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The impact of exchange rate shocks on the consumer price index in Iraq for the period (2020-2022)

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Abstract: The research aims to measure and analyze the impact of positive and negative exchange rate shocks on the consumer price index in Iraq by using monthly data using the (NARDL) model. The results showed that there is a joint integration relationship between parallel exchange rates and the consumer price index in the short term. When exchange rates increase by (1%), this leads to an increase in the consumer price index by (0.018%), while when exchange rates decrease or fall by (1%), this leads to a decrease in the consumer price index by (0.031%). In the long term, when exchange rate increases by (1%), this leads to an increase in the consumer price index by (0.027%), while the decline in exchange rates has a significant negative effect on the consumer price index at a confidence level of (1%). When exchange rates decrease or fall by (1%), this leads to a decrease in the consumer price index by (0.150%). The study also recommended increasing control over the currency selling window to limit exchange rate fluctuations by following up on the economic committees concerned with monitoring changes in market prices. Also, banks should keep pace with the development that has occurred in banks in other countries and use exchange systems that are compatible with the Iraqi economy and bear part of the shocks and circumstances it is going through.

Keywords:
Exchange rates, consumer price index.

A R T I C L E I N F O

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أثر صدمات أسعار الصرف على الرقم القياسي لأسعار المستهلك في العراق للمدة (2020-2022)

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المستخلص

يهدف البحث الى قياس وتحليل اثر صدمات أسعار الصرف الموجبة والسالبة في الرقم القياسي لأسعار المستهلك في العراق من خلال استخدام بيانات شهرية بواسطة نموذج (NARDL)، اذ أظهرت النتائج وجود علاقة تكامل مشترك بين اسعار الصرف الموازي والرقم القياسي لأسعار المستهلك في الاجل القصير عند ارتفاع اسعار الصرف بـ (1%) فإن ذلك يؤدي إلى زيادة الرقم القياسي لأسعار المستهلك بـ (0.018%)، في حين عند تناقص او الانخفاض في اسعار الصرف بـ (1%) فإن ذلك يؤدي إلى انخفاض الرقم القياسي لأسعار المستهلك بـ (-0.031%)، اما في الاجل الطويل فعند زيادة الارتفاعات في اسعار الصرف بـ (1%) فإن ذلك يؤدي إلى زيادة الرقم القياسي لأسعار المستهلك بـ (0.027%)، في حين التراجع في اسعار الصرف له أثراً معنوياً عكسياً على الرقم القياسي لأسعار المستهلك وعند مستوى ثقة (1%)، فعند تناقص او الانخفاض في اسعار الصرف بـ (1%) فإن ذلك يؤدي إلى انخفاض الرقم القياسي لأسعار المستهلك بـ (-0.150%). كما اوصى البحث بزيادة الرقابة على نافذة بيع العملة للحد من تقلبات اسعار الصرف من خلال متابعة اللجان الاقتصادية المختصة بمراقبة التغييرات في اسعار السوق، كذلك على المصارف ان توكب التطور الذي حصل في مصارف البلدان الأخرى واستخدام انظمة صرف تتلاءم مع الاقتصاد العراقي وتحمل جزء من الصدمات والظروف التي يمر بها.

الكلمات المفتاحية: اسعار الصرف، الرقم القياسي لأسعار المستهلك.

Introduction

The exchange rates are considered one of the monetary policy tools that affect the economic activity of any country and thus influence consumer behavior in making purchasing decisions to satisfy their various needs. As the exchange rate is the value of the local currency to the values of foreign currencies, and it is the price at which foreign currencies are bought or sold with the currency. Local is one of the most important means of monetary policy in Iraq and is used to control monetary inflation. The exchange rate is a commodity like any other commodity that takes a price according to the interaction of the forces of supply and demand. The US dollar is widely used in the local market and is one of the most important factors affecting local market prices. Exchange rate fluctuations also effect on the prices of imported and local goods and services as a result of the Iraqi market's connection to the US dollar, and a fall or rise in exchange rates below the required level leads to a rise in the inflation rate. And on this basis, monetary

policy measures must be focused on keeping it within economically safe limits and working to stabilize it, because the exchange rate is one of the most important factors affecting the value of the local currency.

The changes that Iraq witnessed after 2003 in its economic structure, as a result of the lifting of international economic sanctions that were previously imposed on it, are among the most important changes that generated economic and commercial openness to the outside world. Which led to an open market policy to flood the Iraqi market with goods and commodities and an increase in the volume of imports in sectors. Industrial, agricultural, construction and services, as a result of the shortage that the various economic units were experiencing of various goods and services, leading to changes in exchange rates to reflect changes in the values of the Iraqi consumer price indices. It requires stopping by to read the changes that accompanied it.

1. **Research problem:** Consumer price index numbers in Iraq are affected by exchange rates,which are one of the most prominent factors affecting the consumer price index. The problem can be formulated with the following question: What is the relationship between exchange rates and the consumer price index in Iraq? Is there a quantitative effect on it and how much is its effect?
2. **research importance:** The importance of the research comes in explaining the role of exchange rates after the year 2003, and its impact on the general level of prices of goods and services through the consumer price index.
3. **Research hypothesis:** The research is based on the hypothesis that exchange rates play an important role in Iraqi monetary policy and affect the prices of goods and services in Iraq, and that there is a direct relationship between exchange rates and the consumer price index.
4. **Research objective:** The research aims to Measuring and analyzing the relationship between exchange rates and the consumer price index in Iraq to indicate positive shocks and negative shocks on the consumer price index.
5. **Research Methodology:** The research structure includes two methods. The first is an analytical method for the theoretical side of the research when studying the theoretical framework for both exchange rates and the consumer price index and analyzing the relationship between exchange rates and the consumer price index. The second is quantitative standard analysis when

testing the relationship between exchange rates and the consumer price index Consumer.

6. **Research limits:** Iraq's spatial research limits and temporal research limits for the period (2020-2022) through the use of published monthly data.
7. **Research structure:** The research was divided into three main sections. The first section: The theoretical framework included exchange rates and the consumer price index. The second section: Measuring and analyzing the impact of exchange rate shocks on the consumer price index in Iraq.

The first section

The theoretical framework of exchange rates and the price index

First: exchange rates: Exchange rates are one of the important elements in all international economic and trade relations and are an essential part of the work of economic units. This basic function of exchange rates is translated into strategic importance in the development of international financial relations in light of trade openness, and these relations are crystallized by the existence of a tool through which payments are settled between countries. Commercially exchanged transactions that result in inter-related rights and obligations require setting an exchange rate for their currencies, as well as their important role in influencing the competitiveness of the national economy. They are also considered one of the important economic indicators that affect the financial markets and economic transactions, which requires central banks to take exchange rate changes into account. And give it special attention (Mahmoudvand, 2017: 3).

1. **The concept of exchange rates:** Although there is a general concept of exchange rates agreed upon by most economic researchers, there are several concepts that came from the view of these researchers and do not differ in the essence of the concept and its basic context, but rather in the way this concept is presented, which are:

A. The exchange rate is the price of one currency against another currency, and thus it represents the number of units of a local currency against one unit of a foreign currency (James, 2008: 209).

B. It is also known as exchanging one unit of national money for units of foreign money or vice versa. Here, foreign currencies represent all due payments, credits, and deposits, in addition to promissory notes, checks, and transfers (Muhammad, 2017: 504).

C. Also, when one currency is exchanged for another, we need to have an exchange ratio between those currencies, and that one of these two currencies is considered a commodity in front of the other currency (Kazim, 2020: 112). From the above, we conclude that the exchange rate is a tool linking the activities of the local economy and external economies, and it is the measure between the price of the commodity locally and its price globally. Thus, the prices of local commodities are linked to global commodities through exchange rates.

2. Forms of exchange rate

A. **Nominal exchange rate:** It is the price that determines the foreign currency by the number of units of the local currency it represents, and it is officially announced by governments. Sometimes it is changed by a government decision whose goal, for example, is to increase exports, so the government decides to reduce it in order to obtain foreign exchange, as well as to support the import of some goods and compete with the private sector. In some economic transactions (Al-Zorfi, 2018: 44). It can actually take two forms:

B. **Official price:** It is an official price that the government clearly announces to every economy that wants to deal with it and through which commercial transactions are carried out officially.

C. **Parallel price:** It is an exchange rate for a specific country's currency, but it has not been officially announced and depends mainly on the forces of supply and demand. It is usually active in the black market and is characterized by instability (Al-Abdali, 2018: 288).

D. **The real exchange rate:** It is a price inferred through purchasing power parity, meaning that it determines the ratio of the world price of the commodity to be traded compared to the local price in that country. It is considered a competitive indicator, and it has an inverse relationship with the nominal price. If the real price decreases, the nominal price increases, and vice versa, the real price decreases. It means increasing competitiveness between the country and the outside world (Sabaa, 2015: 29).

E. **Adjusted exchange rate:** This is the rate that is linked to the balance of payments, meaning that it depends on the activities of exports and imports (Sayd, 2013: 26).

F. **The** urgent **and forward exchange rate:** The urgent price is that we exchange one currency for a second currency immediately, provided that the period of receipt and delivery does not exceed more than two days, and it is

a price characterized by continuous change. As for the forward price, it is intended to determine the price of the currency at the initial agreement and pay its price at an agreed upon later time. It is imposed by both parties and does not take into account the change in the value of the currency in the future (Murray, 2009: 43).

G. **Cross exchange rate:** It is the price that can be found through the intersection of three currencies, meaning if we know the exchange rate of the dollar against two currencies, then the price is the intersection price between them (Salma, 2015: 6).

3. **The importance and functions of the exchange rate:** The fundamental importance of the exchange rate as the link between the global economy and the local economy is the image that translates the reality of the internal economy and how to deal with it by investors or traders. It is also a linking tool to the labor market, commodities and financial assets. The importance of the exchange rate can be summarized through the functions it performs in... Supporting the economy, the most important of these functions are the following:

A. Development function: The exchange rate is used as a tool to develop some economic sectors, especially with regard to exports and imports. Sometimes it is used to support and develop final products or semi-finished goods intended for export. As for imports, the exchange rate may be used to dispense with industrial branches of goods that may be cheaper to import than to produce locally. It affects the geographical commodity composition of international trade between countries (Al-Ghalbi, 2017: 19).

B. Standard function: means the standard tool by which producers measure commodity prices in global markets and their ability to compete externally.

C. Distributive function: The exchange rate exercises its distributive function at the level of the global economy through foreign trade. It works to distribute income through the decline and rise of currency prices and the practices of commercial activities (Badawa Yi., 2015: 236.)

4. **Factors affecting exchange rates:** There are several factors that directly or indirectly affect exchange rates, and the most important of these factors are the following (Wali, 2020: 114) (Al-Zorfi, 2018: 54):

A. Central bank activity: In all countries of the world, central banks are primarily concerned with monetary policy, so their intervention is directly in order to influence the exchange rate.

B. Balance of Payments: The current account of the balance of payments affects exchange rates as it is the dependent variable and the balance is the independent variable, and this occurs in cases of surplus and deficit.

C. Inflation: High inflation rates for a particular country reduce exports, which leads to a reduction in demand for the local currency, increases its supply, and decreases its value.

D. Debt: External debt is considered one of the problems that most developing countries suffer from, which forces them to obtain foreign currency, which leads to an almost forced decline of the country's currency and has negative effects on the wheel of development and impact on the balance of payments.

E. Interest rate: The interest rate is one of the factors that attract capital. As interest increases in a particular country, money holders want to transfer their money to that country in order to benefit from speculation, which increases the demand for the local currency and increases its price against other currencies.

F. Fiscal policy: It is a group of government interventions to influence the currency price when it is inconsistent with its economic and financial policies.

G. There are other factors that can affect exchange rates, whether directly or indirectly, including the money supply, changes in the value of exports, relative levels of income, and deficits and surpluses in budgets.

Second section Price index: Measuring prices is considered an important statistical mechanism that helps countries determine foreign and internal economic policies despite their different social and economic systems. Prices are one of the important indicators that political and economic decision makers rely on by analyzing and following up on economic changes, and price instability is considered a negative indicator. The state of the economy. Monitoring price movements and diagnosing instability helps the national economy confront economic crises that would harm growth and economic development in general.

1. The concept of the index number: There are several concepts for the index number, some of which we can review:

A. The index number is considered a statistical tool that can be used to measure relative changes in a group of phenomena over a specific period of time. This phenomenon may be either a value or a quantity, and the period to which the base period belongs is called the comparison period (Hussein, 2018, 732).

B. It is the short method that describes economic variables and is usually used to describe changes in quantities or prices over time (Abu Saleh, 2007, 239).

C. The price index is an indicator that measures prices based on the base year, and this approved year must be free of economic fluctuations and crises (Kazim, 2016, 102).

2. Standard set of numbers: There are three main groups of index numbers: (Ministry of Planning, 2020) (Saadoun, 2006: 26) (Almajar, 2008: 314).

A. Consumer price index numbers are relative numbers that measure the rate of change in the prices of goods and services to the consumer over a period of time, and inflation is calculated by the rate of change in consumer price index numbers.

B. The price index, which measures the severity of inflation and its judgment during a certain period, and includes the retail and wholesale consumer price index, as well as the wage and stock index.

C. The index number of quantities, which is used to measure changes occurring in quantities, such as weight and weighting, meaning the relative importance of the goods included in the index number, which includes index numbers for industrial production as well as numbers for exports and imports.

D. The index of values: This group is used to measure the change in prices and quantities at the same time. The most important of them is the index of spending on education, as well as the index of national income, and others.

3. Benefits and objectives of record numbers: Index numbers have a set of benefits that can be summarized as follows (Saleh, 2008: 276) (Ahmed, 2013: 244):

A. Knowing the change in money from one year to another.

B. Measuring the percentage of change in a phenomenon from one year to another or one place to another.

C. It can be used in several fields such as administrative, economic and social sciences.

D. We can use it in the field of monitoring the implementation of plans.

E. Measuring changes that occur in production, prices, exports, imports, and inventory over time.

F. Measuring working hours from one company to another, as well as the number of workers.

G. Measuring the costs of living from time to time or from one place to another.

H. Analyze the factors contributing to changing the phenomenon and explain the extent of the contribution of each of them.

4. Types of price indexes: There are several types and methods of index numbers through which all changes in economic units can be calculated, and these types are (Shehab, 2017: 307) (Al-Kurdi, 2017: 220).

A. Simple index numbers. These numbers are of two types:

1. The simple aggregate index number: It means the ratio of the cost to obtain a group of goods and services from the year of comparison to their identicalness for the same goods and services in the base period. Despite the ease of applying this formula, it does not take into account the relative importance of the different goods, meaning that it takes equal proportions for all goods.
2. Rate numbers: They are considered one of the simplest types of numbers that take the ratio of the quantity or its price in the comparison year to its quantity or price in the base year.

B. Weighted aggregate index number: In order to avoid the defects that mar the aggregate index numbers that are used to determine the consumer price index, this method is used, which weights the prices of specific commodities with specific weights and includes the volume of a commodity consumed or sold and even included in the calculation of the price index numbers in the base period. Or the comparison period, and it has several forms, which are:

1. Laspeyre's formula: This method can be summarized as that it uses consumed quantities and their monetary value in the same base period as weights for the prices of the quantities included in calculating the aggregate and relative index number.

2. Pasch formula: The formula expresses the ratio that you spend in the comparison year to what you spend in the base year for all goods.

3. Fisher's formula: This is what is called the optimal index number. In order to get rid of the opposite bias in the Pasch and Laspeyre numbers, Fisher believes that the optimal number is the product of the geometric mean of the two numbers above. This formula can be used to measure most economic variables optimally.

4. Edgeworth/Marshall formula: In order to avoid exaggerating the results up and down, Edgeworth and Marshall believe that using the average of the quantities consumed and sold for the comparison and base years gives

optimal results for weighting the prices of commodities that are included in the composition of price index numbers.

C. Moving index number: when the comparison does not depend on a specific base year, but rather depends on the comparison of the data of a year with the one that preceded it. It is a number that indicates the annual changes that occurred in the phenomenon studied, both decrease and increase.

Third section: Analysis of exchange rate changes and their relationship to the price index in Iraq: A fixed exchange rate system was implemented, where the US dollar exchange rate was adopted as a means of pricing the Iraqi dinar against other currencies. Other foreign currencies, after there was a multiple exchange system before the year (2003), in which exchange rates reached more than (10) prices approved by economic policy, through a parallel exchange market that is considered the pioneer in determining the exchange rate. According to the absolute floating system, which created an exchange system with many distortions as a result of official pluralism. After the year (2003) and the Central Bank of Iraq obtained its independence in formulating and implementing monetary policy in accordance with Law No. 56 of (2004), and the beginning of the process of restructuring the Iraqi economy in order to build solid foundations for this economy in the context of moving towards a market economy, as the Central Bank held an auction For foreign currencies to announce the end of the implementation of the various fixed exchange systems in Iraq and the resulting distortions and their adoption. Where the exchange rate is determined according to the mechanism of supply and demand, but under the control and supervision of the Central Bank due to the importance of the exchange rate in the Iraqi economy.

It is known that exchange rates in Iraq are determined by the Central Bank, especially after the year 2003 and its disengagement and making it independent. However, this matter did not enable it to fully control and achieve clear stability of currency prices in the Iraqi market. This is due to several reasons, the most important of which are currency smuggling outside the country, money laundering operations, and others. These factors paved the way for the emergence of the parallel market, which largely controls currency prices, making it vulnerable to external and internal shocks that ravage the economy, especially since Iraq's foreign reserves depend heavily on oil sales and the connection to the US Federal Reserve, which increases

the lack of control over it and the interference of political factors. Also, the Central Bank of Iraq was able to set a specific price after the emergence of the currency auction procedures, but the reality still says that the parallel price is the prevailing one and controls daily transactions that greatly affect the prices of various materials, and that the price index is also exposed to these changes, especially since the Iraqi economy depends largely on This phase witnessed many political and financial factors and variables that constituted a challenge and a double shock to the management of the Monetary Authority in maintaining price stability in the country, starting with the decline in oil prices between the years 2014-2015, and so on. This resulted in a decline in general budget revenues, and then a decline in the flow of foreign currencies to the Central Bank, through the intervention of the executive authority, the Ministry of Finance, and the legislative authority (the House of Representatives) and dictating conditions and policies that are inconsistent with the objectives of monetary policy, leading to turbulent situations, which affected the national economy, and with the management of the Monetary Authority aware of these challenges and its clear vision of the continued deterioration of the security and financial situation in the short term, the Central Bank raised the exchange rate, so that (1188) dinars were converted into dinars in (2014) as a result of the decline in cash flows on the one hand and the efforts made To reduce demand for it on the other hand, and with the continued decline in the flow of foreign currencies below the level of the market's need for the central bank and the decline in the flexibility of government spending in a downward trend, which put pressure on foreign reserves and the path of the official and parallel exchange rate, and in 2020 the rise in the parallel exchange rate returns to The Central Bank issued new instructions for buying and selling foreign currencies, as it emphasized its policy of imposing restrictions on banks in response to fears of money laundering and illegal external flows of foreign exchange. Linked to the increase in demand for foreign currency, and since the Iraqi economy is quarterly par excellence and depends on oil revenues to pump financial resources into economic activity, the rise in oil prices led to the flow of more foreign currencies into the state budget, which was reflected and led to a decrease in the parallel exchange rate in the exchange market. The parallel exchange rate witnessed an increase as a result of the repercussions of the Corona pandemic, the major closure of the global economy, and the sharp

decline in oil prices, as the value of the Iraqi dinar was devalued in response to critical financing pressures, and the parallel exchange rate rose to (1234) in (2020), which... It led to fluctuation of the exchange rate in the parallel market.

The Central Bank of Iraq decided, in December 2020, to adjust the exchange rate of the US dollar against the Iraqi dinar, as the purchase price of the dollar from the Ministry of Finance reached 1,450 dinars, while its selling price to banks was 1,460 dinars per dollar, while the selling price to the citizen was 1,470 dinars per dollar.

were excluded from the currency sale auction (they are: Al-Ansari, the Middle East, the Holding Company, and Asia) following directives and warnings from the US Treasury Department against these banks accused of currency smuggling, and the Central Bank justified the reasons for the decrease in the sales volume of the sale window. Foreign currency by shifting the bank to establishing a new electronic platform for selling the dollar and foreign transfers, considering that some banks do not have sufficient readiness to enter into automation.

We note from Table No (1) Despite the short duration of the research, there are significant changes in the parallel exchange rates of the Iraqi currency against the Iraqi dinar, especially after the boom caused by the Central Bank's instructions in late 2020, as the exchange rate rose from (1248) dinars to one dollar in the month of October. To become (1351) dinars per dollar, and after implementing the decision to officially adopt the new pricing at the beginning of 2021, the parallel price rose clearly to become (1460) dinars per dollar for the reasons we mentioned previously. And it continued to rise fluctuating over the past three years with varying growth rates until it became (1530) dinars to the dollar in late 2022, with a growth rate of (0.34). These changes in exchange rates clearly led to confusion in the Iraqi market, which relies heavily on imports in dollars, and directly affected the lives of the poor and middle classes, which constitute a large percentage. From the population of Iraq, prices rise directly with the rise in the price of the dollar, especially since the Iraqi market suffers from a number of censorships, which prompts merchants to exploit these changes in exchange rates.

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Table (1): Research variables

the year	Parallel exchange rates	Monthly growth rate (%)	Consumer price index for the base year 2007	Monthly growth rate (%)
2020M01	1202.34	-	105.4	-
2020M02	1193.84	-0.71	105.4	0.00
2020M03	1198.53	0.39	105.8	0.38
2020M04	1226	2.24	104.6	-1.15
2020M05	1227.21	0.10	104.5	-0.10
2020M06	1243.33	1.30	104.3	-0.19
2020M07	1230.01	-1.08	104.1	-0.19
2020M08	1223.09	-0.57	104.5	0.38
2020M09	1221.61	-0.12	104.7	0.19
2020M10	1241.42	1.60	105.5	0.76
2020M11	1248.62	0.58	104.5	-0.96
2020M12	1351.35	7.60	107.9	3.15
2021M01	1460.5	7.47	108.8	0.83
2021M02	1460.72	0.02	109.6	0.73
2021M03	1460.79	0.00	110.3	0.63
2021M04	1475.64	1.01	110.4	0.09
2021M05	1486.38	0.72	110.4	0.00
2021M06	1486.93	0.04	111.129	0.66
2021M07	1473.04	-0.94	111.8	0.60
2021M08	1475.14	0.14	113.1	1.15
2021M09	1470.57	-0.31	112.3	-0.71
2021M10	1481.06	0.71	112.7	0.35
2021M11	1480.78	-0.02	113.3	0.53
2021M12	1477.1	-0.25	113.6	0.26
2022M01	1479.49	0.16	114.6	0.87
2022M02	1475.1	-0.30	115.1	0.43
2022M03	1473.76	-0.09	116	0.78
2022M04	1473.62	-0.01	116.2	0.17
2022M05	1481.14	0.51	116.4	0.17
2022M06	1481.35	0.01	117.2	0.68
2022M07	1479.59	-0.12	117.8	0.51
2022M08	1476.54	-0.21	118.1	0.25
2022M09	1475.91	-0.04	118.3	0.17
2022M10	1475.17	-0.05	117.8	-0.42
2022M11	1487.58	0.83	118.1	0.25
2022M12	1530.15	2.78	118.5	0.34
the growth The compound (%)	0.67		0.33	

Source: Prepared by the researcher based on:

* of Iraq published data, 2024, at the link https://cbiraq.org/

** World Bank published data, 2024, at the link https://data.albankaldawli.org/

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The second Section: The impact of exchange rate shocks on the index in Iraq for the period(2022-2020)

First: Research variables: The research variables consist of monthly data for the period(2022-2020)

As follows:

First: **The time series graph:** From the graph it is noted that the price index is trending towards increasing in Iraq while the exchange rates, the time series is fluctuating and not static until the eleventh month of the year 2020. Which reached (1351) dinars, and in the following month it began to increase and trend upward, according to the research data and based on the compound growth rate, which reached (0.67) for the consumer price index and the exchange rate. It reached (0.33). It is noted that the relationship between them is direct. See Figure (1).

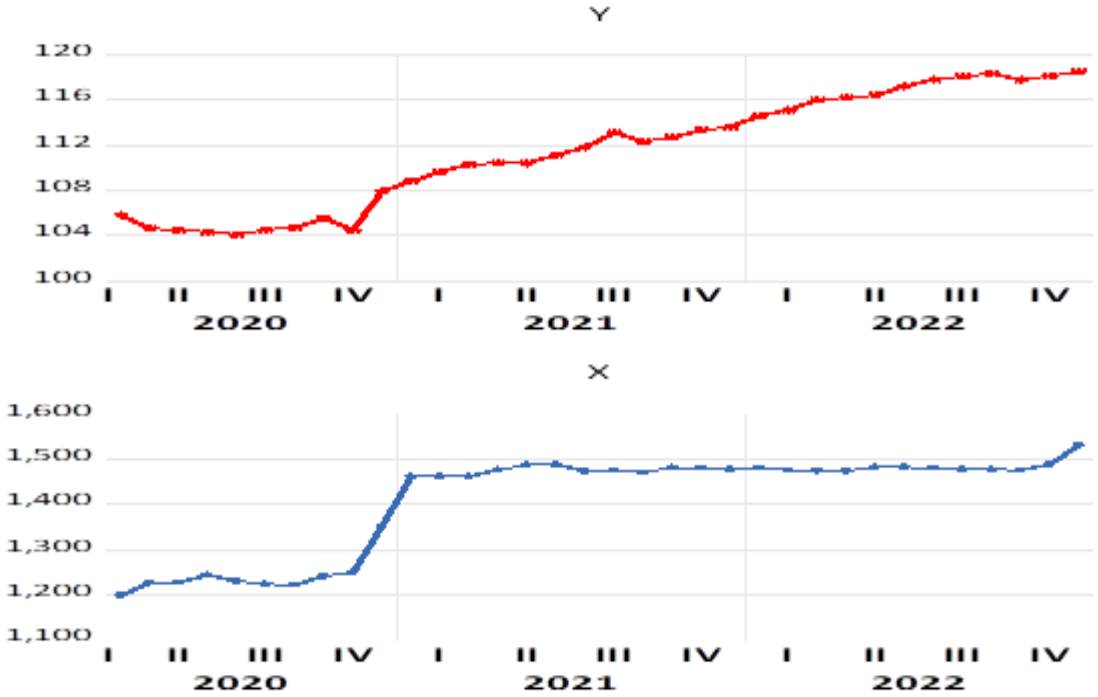

Figure (1): drawing of the research variables

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

Second: **Unit root test:** The unit root test was conducted using the results of Dickey-Fuller to ensure that there is no spurious regression in time. The results of this test indicated that all variables, whether the dependent CPI or the independent exchange rates, are not static at the level. However, after taking the first difference, we noticed that the data became static, that is, stable, whether in the presence of a constant or a constant and a trend, or

even Without a constant and a trend, this conclusion is made at a confidence level of (1%). See Table (2).

Table (2): Time series stationarity test

UNIT ROOT TEST RESULTS TABLE (ADF)			
Null hypothesis: the variable has a unit root			
At Level			
		Y	**X**
With Constant	t-Statistic	0.016	-1.535
	Prob.	0.954	0.504
		n0	n0
With Constant & Trend	t-Statistic	-2.724	-2.112
	Prob.	0.234	0.521
		n0	n0
Without Constant & Trend	t-Statistic	2.897	1.271
	Prob.	0.999	0.945
		n0	n0
At first difference			
		d(Y)	d(X)
With Constant	t-Statistic	-6.341	-3.480
	Prob.	0.000	0.015
		***	**
With Constant & Trend	t-Statistic	-6.291	-3.468
	Prob.	0.000	0.059
		***	*
Without Constant & Trend	t-Statistic	-2.606	-3.154
	Prob.	0.011	0.003
		**	***

Source: Prepared by the researcher based on the results of the statistical program (12. EViews)

Given that the sample is (36) observations, and in order to know the effect of positive and negative shocks, a non-linear regression model for distributed lags (NARDL) will be used.

Third: Determine the degree of slowness: The results of the table show that the best lag gap rank for the model is two according to statistical criteria based on the estimation of the (VAR) model. See Table3))

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Table (3): Determining the degree of slowness

VAR Lag Order Selection Criteria						
Endogenous variables: YX						
Sample: 2020M03 2022M12						
Included observations: 33						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
1	-185.408	167.8373	374.5444	11.60046	11.87255	11.69201
2	**-177.755**	**12.986 ***	**301.28 ***	**11.379 ***	**11.832 ***	**11.531 ***
3	-175.16	4.089666	330.8113	11.46422	12.0991	11.67784

Source: Prepared by the researcher based on the results of the statistical program (12. EViews)

To confirm the suitability of the second lag gap to the model, the inverse roots of the characteristic autoregressive polynomial function were drawn as in the following figure:

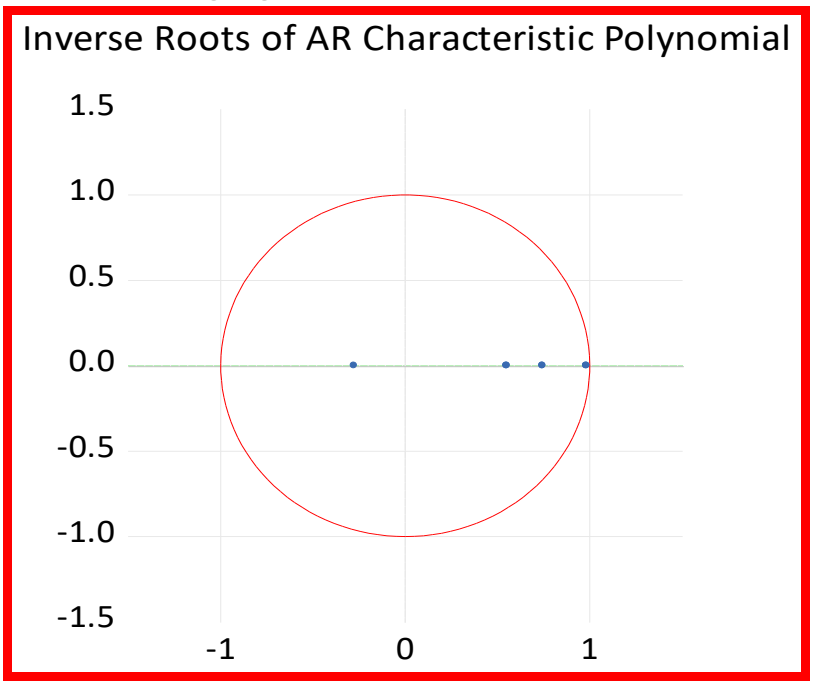

Figure (2): The inverse roots of a second-order autoregressive polynomial function.

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

The above figure shows that all points are located on the perimeter or within a circle with a radius of one unit, and this confirms the validity and quality of all the results that will be obtained by adopting the second optimal deceleration gap.

Doi: www.doi.org/10.25130/tjaes.20.68.1.27

Fourth: **Initial estimation of the model:** The estimated standard model NARDL(2,1,0), which represents the relationship between exchange rates and the price index in Iraq, was significant at the level of (1%) based on the value of the F test of (73.2292), and its explanatory power is (99%) which refers to the changes that occur in the price index variable attributable to the exchange rates, with their increases and decreases, see Table (4).

Table (4): Estimation results of the effect of exchange rates on the consumer price index

Dependent Variable: Y				
Method: NARDL				
Sample: 2020M03 2022M12				
Dynamic regressors (2 lags, automatic): X_POS X_NEG				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
Y(-1)	0.409	0.157	2.611	0.0144
X_POS	0.018	0.004	4.319	0.0002
X_POS(-1)	-0.012	0.004	-2.894	0.0073
X_NEG	-0.031	0.014	-2.163	0.0393
C	21.084	6.628	3.181	0.0036
R-squared	**0.989**	Mean dependent var		111.5273
Adjusted R-squared	**0.988**	SD dependent var		5.043154
F-statistic	526.0664	Durbin-Watson stat		1.913016
Prob(F-statistic)		**0.0000**		

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

Fifth: **Co-integration test:** The F-Bounds Test was used to conduct the test to determine the existence of an integration relationship between the independent variables and the dependent variable. The significance level of the results was determined based on the probability value (Prob), where if the probability value is greater than the significance level Specific (5%), this indicates the existence of an integrating relationship between the variables Therefore, we reject the null hypothesis (H:0) and accept the alternative hypothesis (H:1) which indicates the existence of a cointegration relationship between the parallel exchange rates and the consumer price index, see table (5).

Table (5): cointegration test

F-Bounds Test		Null Hypothesis: No relationship levels		
Test Statistic	Value	signify.	I(0)	I(1)
Asymptomatic: n=1000				
F-statistic	**5.938092**	10%	3.17	4.14
K	2	**5%**	**3.79**	**4.85**
		3%	4.41	5.52
		1%	5.15	6.36

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

Seventh: Impact results:

Short-term relationship:

1. The error correction coefficient or cointegration coefficient appears with a negative and significant value at a degree of confidence (1%) and its value is (-0.208), which means that (21%) of the deviations in the independent variable (exchange rates) are corrected in the dependent variable. (The price index) is corrected in the next period in order to return to the long-term equilibrium position. This means that to $\frac{1}{0.208} \cong \mathbf{4.80}$ the index numbers take approximately less than five months because, to return to their long-term equilibrium value after the effects of shocks and fluctuations in the independent variable exchange rates.
2. **Rise in exchange rates:** The rise or increase in exchange rates has a positive, significant impact on the price index in Iraq at a confidence level of (1%). When increases in exchange rates increase by (1%), this leads to an increase in the price index. Consumer(%0.018) .
3. **Decrease in exchange rates:** A decrease or decline in exchange rates has an adverse moral impact on exchange rates at a confidence level of (1%). When the exchange rates decrease or decrease by (1%), this leads to a decrease in the consumer price index by (1%)(-%0.031) .

Long-term relationship:

1. **Rise in exchange rates:** The rise or increase in exchange rates has a positive, significant impact on the price index in Iraq at a confidence level of (1%). When increases in exchange rates increase by (1%), this leads to an increase in the price index. Consumer(%0.027) .

2. **Decrease in exchange rates:** The decrease or decline in exchange rates has an adverse moral impact on exchange rates at a confidence level of (1%). When the exchange rates decrease or decrease by (1%), this leads to a decrease in the consumer price index by (1%). (0.150%-), see table (6).

Table (6): Estimation results for the NARDL model

NARDL Long Run Form and Bounds Test				
Dependent Variable: D(Y)				
Selected Model: NARDL (2, 1, 0)				
Case 3: Unrestricted Constant and No Trend				
Sample: 2020M03 2022M12				
Included observations: 34				
Conditional Error Correction Regression				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	21.08402	6.628023	3.181042	0.0036
Y(-1)*	-0.208025	0.064686	-3.21592	0.0033
X_POS(-1)	0.005669	0.001747	3.244826	0.0030
X_NEG**	-0.031240	0.014446	-2.16255	0.0393
D(Y(-1))	-0.383385	0.138295	-2.77222	0.0098
D(X_POS)	0.018026	0.004174	4.32E+00	0.0002
* p-value incompatible with t-Bounds distribution.				
** Variable interpreted as Z = Z(-1) + D(Z).				
Levels Equation				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
X_POS	0.02725	0.007914	3.443543	0.0018
X_NEG	-0.15017	0.047871	-3.13704	0.0040

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

The long-run equation is as follows:

EC = Y - (0.0273*X_POS -0.1502*X_NEG)

Eighth: Testing standard problems:

1. **Breusch-Pagan LM test:** This test is used to demonstrate the problem of autocorrelation and through the results The probability values of his statistic reached (0.8977) and are not significant at the significance level (5%). This

means accepting the null hypothesis (H0), which denies the existence of the problem.

2. **Breusch-Pagan- Godfrey test:** This test highlights the problem of heterogeneity of error variance Whether or not there are test results And I reached the probability values for the statistic for this test are (0.125) and are not significant at the significance level (5%). This means accepting the null hypothesis (H0), which denies the existence of the problem in the estimated standard model. See Table (7).

Table (7): Diagnostic tests

Breusch-Godfrey Serial Correlation LM Test:			Prob.
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.108358	Prob. F (2,26)	0.8977
Obs*R-squared	0.281056	Prob. Chi-Square (2)	0.8689
Heteroskedasticity Test: ARCH			
F-statistic	2.477017	Prob. F (1,31)	0.1257
Obs*R-squared	2.441722	Prob. Chi-Square (1)	0.1181

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

To ensure that there are no structural changes in the study data, and to determine the extent of consistency of the long-term coefficients with the estimates of the short-term parameters, two tests were used: (CUSUM) and (CUSUM of squares). It is noted from the graphical line of the tests that they are within the critical limits (the upper limit and the lower limit). at a significance level (5%), meaning the data is characterized by stability, see figure (3).

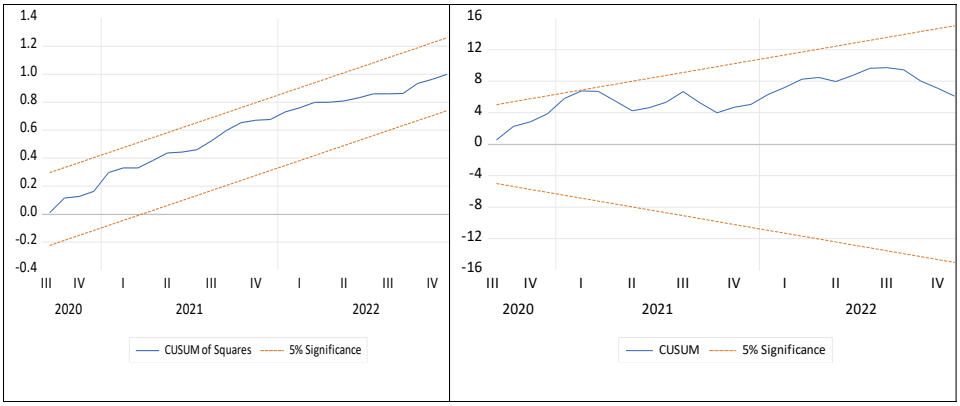

Figure (3): Structural stability tests

Source: Prepared by the researcher based on the results of the statistical program (12. EViews).

Conclusions:

1. Exchange rate fluctuations affect the prices of imported and local goods and services as a result of the Iraqi market's connection to the US dollar.
2. Exchange rates, the time series is fluctuating and not static until the eleventh month of the year 2020, which reached (1351) dinars, after which it increased by more than (1470) dinars.
3. There is a cointegration relationship between the parallel exchange rates and the consumer price index.
4. In the short term When increases in exchange rates increase by (1%), this leads to an increase in the consumer price index by (0.018%), while when exchange rates decrease or decline by (1%), this leads to a decrease in the consumer price index by (0.018%)(0.031%).
5. The long-term relationship When increases in exchange rates increase by (1%), this leads to an increase in the consumer price index by (0.027%), while a decline in exchange rates has an inverse moral effect on exchange rates at a confidence level of (1%). When the exchange rates decrease or decrease by (1%), this leads to a decrease in the consumer price index by (-0.150%).

Recommendations:

1. Increase control over the currency selling window to reduce exchange rate fluctuations.
2. Follow up on the economic committees responsible for monitoring changes in market prices.
3. on a light openness the result between Markets countries the world different He should on Drains that Come on Development that happened in Drains the countries The other.
4. Must Use Systems Cashing It fit with Economy the Iraqi And endure part from Shocks And circumstances that passes with it.
5. necessity Enable the bank Central and more His independence from Okay Pursue Policy Controlled on Prices Exchange The foreigner And reduce drain the reserve to the outside.
6. On Institutions Governmental Providing the necessary support for local production and its development.
7. Providing banking facilities to develop the sector, supporting it with loans, and opening the way for local investment.

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