al, 2023).

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2-2-2. Commercial indicators:

- Ratio of foreign reserves to imports (R/IM)**:**

This percentage represents according to this indicator to measure the adequacy of foreign reserves (Dagher et al, 2022), as this indicator is one of the appropriate indicators to evaluate the adequacy of the size of foreign currency reserves in a country (Drummond, et al, 2009), and therefore the primary motivation for forming and maintaining foreign reserves is It is for the purpose of transactions, and on this basis, the percentage that must be kept of reserves, according to this indicator, is approximately (30%) of the value of annual imports, or the equivalent of the value of imports for a period of three months (Khazraji and Sabreen , 2021), As for developing countries, it is preferable that it be equivalent to their balance of Foreign reserves are the value of their imports for a period of five or six months (IMF, 2000).

2-2-3. Monetary indicators:

- The ratio of foreign reserves to the (MO_2) (R/M2)**:**

This indicator is one of the other indicators that are used to indicate the adequacy of foreign reserves, especially in developing countries (Drummond, et al, 2009) And measuring the degree of confidence in the local currency and the efficiency of the banking system on the other hand (Hussein and Hamdan, 2020) so if the function of demand for money is relatively stable and confidence in the currency of the country is available, then the need for this ratio is not important, and the exact opposite is true for countries that lack the element of stability and confidence in the local currency and according to For this indicator, foreign reserves should be covered by (40%) the broad money supply (Hashem, 2017), as this percentage is important for countries that deal with fixed exchange rate systems standard (Basm,2017).

2.3 (WSFE)and its role in achieving exchange rate stability:

(WSFE)is one of the direct channels used by rentier economies that suffer from poor diversification of their economic resources and the ineffectiveness of traditional monetary tools. The transition is the effect of monetary policy on the real sector (Al-Jubouri, 2015) and the disruption of its economic structure and the heavy dependence on imports to meet its domestic demand, The exchange rate is also the tool the main thing for monetary policy makers is to target inflation and maintain price stability, as the foreign currency sale window is used as one of the most important mechanisms to influence the exchange rate directly (Odeh, 2020).

(WSFE)is a function of open market operations in exchanging foreign currency with local currency, not only to finance foreign trade for the private sector and its needs of foreign exchange, but rather it is practiced as a monetary policy to intervene to stabilize the exchange rate and to control local liquidity levels and contain the power of pumping public expenditures generated by the public budget, especially consumer expenditures and generation A very diverse local demand force for foreign goods and services (imports) in the face of the fragility of local economic diversification and the growing individual spending derived from the strength of public expenditures in the public budget, which represents the basis of inflation resulting from demand pressures or aggregate spending (Saleh, 2011) and one of the main objectives of the foreign currency selling window It is controlling the money supply and general liquidity and reducing inflation through a direct impact on the growth of the monetary mass, as this tool is important and effective to limit the excessive increase in the money supply by controlling the monetary mass (Saleh, 2017) and working to standardize exchange rates or is a tool to achieve stability Cash and defend the price Monetary sterilization, liquidity absorption and reduction of the gap between the official and parallel market.

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3. Discussion of Results:

3.1. Analysis of indicators measuring the optimal level of reserves:

3-1-1. Commercial indicators :

- The ratio of foreign reserves to imports

Imports amounted to (31100) billion dinars in the year (2004), to rise to (59881) billion dinars in the year (2021), with a compound annual growth rate during the research period amounting to (3.93%). The number of months of import coverage witnessed a significant improvement during the research period due to the lifting of economic sanctions And the increase in the prices and quantities of oil exported, and then the increase in public revenues, which was reflected in the increase in the balance of foreign reserves, as the number of months of covering imports in the year (2004) was (3.9) months, bringing the number of months of covering imports in the year (2021) to (18.5) months, at a compound annual growth rate amounted to (9.59%), the period 2005-2008 witnessed a rise in the values of imports, as it amounted to (34686-30614-23799-410349) billion dinars, respectively, and the number of months of coverage in the same period amounted to (6.2-9.7-18.6-16.8) months, respectively ,Respectively, as a result of the improvement in oil prices, the increase in the quantities exported, the increase in the sales of the Ministry of Finance to the (CBI), and the accumulation of foreign reserves, the global crisis came in (2009) due to the drop in oil prices, as imports decreased by (48569) billion dinars, and the number of months to cover imports in the same year was (12.8) month.

For imports to rise again during the period (2010-2013), as the coverage rate for months of imports during the aforementioned period reached (13.7-14.9-13.4-13.9) months, respectively, as a result of the improvement in oil prices that is accompanied by an increase in government spending, part of which is directed towards Imports, and the coverage rate recorded during the period (2014-2017) a significant decrease amounting to (13.0-12.9-14.6-14.6) months in a row due to the dual crisis that led to a decrease in the balance of foreign reserves to enhance government imports to sustain the momentum of the battle, so that the coverage rates rose again to The year (2018), as the coverage rate recorded in (2019) (13.8) months, and the coverage rate recorded an increase in (2020) (15.8 months) due to the decrease in imports due to the Corona pandemic, so that the coverage rate in (2021) continues to increase by (18.5) months due to the change in the exchange rate and the increase in government spending, part of which is directed towards imports, as mentioned above, from this we conclude that the criterion of the ratio of imports to foreign reserves achieves the optimal level of foreign reserves, as it is noted that foreign reserves cover the criterion at the lowest value of months of imports by (3.9) month of the year (2004) compared to the highest percentage of (18.6) months for the year (2007).

Table 1: Number of months of imports covered by foreign reserves (billion dinars)

year	foreign reserve	imports	Average monthly revenues for each year	Number of months of coverage
	1	2	3	4
2004	10109	31100	2591.7	3.9
2005	17846	34686	2890.5	6.2
2006	26158	30614	2551.2	9.7
2007	38375	23799	1983.3	18.6
2008	58958	41034	3419.5	16.8
2009	52224	48569	4047.4	12.8
2010	59263	51380	4281.7	13.7
2011	71119	55929	4660.8	14.9
2012	81312	68800	5733.3	13.4
2013	90097	73831	6152.6	13.9
2014	76973	68329	5694.1	13.0
2015	63435	56105	4675.4	12.9

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2016	53106	40433	3369.4	14.6
2017	57893	44757	3729.8	14.6
2018	76017	54059	4504.9	16.5
2019	79918	68719	5726.6	13.8
2020	78293	62787	5232.3	15.8
2021	92526	59881	4990.9	18.5
compound growth rate	13.09	3.93	3.7	9.59
Max				18.6
Min				3.9
average relative importance				13.5

- Columns (1-2): CBI
- Column (3): by dividing the imports by 12 months, prepared by the researcher.
- Column (4): by dividing the foreign reserves by the average imports during the month

3-1-2.Monetary indicators:

-Analysis of the ratio of foreign reserves to the (MO_2)

We note from table (2) that the ratio of foreign reserves to the (MO) throughout the research period has covered and achieved the optimal level of the criterion, The wide money supply in (2004) reached (10148.626) billion dinars, to rise to (119944.02) billion dinars in the year (2021) and an annual growth rate Composite in(2004-2021) amounted to (15.64%), and the ratio of foreign reserves to money supply in the year (2004) (100%) and in the year (2021) (77%), with a compound annual growth rate the research amounted to (1.53%), and the average importance The percentage amounted to (116), and the (mo_2) witnessed a significant increase during the period (2005-2013), amounting to (11399.125, 15460.06, 21721.167, 28189.934, 37300.03, 51743.489, 62473.929, 67622.173,78318.122) billion dinars, respectively The economic sanctions that were imposed on Iraq in the nineties of the last century, in addition to the rise in oil revenues as a result of the rise in oil prices, as well as the inflation of public expenditures such as salaries, wages, and others, which led to a significant increase in the monetary mass after 2003, Which explains the annual growth rate for the above period, as it reached Average relative importance of annual growth rates (25.9%).

Ratio of foreign reserves to the (MO_2) during the same period amounted to an average importance of (146.2), so that the (MO_2) witnessed a decline for the years (2014-2015), as it amounted to (77593.288-69613.15) billion dinars, respectively, at a negative annual growth rate of (0.9-, -10.3) The ratio of foreign reserves to the (MO_2) amounted to (91, 99%), respectively, in Addition to the fact that the year (2014) did not approve the general budget and the government's directions towards rationalizing spending, bringing the broad money supply to (75523.952-76986.584) billion dinars (2016-2017) at an annual growth rate of (1.9, 8.5%), respectively, and the ratio of foreign reserves to the broad money supply amounted to (70, 75%), respectively, due to the security crisis, especially since the government directed its expenditures towards military spending, as the reason for the high supply of The widespread money led to an increase in the currency outside the banks due to the state of public hedging and the retention of savings to face the state of uncertainty in light of the economic recession (Central Bank of Iraq, 2016).

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Table 2: The ratio of foreign reserves /M2 / (billion dinars)

year	foreign reserve	Broad Money Supply (M2)	Money Supply Growth Rate M2%	The ratio of foreign reserves to the MO_2 %
	1	2	3	4
2004	10109	10148.626	-	100
2005	17846	11399.125	12.3	157
2006	26158	15460.06	35.6	169
2007	38375	21721.167	40.5	177
2008	58958	28189.934	29.8	209
2009	52224	37300.03	32.3	140
2010	59263	51743.489	38.7	115
2011	71119	62473.929	20.7	114
2012	81312	67622.173	8.2	120
2013	90097	78318.122	15.8	115
Average relative importance for the period 2005-2013			25.9	146.2
2014	76973	77593.288	-0.9	99
2015	63435	69613.15	-10.3	91
2016	53106	75523.952	8.5	70
2017	57893	76986.584	1.9	75
2018	76017	77828.984	1.1	98
2019	79918	86771	11.5	92
2020	78293	103353.56	19.1	76
2021	92526	119944.02	16.1	77
compound growth rate		15.64		1.53
Max				209
Min				70
CORREL				0.88
average relative importance				116

- Columns (1-2) CBI
- Columns (3-4) Researcher.

Period (2018-2019) reached an increase in the (MO_2), as it amounted to (77828.984-86771) billion dinars, respectively, at (1.1-11.5%), respectively, and the percentage of the contribution of foreign reserves to the money supply amounted to (98 ,92%) Respectively, the period (2020-2021) witnessed an increase in the broad money supply amounting to (103353.56 , 119944.02) billion dinars, respectively, at (19.1-16.1%), and the foreign reserve contribution to the money supply amounted to (76 ,77%) Respectively, due to the increase in the MO_2, to the increase in public spending on medical supplies and rehabilitation of hospitals due to the Corona epidemic, in addition to giving grants to families during the implementation of the comprehensive ban and the increase in cash liquidity rates to meet the requirements of increased spending as a result of the rise in the general level of prices. (Central Bank of Iraq, 2020) The average relative importance during the research period was (116%) and the highest ratio of foreign reserves to

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(MO) during the research period was (209%) in the year (2008) and the lowest percentage reached (70%) in the year (2016), and because of the strong relationship Between the two variables, foreign reserves and money supply, the degree of correlation reached (0.88), that is, the higher the foreign reserves, the higher the money supply, conclude from the indicator that the foreign reserves have achieved an optimal level.

3-1-3. Analysis of the (WSFE)and its role in achieving exchange rate stability

- Foreign currency sale window

(WSFE)is one of the monetary policy tools in Iraq that were implemented after the year (2003) to sterilize the increasing government spending and to finance foreign trade, especially after the lifting of economic sanctions , (CBI) purchases from the Ministry of Finance amounted to (15770) billion dinars in the year (2004), to rise to (45997) billion dinars in the year (2021), with a compound annual growth rate in (6.5%) and the average importance of the growth rate of purchases during the study period amounted to (12.7).

While the sales of the (CBI) in the window amounted to (8917) billion dinars in the year (2004), to rise to (37094) billion dinars in the year (2021), and a compound annual growth rate to (8.75%), and the average importance of the sales growth rate during the study period amounted to (11.7) The difference between purchases and sales of the (CBI) amounted to (6853) billion dinars in the year (2004), to rise to (8903) billion dinars in the year (2021) billion dinars, in(1.55%). This difference achieved goes to foreign reserve balance.

It is noted that in the year (2005) the purchases of the (CBI) from the Ministry of Finance amounted to (15624) billion dinars, with a growth rate of (-1%), and the bank's sales in the window in the same year amounted to (15420) billion dinars, with a growth rate of (73%), which This was verified by a surplus amounting to (204) billion dinars, which strengthened the balance of foreign reserves to (17846) billion dinars, with a growth rate of (76.5%). The official exchange rate reached (1474) dinars / dollars in the year (2005), and the parallel exchange rate in the same year reached (1478) dinars / dollars, so that the purchases of the Central Bank continued to rise during the period (2006-2008) to reach (22812, 32493, 53326) billion dinars, respectively. And at an annual growth rate of (46, 42, 64%), respectively, while (CBI) sales in the window also increased as a result of the increase in government spending and the demand directed abroad due to the lack of domestic production to meet the demand generated from spending, as it reached during the period (2006- 2008) (15544, 19447, 30318) billion dinars, respectively, with an annual growth rate during the same period amounting to (1, 25, 56%), respectively, and the average difference between purchases and sales was positive and increasing, and this difference in the increase in purchases over sales is what strengthens the balance Foreign reserves and made them record an increase, as the growth rate of reserves during the same period reached (46.6, 46.7, 53.6%), respectively, as a result of the increase in oil revenues, which achieved stability in the official exchange rate during the same period, as it amounted to (1391, 1217, 1172) dinars to dollars on In succession, the parallel exchange rate was also recorded during the same period (1396, 1220, 1180) dinars / dollars, respectively (Al-Shaibani, 2018).

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Table 3: Central Bank purchases ,sales ,the gap between them , the official and monetary exchange rates (billion dinars)

year	Central bank purchases	growth rate	Central bank sales in the window	growth rate	The difference between purchases and sales	foreign reserves	growth rate	official exchange rate	parallel exchange rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2004	15770	---	8917	--	6853	10109	--	1460	1462
2005	15624	-1	15420	73	204	17846	76.5	1474	1478
2006	22812	46	15544	1	7268	26158	46.6	1391	1396
2007	32493	42	19447	25	13046	38375	46.7	1217	1220
2008	53326	64	30318	56	23008	58958	53.6	1172	1180
2009	26910	-50	39770	31	-12860	52224	-11.4	1170	1185
2010	47970	78	42320	6	5650	59263	13.5	1170	1185
2011	59670	24	46563	10	13107	71119	20.0	1170	1217
2012	66462	11	56724	22	9738	81312	14.3	1166	1222
2013	72292	9	62067	9	10225	90097	10.8	1166	1222
2014	55402	-23	60314	-3	-4912	76973	-14.6	1166	1206
2015	38355	-31	52367	-13	-14012	63435	-17.6	1182	1216
2016	30321	-21	39625	-24	-9304	53106	-16.3	1182	1303
2017	47699	57	49881	26	-2182	57893	9.0	1184	1251
2018	61734	29	55711	12	6023	76017	31.3	1182	1195
2019	66015	7	60432	8	5583	79918	5.1	1182	1201
2020	40071	-39	57482	-5	-17411	76973	-2.0	1304	1315
2021	45997	15	37094	-35	8903	92527	18.2	1450	1477
compound growth rate	6.5		8.75		1.55	13.91			
average		12.7		11.7					

Source: Columns (1-3-6-8-9) CBI
- Columns (2-4-5-7) Researcher.

The (CBI) purchases recorded a decrease of (26910) billion dinars, with a negative annual growth rate of (-50%) as a result of the global financial crisis, while sales in the window continued to rise, recording an increase of (39770) billion dinars, with a growth rate of (31%, as we note here that sales exceeded purchases, amounting to (-12860) billion dinars, as the demand for dollars was met through the window through withdrawals from foreign reserves, as it recorded a decrease in the year (2009) amounting to (52224) billion dinars, with a negative annual growth rate of (-11.4%) This is what we notice from the table, the decline in the value of the local currency, as the parallel exchange rate reached (1185) dinars / dollars (Ali and Kalel, 2019).

The period (2010-2013) witnessed an improvement in the volume of foreign reserves, with growth rates amounting to (13.5, 20.0, 14.3, 10.8%), respectively, due to an increase in sales less than the increase in window purchases, which reflected positively on the position of foreign reserves, and this increase is reflected in the difference The positive relationship between purchases and sales, which goes to strengthening the balance of foreign reserves, achieving stability in the exchange rate.

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In (2014-2016), foreign reserves were subjected to a crisis represented by a decline in their levels, as the annual growth rate reached (-14.6, -17.6, -16.3%), respectively, to an alarming extent in threatening the currency cover, sovereign merit, and the ability of the balance of payments to settle Its foreign commitments, as 2014 represented a year of the beginning of the deterioration of the growth of foreign reserves, as Iraq was affected by the course of security events represented by the entry of the Terrorism and the economic crisis that began to plunge global oil prices, Central Bank's purchases during the same period decreased by (55402, 38355, 30321) billion dinars, respectively, with a negative annual growth rate during the same period amounting to (-23, -31, -21%), respectively, and the Central Bank's sales recorded a decrease during the same period (60314, 52367, 39625) billion dinars, respectively, with a negative annual growth rate of (-3, -13, -24%), respectively, and the difference between purchases and sales of the Central Bank recorded a negative difference amounting to (-4912, -14012, -9304) billion Dinars, respectively, as the Central Bank hastened to respond to the variables of security and economic events by withdrawing from reserves to meet the need of the exchange market, whether through the window in cash or transfer, and to defend the parallel exchange rate, as it rose to (1303) dinars per dollar in (2016) (Dagger and Ma'arij **,** 2015).

Analyzing the results of the year (2017) it is noted that the gap between purchases and sales continues despite the purchases achieving a growth rate of (57%), but sales exceeded purchases by a growth rate of 26%, as the difference amounted to (-2182) billion dinars. In this is the high growth rate of foreign reserves, which amounted to (9.0%) from its predecessor, and this is explained by the high value of foreign investments, in foreign banks and the Bank of New York, which helped in reviving foreign reserves (Al-Alaq, 2022), In the years (2018-2019), foreign reserves witnessed a significant improvement as a result of the improvement in oil prices, as the growth rate of foreign reserves reached (31.3, 5.1%), respectively, and purchases recorded an increase that exceeded sales, as it amounted to (6023, 5583) billion dinars, respectively, as it strengthened the balance of reserves And this increase in reserves increased the value of the Iraqi dinar and an improvement in the exchange rate, as the official exchange rate reached (1182, 1182) dinars / dollars, respectively, and a parallel exchange rate amounted to (1195, 1201) dinars / dollars, respectively.

In Year (2020) witnessed a challenge and proof of the monetary authority's efficiency in its proper management of the monetary system, in light of an external shock represented by the general closure as a result of the spread of the Covid-19 epidemic, the collapse of oil prices and a significant decrease in energy demand, in addition to a commitment to the terms of some agreements such as the licensing rounds that grant (10) dollars for each barrel, regardless of international prices, and in addition to that the compensation file, Kuwait, which grants (3%) of the value of one barrel according to the last reduction, which was negatively reflected on the purchases of the window, as the difference between purchases and sales reached (-17411) billion dinars respectively, which is the highest in the study period, and a decrease in foreign reserves, which amounted to (76973) billion dinars, with a negative annual growth rate of (-2.0%) and an increase in the parallel exchange rate, as it amounted to (1315) dinars for one dollar (Saleh, 2023).

As for fixing the official exchange rate, it maintained (1190) dinars /dollars until the date (12/17/2020), when a decision was taken by the monetary authority represented by the letter of the Department of Financial Operations and Debt Management No. (6/1/2440) and dated (20 /12/2020) by changing the official rate to (1450) as a result of raising the exchange rate sold by the Ministry of Finance to (1450) dinars for one dollar, which caused confusion in the parallel market (Central Bank of Iraq, 2021).

We note in the year (2021) and as a result of the change in the official exchange rate, and its stability at the level of (1450) dinars / one dollar, and in the parallel market it reached (1477) dinars per dollar, as purchases amounted to (45997) billion dinars, with a growth rate of (15%) and a decrease in bank sales In the window, it amounted to (37094) billion dinars, with a negative growth rate of (-35%), which was reflected in the achievement of a surplus amounting to (8903) billion dinars that would revive foreign reserves, which amounted to (92527) billion dinars, with a growth rate of (18.2%).

Conclude from the analysis of the above table that the foreign currency sale window affects foreign reserves directly through the increase or decrease in sales and purchases of the foreign currency sale window (AL bermani and Haseen, 2019) ,Higher sales than purchases. Reserves work to fill the difference to meet demand, and avoid a rise in the exchange rate in the parallel market, because the monetary authority has considered the currency sale window a tool of modern monetary policy to influence the exchange rate, inflation, and the general level of prices (Ail and Akkwi, 2022).

3.2. Description of the standard model:

Table 4: variables and symbols included in the standard model

variable symbol	Variable name
FOR dependent variable	foreign reserves
PUR is an independent variable	Central bank purchases
SAL is an independent variable	Central bank sales
Δ	first difference is the values of the variable.
δ_{0i}	fixed limit.
a_3,a_2,a_1	Variable parameters
Ut	random error limit

Source: prepared by the researcher

- Results of stability tests using the ADF

Table 5: Statistical Results of the Extended Test (ADF)

Variable	level			1st difference		
	Intercept	Trernd and Intercept	Non	Intercept	Trernd and Intercept	Non
	Prob.	Prob.	Prob.	Prob.	Prob.	Prob.
FOR	0.6486	0.8028	0.9522	0.0000	0.0040	0.0000
Pur	0.0058	0.0043	0.3056	0.0000	0.0300	0.0000
SaL	0.0074	0.0001	0.8417	0.0100	0.0000	0.0000

Source: The researcher's work based on the Eviews10 statistical program.

We note from Table (5) that the time series for each of the foreign reserves (POR), the (CBI) purchases (Pur) and the central bank sales (Sal) are not static at the level, as the prob recorded a value higher than 5%, which means accepting the null hypothesis that the variable is not still in its levels, and when calculating the first differences, the stillness was in the first difference for the variables that were calculated through Table (5) if the prob value was less than 5% and when Significance level (1%, 5%, and 10%), which means rejecting the null hypothesis, which states that the variables are not stationary and containing the unit root, and accepting the alternative hypothesis .

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- Phillips-Peron (PP) test results

This test is also used in time series quiescence tests, as it is considered accurate when the samples are small, as well as providing critical values that help in processing the time series if it suffers from sudden changes in it, and it is considered complementary to the results of the ADF test and compared with it to ensure whether the estimates are correct or not. And knowing the model that will be used, and we note from Table (7) that the results in the (PP) test are almost identical to the ADF test, meaning that all variables have been inhabited by the first difference.

Table 6: Statistical results obtained from the application of the (P-P) test

Variable	**level**			**1st difference**		
	Intercept	**Trernd and Intercept**	**Non**	**Intercept**	**Trernd and Intercept**	**Non**
	Prob.	Prob.	Prob.	Prob.	Prob.	Prob.
FOR	0.6669	0.8494	0.9695	0.1461	0.0000	0.0000
Pur	0.0000	0.1652	0.0678	0.0567	0.0000	0.0152
SaL	0.2681	0.6460	0.6622	0.5354	0.0200	0.0000

Source: The researcher's work based on the Eviews10 statistical program

We note from Table (6) that the time series for each of the foreign reserves (FOR)(CBI) purchases (Pur) and central bank sales (SAL) are not static at the level, as the value of prob is higher than 5%, which means accepting the null hypothesis that the variable is not still in its levels, and when calculating the first differences, the stillness was in the first difference for the variables that were calculated through Table (6) and we note that the value of the prob is higher than 5% when The level, that is, it did not live in I (0), but it all lived in the first difference, and thus we reject nullity and accept the alternative, i.e. the absence of the unity root problem, model seeks to discover and explain the underlying mechanism of an observed relationship between a dependent and independent variable by including a third explanatory variable, which is usually known as the intermediate variable. This can be illustrated by diagram (1), (Wayne et al, 2012).

- Testing the autoregressive ARDL model

ARDL model test fulfilled the two basic conditions that were previously detailed, namely that the variables included in the model are either static at level I (0) or static at the first difference I (1) or a combination of both, and the second condition is that the dependent variable is static in the first difference I(1) which is foreign reserves , optimal degree of slowing down for the standard variables of the study was (2) based on the spread of (*) included in the values (AIC, FPE HQ, SC). Most of the criteria indicate that the optimal delay period is (2) , after conducting a test of dormancy of the variables in the model (foreign reserves, central bank sales and central bank purchases) it became clear from Table (6) the test results for (P.P) that the variables dwelt in the first difference I (1) meaning that the dependent variable (foreign reserves FR) was static in the first difference I(1) as well, and then these two conditions we were able to apply the ARDL model test.

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Table 7: Results of the ARDL model test

Dependent Variable: FOR				
Method: ARDL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FOR(-1)	0.659538	0.069381	9.505987	0.0000
FOR(-2)	0.299303	0.069230	4.323309	0.0000
PUR	0.352557	0.092946	3.793134	0.0002
PUR(-1)	0.289757	0.090092	3.216237	0.0015
SAL	-0.360173	0.216330	-1.664919	0.0975
SAL(-1)	-0.126004	0.218900	-0.575623	0.5655
SAL(-2)	0.441121	0.199831	2.207466	0.0284
C	588.7650	476.7237	1.235024	0.2182
R-squared	0.988565	Mean dependent var		57555.49
Adjusted R-squared	0.988173	S.D. dependent var		24152.52
S.E. of regression	2626.634	Akaike info criterion		18.62180
Sum squared resid	1.41E+09	Schwarz criterion		18.74846
Log likelihood	-1965.911	Hannan-Quinn criter.		18.67299
F-statistic	2519.508	Durbin-Watson stat		2.004855
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

Source: The researcher's work based on the Eviews10 statistical program

We note from Table (7) that the ARDL model test, based on the optimal degree of backwardness, automatically calculates the optimal time delay for the variables (foreign reserves (POR), central bank purchases (PUR) and central bank sales (SAL), as the optimal degree of backwardness is (2), The statistical results showed that the value of the Adjusted R-Squared (R2) weighted determination coefficient was about (0.988173%) and that (0.2%) is due to other variables and factors that were not included in the model, and the value of (F-statistic) was very significant. Statistically, because the Prob value is less than (5%), as it amounted to (0.00000), and this explains the significance of the model as a whole from a statistical point of view. Statistics (D-W Durbin-Watson stat) indicate that its value is (2.004855), which is greater than the R-squared value, which amounted to (0.98817%), which explains that the model is free from the problem of false regression.

- Bound test

- **Table 8:** Bounds test results

Test Statistic	**Value**	**k**
F-statistic	8.162149	2
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.63	3.35
5%	3.1	3.87
2.5%	3.55	4.38
1%	4.13	5

- Source: The researcher's work based on the Eviews10 statistical program

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Table (8) shows us the results of the limits test, as it shows that the calculated F-statistic value of (8.162149) is higher than the value of the two limits (the highest (I1 Bound) and the lowest (I0 Bound) and the degrees of freedom at a significant level (1%, 5%, 10%) , and this means that we must reject the null hypothesis and accept the alternative hypothesis, which states that there is co-integration between the variables chosen in the model (Azhar, 2022).

- Short-term relationship estimation and unconstrained error correction coefficient (UECM).
- **Table 9:** Results of Estimated Short Run Coefficients

ARDL Cointegrating And Long Run Form				
Dependent Variable: FOR				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FOR(-1))	-0.299303	0.066340	-4.511648	0.0000
D(PUR)	0.352557	0.083693	4.212513	0.0000
D(SAL)	-0.360173	0.186325	-1.933038	0.0546
D(SAL(-1))	-0.441121	0.181875	-2.425413	0.0162
CointEq(-1)	-0.041159	0.007151	-5.755756	0.0000
Cointeq = FOR - (15.6056*PUR -1.0947*SAL + 14304.5511)				

- Source: The researcher's work based on the Eviews10 statistical program

Results of the parameters in Table (9) indicated that they are significant because the value of Prob is less than 5%, and it has a direct relationship in the short term between the independent variable (central bank purchases) and the dependent variable (foreign reserves), and there is an inverse relationship between the independent variable (central bank sales) And the dependent variable (foreign reserves), as the table shows that the relationship between central bank purchases and foreign reserves is a direct relationship, as the purchases coefficient parameter D (PUR) reached a positive value (0.352557) and a significant Prob value amounted to (0.000), so the central bank purchases from the Ministry were affected Finance in foreign reserves by (0.352557%) when these purchases (PUR) change by (1%) with other factors remaining unchanged, which explains that the higher the central bank purchases from the Ministry of Finance from the dollar, the higher the foreign reserves, while the relationship between Central bank sales in window D (SAL(-1)) is an inverse relationship, as the value of the parameter Coefficient reached a negative value of (-0.441121), which explains that as sales of the central bank increased in the window to meet the demand for dollars, foreign reserves decreased, so sales were affected by foreign reserves by (-0.441121%) when the Central Bank's sales change by one unit (1%) with other factors remaining constant at the rate of change, that what was mentioned in the standard analysis matches the economic theory and the analytical aspect in the third chapter above.

Astimated relationship showed that the unrestricted (CointEq(-1) had a negative and significant value of (-0.041159) (Prob = 0.0000), which confirms the existence of a equilibrium relationship in the short term between the dependent variable (foreign reserves) and the two variables. The two independents (sales and purchases of the central bank) towards the equilibrium relationship in the long term, and this means that the error correction coefficient explains that its value (-0.041159) of short-term errors in the previous period (t-1) can be corrected in the current period (t) for Return to equilibrium in the long run when a shock or change in the independent variable occurs.

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- Long Run Estimated Parameters Test

Table 10: Results of Estimated Long Run Coefficients

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PUR	15.605576	6.595271	2.366176	0.0189
SAL	-1.094672	6.737401	-0.162477	0.0411
C	14304.551113	11668.661518	1.225895	0.2217

Source: The researcher's work based on the Eviews10 statistical program

Table (10) shows us that the long-term parameters correspond to the short-term parameters, as the results of the parameters in the table indicated that they are significant because the Prob value is less than 5%, and it has a direct relationship in the short term between the independent variable (central bank purchases PUR) and the dependent variable (Foreign reserves, and there is an inverse relationship between the independent variable (central bank sales) and the dependent variable (foreign reserves), so the foreign reserves increase by (15.605576%) when the Central Bank purchases (PUR) change by (1%) with other factors remaining constant, and the reserves decrease foreign exchange by (-1.094672%) when the Central Bank's sales change by (1%), with other factors ceteris paribus.

- Granger's short-term causality test

To determine the causal relationships and their direction among the variables of the study, we test the null hypothesis (the absence of a causal relationship) against the alternative hypothesis (the existence of a causal relationship), and this is done through the level of significance of the probability value (prop) at (5%).

Table 11: Results of Granger causality test

Pairwise Granger Causality Tests			
Date: 07/14/23 Time: 18:39			
Sample: 2004M01 2021M12			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
PUR does not Granger Cause FOR	214	3.76900	0.0247
FOR does not Granger Cause PUR		22.8938	1.E-09
SAL does not Granger Cause FOR	214	1.80400	0.0472
FOR does not Granger Cause SAL		22.5202	1.E-09
SAL does not Granger Cause PUR	214	9.98880	7.E-05
PUR does not Granger Cause SAL		2.58556	0.0778

Source: The researcher's work based on the Eviews10 statistical program

We note from the results of Table (11) that there is a short-term causal relationship directed from purchases (PUR) of the central bank to foreign reserves (FOR) as the value of Prob (0.0247), which is less than 5%, and also there is a causal relationship directed from the sales of the Central Bank (SAL) to foreign reserves and the value of (Prob.) (0.0472) is less than 5%.

-Performing diagnostic tests for estimated residuals (econometric problems)

In order to ensure the correctness and accuracy of the results obtained in the previous tests, we will perform some diagnostic tests to judge the extent to which the model passes the standard tests.

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- Serial Correlation LM Test

- **Table 12:** Results of the LM Autocorrelation Problem Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.356314	Prob. F(2,202)	0.0974
Obs*R-squared	4.833170	Prob. Chi-Square(2)	0.0892

- Source: The researcher's work based on the Eviews10 statistical program

Table (12) we note that the probability value of (F-statistic) is (Prob = 0.0974), which is greater than (5%), and the probability value of Obs*R-squared is (0.0892), which is Greater than (10%), this means that there is no autocorrelation problem.

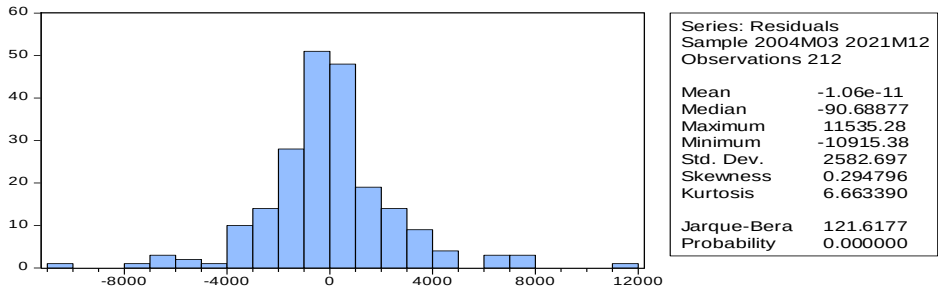

Figure 1: Results of testing the normal distribution problem

Figure (1) shows us the results of testing the normal distribution problem of (Jarque-Bera), as we note that the probability value is (Prob = 121.6177), which is greater than (5%), and the value of (porb) is (0.000.

- Heteroskedasticity Test

Table 13: The results of the test of difference homogeneity of variance problem for (ARCH)

Heteroskedasticity Test: ARCH			
F-statistic	16.64166	Prob. F(1,208)	0.4001
Obs*R-squared	15.55700	Prob. Chi-Square(1)	0.0621

Source: The researcher's work based on the Eviews10 statistical program

Table (13) shows us the results of testing the difference homogeneity of variance problem for (ARCH), as we note that the probability value of (Obs*R-squared) which reached (Prob = 0.0621), which is greater than (10%).

Through the use of the standard model used in this study, we conclude that sales and purchases of the central bank in the window affect foreign reserves and thus achieve monetary sterilization and monetary stability in the exchange rate, and the (CBI) has succeeded in fighting inflation and achieving monetary stability in Iraq, and it has achieved monetary policy during a period The study achieved success by preserving the value of the Iraqi dinar against the US dollar. This success is due to the intervention of the Central Bank by offering large quantities of foreign currency in the market through the window for selling foreign currency. However, it is clear that in the crises that afflicted the Iraqi economy, monetary policy failed to Controlling prices, such as the crisis of 2009, the dual crisis of 2014 terrorism the decreasein oil prices, and the dual crisis of 2020, with the spread of the Corona epidemic.

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4. Conclusion:

Research concluded that the window for selling foreign currency in the Iraqi economy contributed to achieving the mechanism of monetary sterilization, the stability of the exchange rate, and the reduction of inflation, and that the Iraqi economy maintained indicators of the optimal level of foreign reserves, and foreign reserves held by the (CBI) negatively affected the exchange rate of the Iraqi dinar, and foreign reserves, due to their accumulation, positively affected the exchange rate of the Iraqi dinar, oil revenues recorded the highest percentage and the main source for the formation of foreign reserves in Iraq, which made it dependent and exposed to external fluctuations to which the global oil sector is exposed , window for selling foreign currency works to meet the demand for foreign currency, whether it is selling in cash or through remittances to finance the demand for imports from abroad. Monetary policy after the year (2003) is the most prominent in dealing with inflation, and monetary policy is characterized by expansion using the window for selling currency ,foreign exchange to maintain the value of the Iraqi dinar, foreign reserves maintained increasing growth rates during the study period, with the exception of the years that witnessed (financial, security and health) crises, as the average relative importance of the growth rate of foreign reserves during the study period was (16.6%) ,It was found from the analytical side that Iraq maintains an indicator of an optimal level of foreign reserves throughout the study period despite the economic, security and health crises that the Iraqi economy went through, as the average relative importance of the indicator of the ratio of foreign reserves to imports during the study period was (13.5) months , average relative importance of the indicator of the ratio of foreign reserves to the broad money supply during the study period was (116%), and it falls within the optimal level of foreign reserves retention , limits test for co-integration using the autoregressive model of the distributed delay model among the variables (sal, pur, for) indicates that there is a long-term equilibrium relationship, as the calculated value of (F) was greater than the value of the tabular (F) amounted to (8.162149) at a significant level (1%) and (5%) and (10%).

Authors Declaration:

Conflicts of Interest: None

-We Hereby Confirm That All The Figures and Tables In The Manuscript Are Mine and Ours. Besides, The Figures and Images, Which are Not Mine, Have Been Permitted Republication and Attached to The Manuscript.

- Ethical Clearance: The Research Was Approved By The Local Ethical Committee in The University.

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قياس العلاقة بين مؤشرات المستوى الامثل للاحتياطيات الاجنبية ونافذة بيع العملة الاجنبية في العراق للمدة(2004-2021)

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مستخلص البحث:
أدّت الاحتياطيات الاجنبية دوراً مهما في دعم ورفع من مستوى العملة المحلية، إذ حافظ الاقتصاد العراقي على مستوى امثل من الاحتياطيات الاجنبية وساهم البنك المركزي في تعقيم المعروض النقدي ومواجهه الإنفاق المتزايد من وزارة المالية ومحافظة على استقرار سعر الصرف العملة المحلية، اذ هدفت الدراسة الى تحليل اثر نافذة بيع العملة الاجنبية على معدلات التضخم والتي تعد احد الادوات المباشرة التي تستخدمها السياسة النقدية وان مشكلة البحث تنص في الاقتصادات الريعية التي تعاني من ضعف انتقال وفاعلية القنوات التقليدية مما يجب اتباع نافذة بيع العملة الاجنبية واستنتجت الدراسة ان البنك المركزي العراقي حافظ على مستوى امثل من الاحتياطيات الاجنبية و ان الية التعقيم النقدي حققت نتائج ايجابية ومقبولة على الرغم من الزيادات الكثيرة في الإنفاق الحكومي واستطاع البنك المركزي ان يزيل التعددية في اسعار الصرف وان يخفض من معدلات التضخم تدريجياً فبعد ان كان التضخم يسجل ارتفاعا بلغ (53.1%) عام (2006) استطاع البنك المركزي ان يخفضه الى (6%) عام (2021), واظهرت نتائج التحليل القياسي ان هنالك علاقة طردية وتكامل مشترك بين الاحتياطيات الاجنبية ونافذة بيع العملة الاجنبية اذ بلغت قيمة (Bounds test) (8.1621) .

نوع البحث: ورقة بحثية.
المصطلحات الرئيسة للبحث: الاحتياطيات الاجنبية , نافذة بيع العملة الاجنبية , التضخم , التعقيم النقدي , سعر صرف الدينار العراقي.