

Measurement of Mutual Effect Transition Mechanisms of Monetary Policy and Economic Growth in Iraq Using Toda - Yamamoto Approach for the Period (1990-2019)

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Abstract

Economic growth is one of the fundamental goals governments seek and aspire to, representing the material conclusion of economic and non-economic efforts in society. It is one of the necessary conditions for improving the standard of living and prosperity of communities to achieve a sustainable growth rate as an expression of the entire development process to raise economic growth rates in the long term. This research, therefore, included knowledge of the causal relationship between monetary policy indicators in both the interest rate and the offer of cash and exchange rate in the direction of economic growth in Iraq for the period (1990-2019). It also aims to determine how monetary policy's mutual impact on economic growth is transmitted by measuring and analyzing causal relations between financial indicators and economic development in Iraq. Based on the standard approach based on a recent methodology for testing causality (Granger) provided by Toda-Yamamoto, which is based on the self-regression model (VAR). It allows us to test the study problem and reach the desired results. The research results were the absence of the causal relationship of the interest rate towards GDP due to the everyday use of the interest rate as a monetary policy instrument in stimulating the investment process, which does not affect output. On the other hand, the causal relationship between both the exchange rate and the broad cash supply towards production is due to the effectiveness of these monetary policy indicators in influencing GDP. The study also recommended activating the role of these monetary policy indicators to control inflation on the one hand and promote growth on the part of others.

Keywords

Monetary Policy, Mutual Funds, Economic Growth, Mutual Effect Transition.

Introduction

The Monetary Policy is one of the critical components of the macroeconomic policy framework. Plans and strategies that determine the country's economic path are drawn up in the coming period. All the economies in the world have their objectives, and the most important of these goals is the continuous increase in GDP by increasing the rate of population growth while maintaining price stability and achieving economic growth. Hence the importance of research into the mechanism of monetary policy transition and its impact on economic growth to assess the effectiveness of monetary policy and make decisions about policy preparation. It has led to the need to understand the mutual influence of monetary policy on GDP to improve economic performance (A.H. Almagtome, Al-Yasiri, Ali, Kadhim, & Bekheet, 2020). Therefore, the Central Bank of Iraq has exercised a balanced policy to balance two contradictions. The first is the state economy and its keeping pace with the reality of the rent economy. The other is to keep up with the free market, a lackluster market that serves internal distribution activity. The movement of money abroad regardless of the desired results in building an economic model. It generates a trend of inflows and outflows in foreign currency free from this duality. The extreme polarization between two different economies (state and market) and two flows (foreign currency inflows provided by the state economy and outflows from that currency that the private sector tends to one way out of borders without looking back). The Central Bank of Iraq has also used a policy of intervention in the exchange market to reach a stable level in the exchange rate of the Iraqi dinar in an attempt to test its instruments to address inflationary expectations based on the concept that current monetary policies are policies that resolve the art of managing expectations. Therefore, this research came to address the following problem.

What is the direction of the causal relationship between monetary policy indicators and economic growth in Iraq for the period (1990-2019)?

Therefore, we assume a mixed causal relationship between some monetary policy indicators and economic growth in Iraq.

Theoretical Framework

What is Monetary Policy

According to the development of monetary theories, contemporary monetary policy concepts have varied and have developed many developments in terms of jobs and goals. That's why they gave economists two monetary policy concerns: -

1. **The narrow meaning of monetary policy:** -Ranlett (1977) defined it as the central bank's policy of managing the rolling money supply as a means of achieving a set of state economic policy objectives.
2. **The broad meaning of monetary policy:** all monetary decisions and actions, whether their objectives are monetary or non-monetary, or all decisions and non-monetary actions aimed at influencing the monetary system. Through this definition, the term monetary policy has changed, with the content being transferred from the limited interpretation of the mechanism of monetary policy (A. Almagtome, Khaghaany, & Önce, 2020). Instead, it works to a comprehensive understanding of all the decisions and actions taken by the Central Bank to influence money in terms of its value and cost of providing it using direct and indirect means (Hameedi, AL-Fatlawi, Ali, & Almagtome, 2021). In addition, it is expanding the work of its objectives to include non-monetary monetary goals (Hülsmann, 2003).

Mechanisms for the Transition of the Impact of Monetary Policy on Economic Growth

The term transition mechanism is used "to denote the mechanism or how changes decided by monetary policy in the supply of cash or short- and long-term interest rates can affect real variables (Al-Fatlawi, Al Farttoosi, & Almagtome, 2021). In addition, it may be used to denote the process by which monetary policy decisions can affect the economy in general and at the general price level in particular (Weber, Gerke, & Worms, 2009). The economic transition mechanism is one of the most influential areas of the monetary economy called the Black Box due to the following:

- a. Spreading changes in monetary policy through the financial system to markets (bonds and bank loans) directly affects spending decisions for individuals and companies.
- b. The spread of monetary policy shocks through the financial system to the real economy on output and prices.

Therefore, understanding the mechanism of impact of monetary policy and how it works is critical to the success of monetary policy in achieving its objectives (Ali, Almagtome, & Hameedi, 2019). There is an agreement on significant channels because of the economy's different structural and institutional features from one country to another (Pétursson, 2001). Its reflection on the nature of the work of these mechanisms, which the effects of the implementation of monetary policy will be transmitted to the economy.

1. Channel of Interest Rate

The primary mechanism in which macroeconomic models operate is the interest rate channel and is called a traditional channel for the transmission of monetary policy impact

in the TREASURE MODEL(IS-LM). When pursuing an expansionary monetary policy to counter the increase in the money supply, nominal interest rates fall, leading to lower real interest rates in the short and long term. Consequently, under the assumption of price stagnation, it will increase the volume of investment spending. In contrast, consumer spending has shown that the flexibility of family sector spending is relatively high concerning the real interest rate. Therefore, lower accurate interest rates lead to increased demand by the family sector for durable consumer goods and increased investment in the housing sector (Kuttner & Mosser, 2002). Therefore, real interest rates, in turn, affect the lower cost of money through their impact on investment decisions, resulting in an increase in both consumer and investment spending on the one hand and increased aggregate demand and output on the other (Cevik & Teksoz, 2012).

$$Ms \uparrow \rightarrow i \downarrow \rightarrow I \uparrow C \rightarrow \uparrow Yd \rightarrow \uparrow \pi \quad (6)$$

2. Channel of Exchange Rate

Today's exchange rate has a special place in monetary policy because it can significantly impact exchange rate movements through its ability to influence the relative prices of domestic and foreign goods through the aggregate demand and supply channel. Thus, it affects domestic and foreign demand on domestic goods known as "indirect spread," which indirectly affects the inflation rate. Future changes in the exchange rate are the tool for linking household and foreign interest rates on major international currencies, which play a crucial role in savers' shift to higher-yielding currencies. However, when domestic real interest rates rise for an overseas counterpart, domestic deposits become more attractive than foreign currency-denominated deposits. It leads to a rise in the value of local deposits relative to stakes in other currencies. It means the dollars are rising. The local currency's appreciation makes domestic goods more expensive than foreign goods. These two effects result in a higher exchange rate in the local currency, affecting prices and financial positions.

$$M \downarrow \rightarrow i \downarrow \rightarrow E' \rightarrow N X \downarrow \rightarrow Y \downarrow \rightarrow \downarrow \pi \quad (7)$$

On the other hand, the exchange rate directly conveys the impact of monetary policy through the inflation channel known as the direct spread effect. If exchange rate changes directly affect inflation by increasing import prices or domestic prices of goods and services entering international trade (Mishkin, 1995).

3. Cash Offer Channel

It is one of the oldest channels that affect macroeconomic variables by controlling the central bank monetary reserves, whose impact on financial totals is transmitted by the economic multiplier. Both the Central Bank and commercial banks influence cash offers by creating money. This channel also conveys the impact of monetary policy directed towards money held by individuals and thus transfers the direct effect on output. Monetary policy works through changes in money supply, affecting aggregate demand that moves in line with the cash balances used to finance transactions. It, therefore, affects real GDP, potential output, and price level. If the national economy does not fully use it, the increased money supply will be reflected in increased aggregate demand and higher GDP to potential output. The opposite situation occurs when the economy reaches the level of total use. The increase in the supply of money increases the overall level of prices and thus creates inflationary pressures in the economy (Mishkin, 1999). As described in the following chart:

$$M_s \rightarrow \downarrow P_s \rightarrow \uparrow AE \rightarrow Y_A < Y_P \rightarrow \uparrow Y_A \uparrow$$

Features of the Work of Monetary Policy in Iraq

The Mechanism of Action of Monetary Policy in Iraq for the Period (1990-2019)

Monetary policy is one of the most important arms of the country's public economic policies, playing an important and active role in regulating the supply of cash and controlling cash and credit. According to this role, the monetary authority represented by the Central Bank can achieve specific vital objectives according to priorities estimated by the economic problem that afflicts the economy. Moreover, this phase has been characterized by the monetary policy being in line with fiscal policy. The central bank represented (leverage) its primary objective of financing the government deficit in the general budget. Monetary policy has not been sufficiently liberalized to become a support tool for changing underdeveloped realities and adapting them to stability and economic progress requirements. Financial stability has not taken on sufficient importance in stopping the impact of inflationary factors. Monetary policy has the other way around in the face of fiscal policy requirements without curbing the inflationary effects. Monetary policy has become adaptive, i.e., adapting to fiscal policy in its general directions. Without having any choice, it lost its objective independence to influence budgetary policy on the one hand and reduce its extreme expansionary and inflationary results on the other (Roger, 2010).

The monetary policy took a new turn in its approach after 2003 when the regime was changed, taking several laws and procedures by the coalition authority, the most important

of which was the number (56) of 2004, which granted the Central Bank of Iraq independence. Under Article II paragraph (2), the Central Bank was given complete freedom from the Government in facilitating its banking operations. Thus, the monetary authority is not obliged to adopt specific measures and means dictated by the government, in addition to giving a more significant role to indirect financial instruments, resulting from these extended measures (2007-2011), a golden triangle of economic stability. Its pillars were the decline in prices or inflation to one decimal place and the stability of the exchange rate after more than two decades of deteriorating economic stability. Monetary policy has thus been able to restore the Iraqi dinar's strength in generating a wealth effect. It has been a model of strong success in achieving monetary policy objectives in controlling prices, providing a key incubator for the launch of development in Iraq, and pushing economic growth rates (Sumer & Joseph, 2018). It aimed to promote economic and monetary stability to create an economic bio based on the supply and demand mechanism.

Analysis of monetary policy indicators and economic growth in Iraq

Table 1 shows that the central bank's interest rate structure was rigid and stable during the period (1990-2002), and the inability to attract economic savings for that policy rate (nominal) announced by the Central Bank of Iraq is stable and has stabilized at the level (6.13%). In contrast, the period (2003-2011) in Iraq witnessed financial liberalization effectively embodied by the national financial market through the freedom of the banking system and the divorce of its ability to determine the interest rates credited and owed. It is a crucial pillar of strengthening financial intermediation, which is the essence of financial stability to ensure a natural balance of the forces of supply and demand for cash. Therefore, in line with the requirements of the new monetary policy in the context of the market economy. 2012-2019 also witnessed interest rate stability as the Central Bank continued to adopt the interest rate (policy rate) of (6%) per annum from 2012-2015. To achieve monetary stability and raise economic growth rates by stimulating the activity of financing development projects. Therefore, the effects were negatively reflected on the exchange rate of the local currency against the dollar. The Iraqi dinar exchange rate in the parallel market deteriorated rapidly during this phase due to high inflation rates. A similar exchange rate against the dollar (10) dinars per dollar was recorded in 1991 at an annual growth rate of 150% after (150%) 4) Dinars per dollar in 1990. The Iraqi dinar exchange rate against the dollar rose to (1957) dinars per dollar in 2002 and at an annual growth rate (1.5%). It is mainly due to internal and external factors, external factors of economic embargoes, sanctions against Iraq, low oil revenues due to the suspension of crude oil exports, the freezing of foreign reserves abroad, and the denial of its benefits to Iraq. It has caused a deficit in Iraq's balance of payments and a decline in the size of the central bank's

international reserves. In addition to the internal factors represented by the state budget deficit, which caused a significant increase in the supply of cash during the 1990s through monetary financing policy. It is a policy of reducing the cost of financing at a specific nominal interest rate. It is carried out through the mechanism of linking the expansion of the offer of cash in the funding of the budget deficit due to the state's reliance on financing its expenses on the banking system in conjunction with reconstruction expenditures after 1991. In turn, the overall level of prices increased, and the dinar's purchasing power was negatively influenced (al-Rubaie & Ahmed, 2021). In return, he created a parallel foreign exchange market, hybrid composition, dealing with exchange rates for the Iraqi dinar and varying depending on the category of the Iraqi currency and the way it is printed (Hussein & Muslim, 2020). During the period (2012-2019), this period saw stability in the official exchange rate of the Iraqi dinar due to the central bank selling foreign currency through an auction (currency window) daily.

Even though monetary policy efforts to control and control the supply of cash, one of the central bank's first concerns under the changes it witnessed is the issuance of the new law, it was represented by the independence of the central bank in the management of monetary policy, which took on the light of the reform package. Still, the offer of cash continues to suffer from an imbalance in control of the size of the monetary bloc (Al-Rubaye & Kadhum, 2021). The reason is that the Central Bank continues to use monetary policy instruments by working on investment windows and developing new financial products by issuing medium-term securities and issuing Islamic certificates of deposit. These measures aim to achieve domestic prices' stability and control and manage liquidity levels in demand and total supply. They also aim to adopt the interest rate (policy rate) of (4%) and borrow domestic debt by issuing two types of bonds and treasury transfers to meet budget financing needs.

The trajectory of the development of GDP growth at the level of the Iraqi economy increased during the period (1990-2002) about (-78705.1104822.9) billion dinars at prices. This period has seen fundamental changes in the structure of the Iraqi economy due to the imposition of economic sanctions by the United Nations. They have resulted in the suspension of oil exports and low investment, capital accumulation, declining industrial and agricultural production, and deteriorating performance of the product and service sectors. Subsequent economic reform in 2003 saw a marked improvement in GDP. During this period (2003-2011), this improvement was due to lifting economic sanctions and the resumption of crude oil exports. The return of some economic sectors to economic activity, Iraq's openness to the outside world, and the expansion of its foreign trade, but after the twin crises, which began in 2014 and 2015, led to a decline in GDP at constant prices. This

decline is due to the significant decrease in oil prices in international markets and the political crisis in Iraq. The events took place in Iraq due to ISIS attacks in some provinces of Iraq and its control of some oil fields. It has put pressure on the general budget by increasing spending on military and humanitarian needs. It also threatened the security of oil facilities (Henrichsen, Betz, & Lisosky, 2015). It is due to the decline in both the total annual production of crude oil the shrinking contribution of economic activities, in addition to the fiscal policies adopted by the government and its orientation towards financing spending for the reconstruction of the liberated areas and the high inflation rates resulting from the negative repercussions of regional conditions. Thus, output increased slightly in the two years (2018-2019) at an annual growth rate of (2.6%-6.0%), respectively. It is due not to the improvement in oil prices globally due to the development and growth of the performance of the world economy. Instead, it has led to a rise in investment rates, positively impacting the Iraqi economy. It relies heavily on oil exports to meet its needs and finance the general budget.

Table 1 Development of monetary policy indicators and GDP in Iraq for the duration (1990-2019)

GDP growth rate %	GDP (2007=100)	Annual M2 growth rate%	M2 Wide Cash Show	Exchange rate growth rate%	Exchange rate in the market (parallel)	interest rate	Years
57.8	78705.1	-	24.9	33.3	4	6.13	1990
(64.0)	28296.8	41.7	35.2	150.0	10	6.13	1991
32.59	37519.3	71.3	60.4	110.0	21	6.13	1992
30.29	48883.8	94.1	117.2	252.4	74	6.5	1993
3.85	50768.1	139.3	280.4	518.9	458	6.5	1994
2.12	51844.4	177.5	778.2	265.5	1674	7.25	1995
11.02	57558.0	41.1	1098.1	(30.1)	1170	7.25	1996
21.24	69782.2	13.7	1248.7	25.7	1471	7.25	1997
34.86	94106.2	32.3	1652.4	10.1	1620	7.25	1998
17.58	110652.2	6.8	1865.4	21.7	1972	7.35	1999
1.41	112208.5	19.2	2223.5	(2.1)	1930	7.35	2000
1.77	114190.8	28.2	2849.6	(0.1)	1929	7.35	2001
(8.20)	104822.9	28.9	3673.0	1.5	1957	6.35	2002
(36.66)	66398.2	89.3	6953.4	(1.1)	1936	6.35	2003
53.39	101845.3	76.2	12254.0	(24.5)	1462	6	2004
1.68	103551.4	19.8	14684.0	1.1	1478	7	2005
5.64	109389.9	43.6	21080.0	(1.0)	1463	16	2006
1.89	111455.8	27.9	26956.1	(17.0)	1214	20	2007
8.23	120626.5	29.5	34919.7	(2.8)	1180	16.75	2008
3.38	124702.8	30.1	45437.9	0.4	1185	8.83	2009
6.40	132687.0	32.9	60386.1	0.0	1185	6.25	2010
7.55	142700.2	19.5	72178.0	2.7	1217	6	2011
13.94	162587.5	4.6	75466.0	(0.8)	1207	6	2012
7.63	174990.2	16.2	87679.0	1.2	1222	6	2013
2.26	178951.4	3.5	90728.0	(1.3)	1206	6	2014
2.61	183616.3	(9.1)	84527.3	3.4	1247	6	2015
13.79	208932.1	7.0	90466.4	2.2	1275	4	2016

(1.82)	205130.1	2.6	92857.0	(1.9)	1251	4	2017
2.6	210532.9	2.7	95390.7	(4.0)	1208	4	2018
6.0	223075.0*	8.4	103440.5	(0.5)	1201.7	4	2019

Source: The researcher's work is based on Central Bank annual statistical bulletins (1990-2019), Directorate General of Statistics and Research, separate pages. The- the Republic of Iraq, Ministry of Planning / Central Bureau of Statistics and Information Technology, Directorate of National Accounts.

- The compound annual growth rate was calculated according to the following formula:-

$$Y = \left[\left(\frac{P_t}{P_o} \right)^{\frac{1}{T-t}} - 1 \right] * 100 \dots (1)$$

Bracketed values are negative values.

Measuring and analyzing mechanisms for the transition of the mutual impact of monetary policy and economic growth in Iraq for the period **(1990-2019)**

Description and Formulation of the Model

At this stage, the relationships between economic indicators are described in mathematical formats based on the logic of economic theory to measure and interpret them, through which the relationship between the dependent economic indicators (approved). The independent (illustrative) indicators are included in the model are determined in the light of economic theory data (Elliott & Woodward, 2007). In the context of our study, the standard model of the mechanisms for the transmission of monetary policy impact on economic growth will be described according to the set of indicators used in the model, which were produced by the theoretical and analytical aspects of both the first and second researches. Among the most common descriptions of the model was the use of independent variables for monetary indicators representing (Cash Offer (M2) Exchange Rate (Exch). Interest rate (INTR) and the dependent variable is GDP.

$$\mathbf{GDP = f(M_2, Exch, INTR)}$$

Time Series Stability Test (Sleep Test)

Standard economy models that use time-series data are counted to estimate one of the first steps in identifying whether the timing chain is static or non-static. However, when the time series does not have the status of stillness, the one we get between time series variables is often a false regression. In light of this, economists (Engle-Granger) sought to solve this

problem by developing a statistical test called the "time-series sleep test" because they are zero-grade integrated time chains symbolized by (0)I. The stillness of time chains is meant as the absence of a general trend of the phenomenon up or down the time path of the time series. Their characteristics do not change over time, namely, the stability of the arithmetic average and the variation, which are characteristics of the availability of stillness in the time series. Therefore, sleep (stability) is necessary for analyzing economic indicators before testing integration and causal relationships (Cameron, 2014). There are several tests To achieve this, such as the Dickie-Fuller Simple Test(AF), the Dickie-Fuller Extended Test (ADF), and the Phillips-Byron test.

Toda –Yamamoto Causality Test

This test was developed by Hiro Y. Toda and Yamamoto Tukain in 1995 and later acquired by Dolado and Luthkepohl in 1996. It is a new approach to studying the causal relationship between variables and determining their directions. This test is characterized by the need to stabilize the time chains at the same level as a stranger. It can be used in the case of different grades for the integration of time series (0)I, (1)I, or even (2)I. This method also does not require a standard integration of time chains. This approach was developed to eliminate the shortcomings of the traditional causality test (Granger Causality), the most important of which was the problem of model characterization and the number of slow periods, in addition to the most critical defect of false regression (instability problem) (Alimi & Ofonyelu, 2013).

The Toda-Yamamoto causality test application includes three steps (Dembure & Ziramba, 2016).

Testing the Stability of Time Series and Determining the Degree of Great Integration (d_{max})

The first step is to study the stability of time series to determine the degree of integration of each series. Several unit root tests, including the Ducky Fuller (ADF) test and the Phelps Peron Test (PP). Then extract the maximum integration score (d_{max}), which takes the value of the most significant degree of time chains' stability that depends on their importance in estimating the model (VAR).

Determining the Optimal Deceleration Period (P) for the VAR Model

The VAR model of variables is estimated at time series levels regardless of the degree of stability obtained in the previous step. After evaluating, the optimal slowing period is

determined by statistical criteria (AIC AIC, Schwartz SC, NN-Queen HQ). Finally, the lowest value of each standard is tested and is offset by the optimal time slow down. The duration of the slowing down (P) that will be based on it is the VAR estimate of the model for the study of causality relationship.

1. Hibernation test is done based on modified Wald test, a method developed for wald testing to test the self-developed regression vector(K) VAR parameters. K equals the great degree of integration plus the optimal slowing duration (K=p+d max). Thus, this test follows the chi-Squared distribution with k degrees of freedom (Ayad & Belmokaddem, 2017).

$$GDP_{it} = \alpha_{1it} + \sum_{w=1}^{p+d \max} B_{1it} GDP_{it-i} + \varepsilon_{1it}$$

GDP variables study in the duration of (it). Each () is white noise for both equations, which must be zero in the sense of constant variation and the absence of a subjective correlation between the limits \mathcal{E}_1 of random error in the model. Once the model has been assessed, it is necessary to ensure its validity, particularly in terms of stability, through the testing of the monocycle and by providing. It is free of problems of linear multiplicity, heterogeneity of contrast, and linear correlation based on the tests known in determining It. One of the primary conditions for applying this methodology is that the degree of integration between the time chains (d_{\max}) exceeds the optimal slowing times (K). This methodology can be summarized according to the following chart:

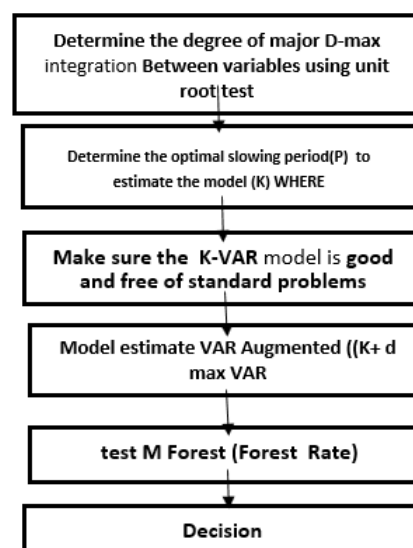


Figure 1 Steps to apply Toda-Yamamoto methodology

Source: Sbaki Wafa, Lt. Col. Mustafa, Toda-Yamamoto Causal Test between Education and Economic Growth in Algeria (1980-2019), Journal of Strategy and Development, Issue 3-Volume 2019.9, p. 305.

Estimating the Causal Relationship of Monetary Policy Indicators and GDP Growth Using the Toda-Yamamoto Methodology

1. Testing the Stability of Indicators

Table 2 shows the results of the Unit Root Test (ADF) and indicates that GDP, EXCH is stable at the level in spirit (1%), and NTR was stable at the level as well. But, at a moral level (5%), it will be integrated to the (0)I degree, which means that the hypothesis of nothingness that there is a problem of the root of the unit and acceptance of the alternative view can be rejected. ($H_0: B = 0$)($H_1: B \neq 0$) While (M_2) was stable in the second team at a moral level (1%) and will be integrated from the second class (2)1.

Table 2 Unit root test results

Morale level	Level of differences	Shape of slope	Appreciation		Variables
			Probabilities	calculated t	
1%	Level	Cross	0.0000	-8.826617	GDP
1%	The second difference	Cross	0.0060	-3.956137	M_2
1%	Level	Cross	0.0022	-4.366802	EXCH
5%	Level	Cross	0.0137	-3.554337	IN

Source: Prepared by the researchers based on the results of the assessment of the statistical program J. Eviews12)

Due to the stability of the monetary indicators, both (interest rate and exchange rate) at the original level while (broad cash offer) was stable at the second difference. As a result, AMA (GDP) stabilized at the level. In line with the theoretical basis of the standard economy, the analysis of these models is supposed to be carried out according to a causal test (**Toda-Yamamoto**). This test is a modern method of testing the causality of relationships and trends of influence in standard models of non-integrated time series of the same degree (0)1, and (1)1, (2)1. This method has been used to measure and analyze the impact of the causal relationship between monetary policy indicators and GDP as follows:

2. VAR Lag Order Selection Criteria

To determine the optimal duration of slowing down, we use a set of statistical criteria such as the AIC (AIC) Hannen HQ standard), the Schwartz Standard (SIC), the FPE standard, and the LR standard. A lower value is chosen for each measure which determines the

optimal slowing. Table (3) shows that the prevailing criteria are equal to one, so the degree of time lag (P=1).

Table 3 The optimal time-lapse duration

VAR Lag Order Selection Criteria						
Endogenous variables: GDP INTR EXCH M2						
Exogenous variables: C						
Date: 07/23/21 Time: 13:56						
Sample: 1990 2019						
Included observations: 29						
HQ	SC	AIC	FPE	LR	LogL	Lag
66.97967	67.10920	66.92061	1.36e+24	NA	-966.3488	0
61.01105*	61.65869*	60.71573*	2.78e+21*	175.3998*	-860.3781	1

Source: Prepared by the two researchers based on the program's estimated results. EVIEWS 12

3. Estimate a model: VAR (1)

it can be said that the estimated VAR model (1) is of acceptable statistical quality, so the model's validity meets the requirements. Therefore tests can be carried out for other:

4. Inverse Roots of AR Characteristic

We use multiple root tests to find out how stable the model is. For example, the results of the self-regression beam are regular if the single roots of many boundaries within the circle are inverted, as in Figure 2 AT:

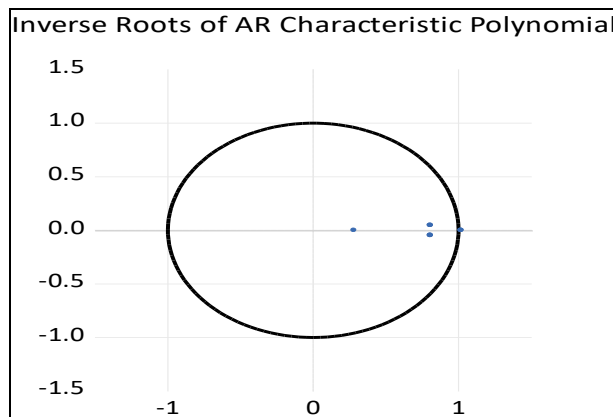


Figure 2 The one-sided circle of its stability

Source: Prepared by the two researchers based on the program's estimated results. EVIEWS 12

5. Residual Serial Correlation LM Tests

We use the latest to find out that there is no phenomenon of self-association between the trumpets, as the zero hypotheses acknowledge that there is no subjective association between the condoms of the model because the probability value is more significant than (5%), and as in table (4) AT:

Table 4 Self-link test results

VAR Residual Serial Correlation LM Tests			
Null Hypothesis: no serial correlation at lag order h			
Date: 07/08/21 Time: 02:03			
Sample: 1990 2019			
Included observations: 29			
Prob	LM-Stat	Lags	
0.0042	34.81972	1	
0.8593	10.13762	2	
0.2215	19.97264	3	
0.3830	17.03948	4	
0.8303	10.65446	5	

Probs from chi-square with 16 df.

Source: Prepared by the researchers based on the estimated results using EViews 12.

6. Residual Normality Tests

The probability distribution must be made to study the behavior of any timing chain about the nature of its stability, and the natural distribution depends on the kurtosis and skewness factors. The outcome is a Jarque-Berra test to reveal the heart of the natural distribution of the psych. Figure (3) E. Li indicates that the probability values of this test are more significant than (5%) because Probability=0.514343 Accepts the hypothesis of nothingness considering that the condom of the model is normally distributed.

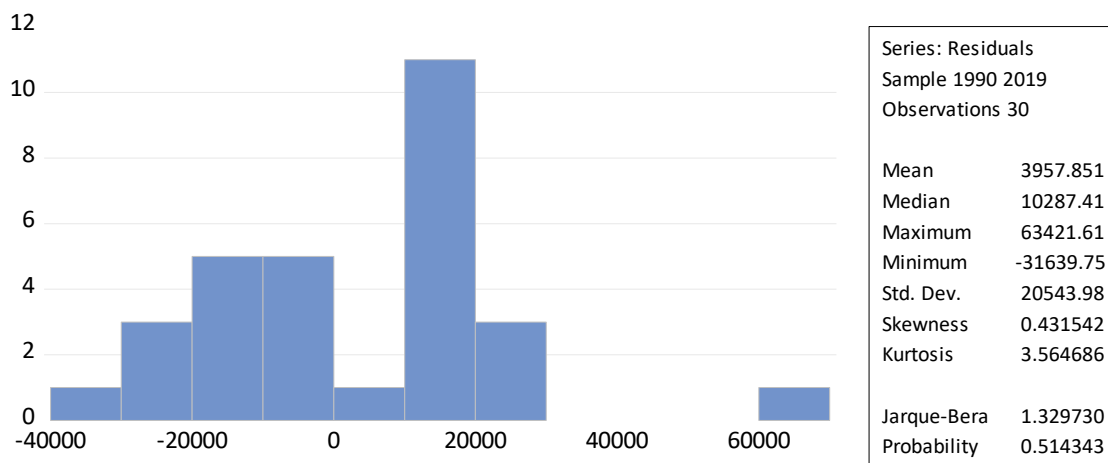


Figure 3 Results of natural distribution test

Source: Prepared by the researchers based on the estimated results using EViews 12.

7. Residual Heteroskedasticity Tests

Table 5 shows that the probability value of Chi-sq A is greater than (5%), i.e., acceptance of the hypothesis of nothingness and the top of the model condom with a homogeneous contrast.

Table 5 Results of the contrast heterogeneity test

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)		
Date: 07/08/21 Time: 02:07		
Sample: 1990 2019		
Included observations: 29		
Joint test:		
Prob.	df	Chi-sq
0.1641	80	122.28886

The researchers prepare the source based on the estimated results using EViews 12.

8. Toda- Yamamoto Causality Test

Table 6 shows that when GDP is a dependent variable and both INTR, EXCH, M2) as independent variables, it shows no causal relationship to the interest rate towards GDP. It may be due to the low use of the interest rate as a monetary policy instrument to stimulate the investment process, which does not affect GDP. It confirms the separation of the central bank's behavior from the real behavior of GDP, particularly the weak effectiveness of targeting the interest rate channel in influencing real output as a signaling tool that responds to changes in GDP. On the other hand, there is a causal relationship between the exchange rate and the broad exchange offer towards GDP, which may be due to the effectiveness of these monetary policy indicators in influencing GDP. To stabilize the price levels and then economic stability. This adoption came in response to the transformation of that administration from targeting the monetary bloc to targeting inflation through the exchange rate channel, which is controlled by open market operations that are carried out in foreign exchange auctions based on the management of the offer of cash and under the stability of the exchange rate. In general, the morality of the causal relationship confirms the impact of independent variables as a whole towards GDP.

When (INTR) is a dependent variable and GDP, EXCH, M2 (independent variables). It turns out that there is no causal relationship between GDP and exchange rate and the offer of cash towards the interest rate because there is no reciprocal relationship between the output and the interest rate. As indicated above, there is no effect on the exchange rate and the cash offer towards the interest rate. So output and some monetary policy indicators do not cause changes in interest rates. In general, the causal relationship to the impact of independent variables as a whole towards the interest rate is evident.

In the adoption of (EXCH) a dependent variable and both GDP, INTR, (M2 independent variables), it was found that there is no causal relationship between all GDP and interest rate and the offer of broad cash towards the exchange rate because the morality of the causal relationship between them is not proven. It may be because the exchange rate stabilizes through the central bank's policy of using the Monetary Balance Fund to maintain exchange rate stability and not for output indicators, interest rate, and cash supply as a primary reason for exchange rate changes. This result reflects what is happening in Iraq. In general, the inequity of the causal relationship of the impact of independent variables towards the exchange rate is evident.

Suppose M2 adopts a dependent variable and GDP, INTR (EXCH independent variables). In that case, it turns out that there is no causal relationship between all GDP and the exchange rate towards the offer of cash because the morale of the test has not been established. It may be because the result may not affect the offer of money, which is supposed to be a kick-off between them. The interest rate is also a reason to influence the offer of cash at a moral level (5%). It corresponds to economic logic. In the case of interest rate cuts, the offer of cash usually increases and vice versa, and this explanation is more likely. In general, the lack of morality of the causal relationship of the impact of independent variables on the presentation of criticism is evident.

Table 6 Toda- Yamamoto causality test

VAR: Granger Causality/Block Exogeneity Wald Tests			
Date: 07/08/21 Time: 02:09			
Sample: 1990 2019			
Included observations: 29			
Dependent variable: GDP			
Excluded	Chi-sq	df	Prob.
INTR	0.199539	1	0.6551
EXCH	11.41594	1	0.0007
M2	18.41196	1	0.0000
All	19.45829	3	0.0002
Dependent variable: INTR			
Excluded	Chi-sq	df	Prob.
GDP	0.026870	1	0.8698
EXCH	0.073766	1	0.7859
M2	0.298772	1	0.5847
All	1.615956	3	0.6558
Dependent variable: EXCH			
Excluded	Chi-sq	df	Prob.
GDP	0.910190	1	0.3401
INTR	0.438277	1	0.5080
M2	1.400715	1	0.2366
All	1.862768	3	0.6014
Dependent variable: M2			
Excluded	Chi-sq	df	Prob.
GDP	0.219366	1	0.6395
INTR	5.389444	1	0.0203
EXCH	0.398108	1	0.5281
All	6.022641	3	0.1105

Source: Prepared by the researchers based on the estimated results using EViews 12.

Conclusion and Discussion

Monetary policy is essential in any economy, as we have seen its influential impact on economic growth. Therefore it must be used to understand the mechanism of relations between economic and macro policy indicators to develop a successful monetary policy that achieves sustainable growth rates. Economic growth during the period (1990-2003) suffered a sharp decline in its paces due to international wars and sanctions, which led to the suspension of oil exports, which lost the general budget as its primary resource, fuelling inflation, destabilizing and declining annual GDP rates. The post-2003 phase of the new Central Bank Act (56) (2004). The central bank has been granted autonomy in managing monetary policy. There is no causal relationship between the interest rate towards GDP. It confirms the separation of the central bank's behavior from the real behavior of GDP.

While there is a causal relationship between the exchange rate and the broad exchange offer towards GDP. It may be due to the effectiveness of these monetary policy indicators in influencing GDP and because the exchange rate channel has become the main channel in the management of monetary policy, which has adopted exchange rate stability as an intermediate or nominally proven goal. As demonstrated by the standard model results, some monetary policy indicators in Iraq play a significant role in influencing economic growth through multiple mechanisms. They agreed with the research hypothesis. The results indicate a causal relationship between the exchange rate and cash offer to GDP. We, therefore, recommend activating the role of these monetary policy indicators to control inflation on the one hand and promote the growth process. It is done by improving the value of the Iraqi dinar while providing a suitable climate to create a flexible production apparatus with competitiveness to achieve favorable growth rates with a decline in inflation rates in the short term. It also ensures a rise in GDP rates in the short and long time. Moreover, A programme of economic reforms should be adopted, including strengthening the role of the private sector and correcting structural imbalances through a gradual shift from the rentier nature of the economy to supporting productive sectoral growth in both (agriculture, industry and services) in order to increase its contribution to GDP formation by increasing the investment allocations packaged to them in the general budget to granting tax exemptions and concessions to attract and encourage domestic and foreign investors to enter into productive projects and maintain the financial surpluses achieved from oil revenues through the establishment of a sovereign fund that absorbs a percentage of oil revenues, especially in times of positive external shocks, and invest these loyalists in safe windows to benefit from them in the development of sources of public budget financing, and resort to them to reduce the impact of external shocks to the public finances in Iraq as a result of fluctuating oil rents and dam Budget deficit.

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