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Measuring the effect of Money Supply on Economic Growth in Iraq Using a Methodology (ARDL) for the (2003-2020)

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Abstract
The money supply plays an important role in the development of the sectors of the national economy, and this role is evidenced by the influence of the money supply on the process of economic growth in general, because the gross domestic product (GDP)GDP) represents one of the important indicators of the growth process, so the research deals with part of that relationship between the money supply and the gross domestic product, to reflect that relationship on the national economy, as the study aims to measure and analyze the money supply and economic growth represented by the gross domestic product.at pricesfixed in Iraq for the period (2003-2020), and the standard model was built that includes the money supply in the narrow, broad and broader sense, and the gross domestic productat pricesfixed, and according to semi-annual data using the program (Eviews12) The study concluded that there is a co-integration relationship between the variables of the study, and it became clear that there is a one-way causal relationship between the money supply in the narrow sense that causes the gross domestic productat pricesThe fixed and one-way causal relationship between the money supply in the broad sense and the gross domestic productat pricesPersistent and there is no causal relationship betweenShownIn the broadest sense, monetary and gross domestic productat pricesfirmware.

Keywords: money supply, growtheconomic, Gross domestic product at fixed prices.

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Introduction :

Monetary policy is an important part of quantitative economic policy, as monetary policy plays an important and effective role in regulating the money supply and controlling monetary liquidity and credit, and through this important role, the monetary authorities are represented in the central bank as the highest monetary authority that can achieve specific vital goals and priorities determined by the problem Sometimes the monetary authorities use intermediate goals such as the money supply to reach

the final goal they aspire to, such as price stability, and reducing inflation, which is one of the most prominent and most important goals pursued by all economies of the world, as inflation has negative effects that are reflected on the economy and economic growth,Where is the criticism?YoonThey stress that money plays an effective role in bringing about positive changes in the level of income,and thereforeThat the increase indisplayedCash may leadTo a corresponding increase in GDP in the short term, Wanits effectLimited to general levelfor pricesIn the long runTomedium and long

research importance: The money supply is one of the most important macroeconomic variables that affect the overall national economywill be reflectedOn output, income, use and others, and from here the research problem emerges in the form of a question that says:what mdyThe effect of changes in the money supply and its componentsthe basicOn economic growth in Iraq?.

problemsearch: Economic stability at the general level of prices is one of the main objectives of monetary policy, and achieving this goal may collide with the goal of achieving economic growth. Hence, the problem of the study is characterized in the form of a question that:

what mdyThe effect of money supply on real economic growth?

hypothesissearch: Lead changes (decreaseand height) in the money supply leads to changes in economic growth in the same direction.

search objective: The research seeks to achieve the following objectives:

1- Follow through analysis the paths and developments of the money supply and the real economic growth in Iraq.

2-Explanation of the impact of the money supply on economic growth inIraq.

Spatial and temporal limits of research: The research used Iraq as a spatial limit for it. As for the time limits, the research included (18) years extending since 2003, which is the beginning of a new political and economic system in Iraq and ends until 2020, which is the last year that allows obtaining data available in its primary sources, which is the Ministry Planning, and the Central Bank of Iraq.

Research Methodology: The research depends on the inductive approach to analyze the research variables and using the descriptive analysis method of the research data and modern economic measurement methods represented by the methodology of(ARDL)By using modern statistical software(EViews12).

Structuralthe study: The research consists of three axes

the hubthe first:the foundationtheoretical presentationcashand growthEconomic.

The second axis: analysis of the RAAT path and the evolution of the components of the money supplyand growtheconomic inIraq.

The first axis: acestheoreticaltofor cash offerand growthEconomic

Or not:money supply conceptAnd its components:

Economists have had a hard time trying to agree on a specific definition ofMnakedAnd thez cash includes its componentsthe basic,This dispute revolves around a pointbasic and isThe constituent elements ofMnakedAnd thez cashsopointing conceptPainnakedAnd thez puritydeTo 'the amount of payment methods available inthe society,which is the sum ofFrommoneydifferentSpecies present in a community over a period of timecertain,The money supply can also be defined as the sum of monetary units owned by a society during a given period of time.(Shendi,Abdul Khader,20166 ,).

The components oftoThe money supply is represented by the so-called monetary aggregatesWhichQuantitative indicators related to the nature of the economy and the degree of development of banks, as they give information to the monetary authority about growth rates, and that many central banks, whether in developing or developed countries, have followed the achievement of intermediate goals based on the rate of growth of the money supply at a fixed rate within the limits of the growth rate in the monetary base Which amounts to about 4% to face the fluctuations that occur in prices, especially in the seventies and eighties of the last century, as this trend stems from a strong conviction that compels the central bank to maintain a stable and weak growth rate of the monetary mass, which is attributedyTo the contemporary critical theory of Milton Friedman (Dagher, Farhan, Bedoon, 2017), asThese aggregates provide information to monetary authorities about the pace of SEO growthnothe following different:

1-cash complex(Mo)(monetary base):The monetary base consists of a circulating part represented by the cash balance in the possession of the public and symbolized by the symbolE, and the non-current part represented by bank reserves and is symbolized by the symbolR, so that the monetary base equation can be formulated as follows: (slaveAs-Samad, 4, 2018)

M0= E + R

2-monetary aggregate (M1):It is represented by the total means of payment circulating in a country during a period of timespecific,Where the following are included in this definition:(vegetable, foodn,188,2018)

aCirculating money:It is the paper and coin currency that is used in various transactions.

B-Deposits:They are deposits held in the form of current accounts or demand deposits in bankscommercial,Both tools are instant payment methodsof high liquidity.

An equation can be writtenmoney supplyIn the narrow sense according to the following formula:(Al-Janabi,2014, 60-59)

M1=M0+ R1

Where:

M0: the currency in circulation

R1: current deposits

3-monetary aggregate (M2) Cash offer in the senseWide:qlocal cashown and sheInclude (M1) In addition to time deposits in banks and savings deposits in savings funds (semi-money), which is less liquid than (M1) (Abdul Rahim, 138,2014), and accordingly, it can be considered about the money supply in the broad sense in the following equation: (Al-Shammar, Al-Sharrouf) ,332,2009)

M2 = M1 + R2 + R3

whereas:

M2: Money supply in its broadest sense

M1: money supply in the narrow sense

R2: Term Deposit(temporal)

R3:savings deposits(depositsavings)

4- The complexcash (M3): Widthmeaning moneythe widestM3 This monetary complex includes all the elements of the monetary complex (M2).add toTerm deposits with other financial institutionsTheBanking and we symbolize it with the codeR4, And theCanFormulating the concept ofMcash offerIn the broadest senseThis is through the following relationship:(slaveSamad,2,2018):

M3 = M2 + R4

Wherethat:

M3:Money supply in the broadest sense

M2: ShowMoney in a broad sense

R3:Term deposits with non-bank financial institutions

5-monetary aggregate (M4) is called liquiditythe public:The general liquidityM4 frommoney supplyM3In addition to the rest of the financial assets owned by the non-banking economic units.(Al-Fatlawi,39,2017)

6-monetary aggregate (M5): There are those who add to the previous societies a fifth monetary complex, which consists of M4 and to which certificates are added.Deposit. (slaveSamad,7,2018)

Second: The concept of economic growth and its measures:

The concept of economic growth: It is an indicator that is not easy to determinecomprehensive,where more than one is usedConcept,qEconomic growth reflects quantitative changes in production capacity and the extent to which it is exploitedenergy,and risesThe rate of growth in national income with an increase in the rate of use of this generated energy and vice versaRight.(weightand Al-Rifai, 381,2007).qEconomic growth is also known as the increase in real national product (income) during a certain period of time, or the continuous increase in the real output of a person (income) during a certain period of time. (Mandarin,312, 2012).

economic growth metricsy:Three types of scales can be distinguishedeconomic growth, which are as follows:

1Monetary rates of growth:Growth rates are calculated based on monetary estimates of the size of the economytotal,That is, after converting in-kind and service productsto whatcurrency equivalentcash,And thisThe method is the easiest and the best, despite the reservationsaround,like badAppreciation,Ignore the effect of inflationand hereDistinguish between growth rates in pricesongoing,and growth ratesAt constant prices, growth rates in pricesGlobalism.(Al-Mahi, 171, 2010)

A- Growth rates at current prices: It is a measure of growth in local currencyfor the state,so. is publishedits dataannually,Therefore, annual growth rates can be measured based on thesedata,This method is suitable for studying local growth rates for a short period.

B - Growth rates at constant prices: Since the current prices do not accurately reflect the real increase in income or production as a result of the phenomenon of economic inflation and price increase, it has become necessary to adjust the data based on index numbersfor prices,Any estimate of GDP at pricesfirmware.

C- Growth rates at international prices: local currencies must be converted when conducting international economic studiescomparison,Because local currencies cannot be used due to the difference in currency exchange rates from one country to another, this method is used, especially in foreign trade studies.

2-In-kind rates of growth: It expresses the extent of improvement in the per capita share of in-kind services due to the inaccuracy of using monetary measures in the field of services, such as: the number of doctors per thousand people, the number of hospital beds per thousand people, the per capita share of goods and foodstuffs ... etc.) Al-Quraishi, 39, 2017).

3-Purchasing Power Comparison:International organizations use a measure of the value of national product (the value of goods and services produced by the national economy during a certain period of time, often in a year) denominated in the US dollar when publishing their reports when comparing the economic growth of countries in the world, and then they arrange countries according to the degree of

progress and backwardness according to that measure , which is one of its most important shortcomings as it links the strength of the economy and the exchange rate of the national currency to the US dollar, at a time when the value of most currencies in the global financial markets is turbulent, as the International Monetary Fund experts warned that this measure hides the real value of the economies of developing countries, so it was Preparing a scale that depends on the purchasing power of the national currency within its borders, that is, the volume of goods and services that an individual needs in return for one unit of his national currency compared to the purchasing power of foreign currencies in other countries. (behind,470,2018)

The second axis: analysisThe evolution of the components of the money supplyand growthThe economist in IraqFor the period (2003-2020)

Or not:evolutionanalysis trackdisplayedTheCash in Iraq during the period 2003-2020

The development of the money supply reflects a true picture of the development of the banking system and the banking awareness among the public and the degree of development of the financial and monetary markets, as the money supply started small and then increased and expanded during the study period until now, according to the data in Table (1),soThe period (2003-2021) witnessed the continuation of the money supply in the narrow sense, increasing from (2,898,189) billion dinars in (2003) to (119,944,017) billion dinars in (202).0) with an annual change rate (16.66%) as a result of the strategy followed by the new monetary policy in managing the growth rates of the narrow money supply to maintain the value of the currency, and the large cash issuance made by the Central Bank of Iraqfor reasonsMany, such as replacing old Iraqi currencies, and the surplus of foreign cash reserves as a result of the rise in crude oil prices because the latter is the source of foreign currency and the consequent increase in spending in the state's general budget to accommodate the working class, all of this encouraged an increase in the issuance of cash in the economy (Kadhim et al. , 121, 2019) for the components of tight money supplyM1 The net currency in circulation increased during this period, from (1878486.1) billion dinars in (2003) to (71,526,054) in (2021), while current deposits increased in (2021) to reach (48,417,963) after it was (1,019,703) In (2003), where we note from the table (1The development of the net currency in circulation was to a greater degree than the current deposits, and that the growth rates of the currency in circulation recorded the highest level in the money supply in 2005, reaching (79.94%), and recorded its lowest level in (2011) to reach (45.28%), as for current depositsI registeredThe highest contribution percentage was in (2011) at (54.72%), while the lowest percentage was in (2005) at (20.06%).

as wellWe note from the table (1) The decrease in the money supply in the narrow sense in the two years (2014-2015) with a negative growth rate of (-1.54%) and (-4.24) overstraight and causeIncluding the decline in oil exports and the decline in revenues from those exports due to the ISIS war and the decline in international oil prices, and consequently the negative impact on the size of the money supply and its growth rate (Khoshnaw, 37, 2019)..

As for the year (2016), the money supply recorded (M1), an increase of (8.49%), and the reason for this increase is mainly due to the growth of the currency outside banks, with its contribution reaching (55.71%) of the total money supply, in contrast to the decline in the relative importance of current deposits, whose contribution amounted to (44.29%) of the money supply. The reason for this is the state of fear among the public to keep cash savings to face the uncertainty in light of the state's economic stagnation., (Annual Economic Report of the Central Bank of Iraq, 26, 2016). In 2017, 2018 the money supply increased (M1) to (77,828,984) at the end of (2018) compared to (76,986,584) in (2017), which is mainly due to the growth of current deposits by (47.97%) to record (37,330,917) of the money supply (M1), while the currency outside banks recorded a slight decrease of (0.4%) to reach (40,498,067) in (2018) compared to (40,343,309) in 2017, constituting (52).03%) of the money supply (M1), but during the years (2019) and (2020), the money supply continued to rise with annual growth rates (11.49%) and (19.11%), respectivelyresultThe growth of the currency in circulation outside banks to record (59,987,098) compared to (47,638,603) and it constitutes (58.04%) of the money supply (M1) This rise is attributed to the rise in public spending during the spread of COVID-19 on medical supplies and rehabilitation of hospitalsIn additionTo the money provided to families during the application of the comprehensive ban, as for current deposits, it rose to (43,366,458) compared to (39,132,397) in 2019, and constitute (41.96) of the money supply (M1), and in the year (2021), the money supply (M1) increased by (16.05%) to reach (119,944,017) billion dinars, and the reason for this increase is due to a rise ineThe currency is in circulation by (59.63%) of the money supply to record (71,526,054), while current deposits rose to recordEndThe year (48,417,963) billion compared to the previous year (43,366,458), but the percentage of its contribution to the money supply decreased by (41.36%) compared to the percentage of the currency in circulation, and this shows that the money supply is still growing at high rates parallel to the percentage of the currency in circulation. This imbalance is due to the nature of the rentier Iraqi economy as a result of the oil sector's leadership in most public revenues by about (95%), which generates the emergence of a new problem, which is considered a major challenge for the Central Bank, which is the extent of the bank's ability to control the money supply in light of the government's increasing demand for the currency Local government to cover its increasing expenditures, while at the same time putting the independence of the bank on the line (Kazim et al., 121, 2019).

2-The evolution of money supply in the broad sense (M2)sonote from the table(1) that (M2) maykeep it upupwhat's wrongDrYear (2003) to (2015): (Khoshnaw, 37, 2016)This is due to:

A- The continuous increase in the current public expenditures represented in the increase in the salaries, allowances and wages of workers in the state.

B - Increasing investment spending and inflating the number and size of projects in Iraq.

C - Increasing military expenditures and increasing the armament of the armed forces to confront the enemies.

D - Increasing security expenditures and developing security services.

E - Increasing the volume of the foreign reserves of the Central Bank of Iraq, which is necessarily offset by the national currency, for the purpose of achieving stability in the exchange rates of the Iraqi dinar.

2015 witnessed (M2) decreased with a negative annual growth rate of -6.67, due to lower oil prices and a decrease in net foreign assets,As for the years (2016-202 .)0) We note that (M2) has increased at different rates of growth as well (7.03, 2.64, 2.73, 8.44, 15.92), where this increase in growth came as a result of the growth in supply.cash meaningydistress(M1) and quasi-money (other deposits).

3-The evolution of the money supply in the broadest senseM3)so We note from the table (1) that (M3) has been increasing continuously from (2003-2014) due to the increase in both the money supply (M3) and government deposits, with the highest contribution of government deposits to the money supply.In (2008) at a rate of (46.01%), while during the two years (2015-2016), the annual rate of change in the money supply became negative due to the decrease in both money supply (M2) and government deposits, while the years from (2017-2021) continued to increase (M3) and thus will reflect the extent of development of the volume of local liquidity in the Iraqi economy.

Table (1)

The evolution of the money supply in Iraq for the period from (2003 - 2020)

M3%	M3	M2 %	M2	M1%	M1	the year
.....	6,222,090	.....	4,021,847	.....	2,898,189	**2003**
152.54%	15,713,057	185.89%	11,498,148	250.17%	10,148,626	**2004**
43.60%	22,563,622	27.49%	14,659,350	12.32%	11,399,125	**2005**
55.33%	35,047,041	43.60%	21,050,249	35.62%	15,460,060	**2006**
32.20%	46,333,896	27.88%	26,919,996	40.50%	21,721,167	**2007**
17.14%	54,275,827	29.50%	34,861,927	29.78%	28,189,934	**2008**
26.81%	68,826,578	30.10%	45,355,289	32.32%	37,300,030	**2009**
17.30%	80,735,100	32.93%	60,289,168	38.72%	51,743,489	**2010**
23.28%	99,527,304	19.54%	72,067,309	20.74%	62,473,929	**2011**
13.87%	113,329,268	4.54%	75,336,128	2.02%	63,735,871	**2012**
9.42%	124,004,166	16.18%	87,526,585	15.84%	73,830,964	**2013**
3.36%	128,167,748	3.47%	90,566,930	-1.54%	72,692,448	**2014**
-5.38%	121,272,998	-6.67%	84,527,272	-4.24%	69,613,150	**2015**
-0.36%	120,831,363	7.03%	90,466,370	8.49%	75,523,952	**2016**
2.68%	124,069,026	2.64%	92,857,047	1.94%	76,986,584	**2017**
18.00%	146,405,257	2.73%	95,390,725	1.09%	77,828,984	**2018**

0.73%	147,467,846	8.44%	103,441,131	11.49%	86,771,000	**2019**
9.59%	161,615,294	15.92%	119,906,260	19.11%	103,353,556	**2020**

Source: coffeeKIraqi Central Bank, annual statistical group, for different years (2003-2020)

secondly:Gross domestic productat pricesfirmware:between table (2) that the gross domestic productat pricesThe constant (700=100) during the period (2003-2016) sDrIt achieved an increase, but with fluctuating growth rates (53.44%) (1.75%) (5.60%) (1.91%) (7.49).%)(4.05%) (6.47%) (7.51%) (13.94%) (7.63%) (2.26%) (2.61%)(13.79%), respectively, as a result of the remarkable improvement in the internal factors represented by the improvement in security conditions, in addition to external factors and the rise in oil prices in global markets, which contributed to pushing growth indicators forward. As for the year (2017), the GDP witnessedat pricesRelatively declining and with a negative growth rate (-1.82%) due to the decline in the contribution of some economic activities, in addition to the fiscal policies taken by the state to finance spendingto reAges in the regionsliberated,During (2018-2019), the GDP increasedat pricesFixed due to increased oil exports and increased contribution to GDP. As for the year (2020) achievedGDP growth rateat pricesThe constant growth rate is negative (-11.18%), which is due to the decline in oil revenues as a result of the outbreak of a pandemiccorona,This had a significant impact on the gross domestic productTotal. soKWhoever follows the path of the GDP, we note that it is affected by the local and external shocks that Iraq and the world are exposed to as a result of the dependence of the growth of the output on one sector, which is oil, which is hostage to the variables that the world and the country are going through, and that this imbalance has been sustainable in its content for decades, and we did not notice an effective strategy for the advancement of the country, Today, Iraq urgently needs to accelerate the adoption of the policy of economic diversification and the method of participation between the public and private sectors as a strategic option during the current stage to overcome the problem of insufficient government allocations and address the inefficiency of performance in the implementation of development projects. (Ali, 300, 2021).

Table No. (2)

The GDP index at current and constant prices in Iraq for the period (2003-2020)

growth rate forGDP at constant prices %	GDP at constant prices	the year
.....	66,335,848	**2003**
53.44%	101,788,449	**2004**
1.75%	103,568,449	**2005**
5.60%	109,368,369	**2006**

1.91%	111,455,813	**2007**
7.49%	119,802,041	**2008**
4.05%	124,659,542	**2009**
6.47%	132,731,012	**2010**
7.51%	142,700,217	**2011**
13.94%	162,587,533.1	**2012**
7.63%	174,990,175.0	**2013**
2.26%	178,951,406.9	**2014**
2.61%	183,616,252.1	**2015**
13.79%	208,932,109.7	**2016**
-1.82%	205,130,066.9	**2017**
2.63%	210,532,887.2	**2018**
0.60%	211,789,774.7	**2019**
-11.18%	188,122,265.8	**2020**

Source:Column Ministry of Planning, accountsnationalism,Annual Statistical Bulletinse, for years mKhturn

* The percentage was extracted by the researcher

the hubThird: measureEffectMoney supply in economic growth

Statistical software will be usedEViews 12 to analyze the impact of the money supply (M1, M2, M3) on economic growth (represented by gross domestic product).at pricesfixed)

First: a description of the variables used in the measurement

Here, the independent and dependent variables must be identified. The following is a description of the variables included in the model:

1- The dependent variable:NGDPGross domestic product at constant prices expressing economic growth.

2- Independent Variables:

-M1The money supply in the narrow sense.

-M2The money supply in the broad sense.

-M3Money supply in the broadest sense.

After defining the dependent and independent variables, we can formulate the following functional relationships for the model variables

Second: Estimating the relationship between the components of the money supply(M1,M2,M3)and GDP at constant prices

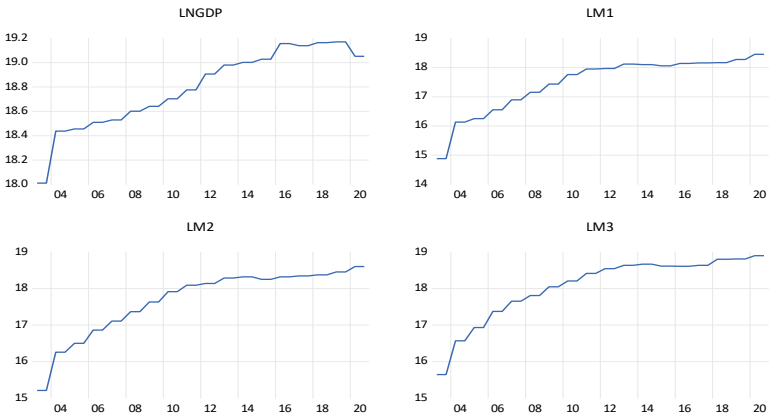
The stability of the time series of the data of the variables used must be ensured before starting to estimate the modelAnd its use in analysis and prediction in the study where the logarithmic formula was used because it is more suitable for the study data and its fluctuations and instability to make sure oftheir levels,As this is a prerequisite for the correctness of the analysis, estimation, orForecasting.(Sheikhi, 195, 2011)And as in the following equations:

And that this model uses semi-annual data in estimating the relationship between the components of the money supply and the GDP at constant prices.

1. Graph of the time-series dormancy test:

Figure (1) shows the instability of these variables(LNGDP,LM1,LM2,LM3)The problem of instability of time series must be addressed by taking the first differences for it, as the unit root is used as follows:

Figure (1) The results of the silence test



Source: Prepared by the researcher based on program outputs(EViews 12)

2Sleep test results Stationarity

Unit wall tests were used to find out if the variables were static or not, and to identify the degree of integration of the economic variables.(ADF)To find out the extent of the inactivity of the variables under study, the results were as follows:

Table (3) Results of unit root test according to Dickey-Fuller testADF

degree of integration	ADFtest					Series
	When the first difference		at level			
	Prob.*	t-Statistic	Prob.*	t-Statistic		
I(0)	-	-	0.06944**	2.793840-	fixed limit only	LNGDP
	-	-	0.0322*	3.750726-	jumpy limitTand general direction	
	-	-	0.9901	2.105717	without a bouncy limitTand general direction	
I(1)	0.0000*	7.338383-	0.11026	2.602469-	fixed limit only	LM1
	0.0000*	7.364239-	0.4604	2.221100-	jumpy limitTand general direction	
	0.0000*	6.420186-	0.9972	2.641249	without a bouncy limitTand general direction	
I(1)	0.0000*	6.368526-	0.0541	2.916947-	fixed limit only	LM2
	0.0001*	6.296784-	0.6625	1.839501-	jumpy limitTand general direction	
	0.0000*	5.705199-	0.9952	2.417331	without a bouncy	

					limitTand general direction	
I(0)	-	-	0.0003*	5.141864-	fixed limit only	LM3
	-	-	0.0026*	4.958804-	jumpy limitTand general direction	
	-	-	0.9802*	1.794503	without a bouncy limitTand general direction	

*at the 5% level

**At level 10

The source was prepared by the researcher based on the outputs (EViews 12)

Table (3) shows the presence of a unit root in the time series of variables (LM1,LM2(at its original level, which means that the null hypothesis is accepted)H°:b=0) which states after the time-series inactivityWhereProbIt was greater than 5% at its original level, and after taking the first difference to it, the time series became static as the value ofProbLess than 5%, so it is considered a first-class integratedI(1)As for the time series (LM3,LGDPIt was static at the level and did not containyon the unit root where the null hypothesis is rejected and the alternative hypothesis is accepted (H°:b=0) so it is considered an integral of degree zeroI(0).

3-Determining the duration of slowdowny:

I showedtests results (HQ, AIC, SC) that was usedTo determineThe optimal deceleration period that achieves the best estimate for a model in the table (4), that period is the periodthe fourthtotochangedshe saw, because its value is the lowest compared to the rest of the values in the testsTherefore, that period will be adopted in the estimation of this model, which meansythat modelvectorsCorrection of the error that will be used to reveal the direction of the relationship between the variablesatThe place of study will include a slowdown period(4) .

Table (4) the optimal deceleration period

Lag	Log	LR	FPE	AIC	SC	HQ
0	128.1694	NA	NA	-7.760590	-7.577373	**-7.699859**
1	229.8029	171.5065	171.5065	-13.11268	-12.19660	**-12.80903**

2	255.6098	37.09730	37.09730	-13.72561	-12.07666	**-13.17903**
3	272.9475	20.58860	20.58860	-13.80922	-11.42740	**-13.01971**
4	323.6215	*47,50684	*47,50684	-15.97634*	-12.8665*	**-14.94391***

Source: Prepared by the researcher based on the outputs of (EViews 12)

4-Autoregressive model estimation of distributed deceleration (ARDL)

We note from Table (5) that the estimation was made by the autoregressive model of the distributed slowdown, and the best formula was (4,4,4,4), as shown in the following figure:

Table (5) Results of model estimationARDL

Variable	Coefficient	std. Error	t-Statistic	Prob*
LNGDP(-1)	0.057325	0.151445	0.378523	0.7122
LNGDP(-2)	0.388923	0.210231	1.849982	0.0913
LNGDP(-3)	-0.151846	0.192844	-0.787403	0.4477
LNGDP(-4)	-1.023418	0.374126	-2.735490	0.0194
LM1	-2.319721	0.839239	-2.764078	0.0184
LM1(-1)	-0.117324	0.268692	-0.436649	0.6708
LM1(-2)	-0.972114	0.574913	-1.690890	0.1190
LM1(-3)	-0.015198	0.244423	-0.062178	0.9515
LM1(-4)	-1.647779	0.419515	-3.927821	0.0024
LM2	2.827370	1.042154	2.713007	0.0202
LM2(-1)	0.070930	0.366931	0.193306	0.8502
LM2(-2)	1.053228	0.702246	1.499800	0.1618
LM2(-3)	0.075471	0.391822	0.192616	0.8508
LM2(-4)	2.814238	0.622081	4.523906	0.0009
LM3	0.079924	0.166025	0.481398	0.6397
LM3(-1)	-0.067473	0.194368	-0.347144	0.7350
LM3(-2)	-0.483028	0.236558	-2.049694	0.0650
LM3(-3)	-0.002095	0.137194	-0.015273	0.9881
LM3(-4)	-0.789444	0.179813	-4.390353	0.0011
C	22.60725	7.722893	2.927304	0.0138
@TREND	0.019527	0.010674	1.829373	0.0946
R-squared	0.996953	Mean dependent var		18.86382
Adjusted R-	0.991414	SD dependent var		0.253999

squared			
SEof regression	0.023535	Akaike info criterion	-4.415974
Sum squared resid	0.006093	Schwarz criterion	-3.454084
Log likely	91.65558	Hannan-Quinn criter.	-4.097135
F-statistic	179.9828	Durbin-Watson stat	1.565731
Porb(F-statistic)	0.0000000		

Sour

ce: Prepared by the researcher based on the outputs of (EViews 12)

5- Model quality tests: It includes two tests

A: Tests for the series of residuals(Residuals Diagnostics Test)

It is represented by the lack of autocorrelation test between errors and the test for the instability of variance as in the following table:

Table (6) Summary of the results of the detection of the quality of the estimated model

				TEST
Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags	F-statistic	0.346695	Prob. F(2,9)	0.7161
	Obs*R-squared	2.289031	Prob. Chi-Square(2)	0.3184
Heteroskedasticity Test: Breusch-Pagan-Godfrey Null hypothesis: Homoskedasticity	F-statistic	1.670834	Prob. F(20,11)	0.1916
	Obs*R-squared	24.07505	Prob. Chi-Square(20)	0.2391
	Scaled explained SS	2.09254	Prob. Chi-Square(20)	1.0000

Source: Prepared by the student based on the outputs (EViews 12)

nlaluck from the table (6) The estimated model is devoid of serial correlation, i.e. we accept the null hypothesis which states that there is no serial correlation between the residuals because the test valueF and Chi-Square are not significant at the level of significance 5%, and we reject the alternative hypothesis in the presence of the serial correlation and also that it is free from the problem of heterogeneity of variance because the statistical indicators also have a positive error.

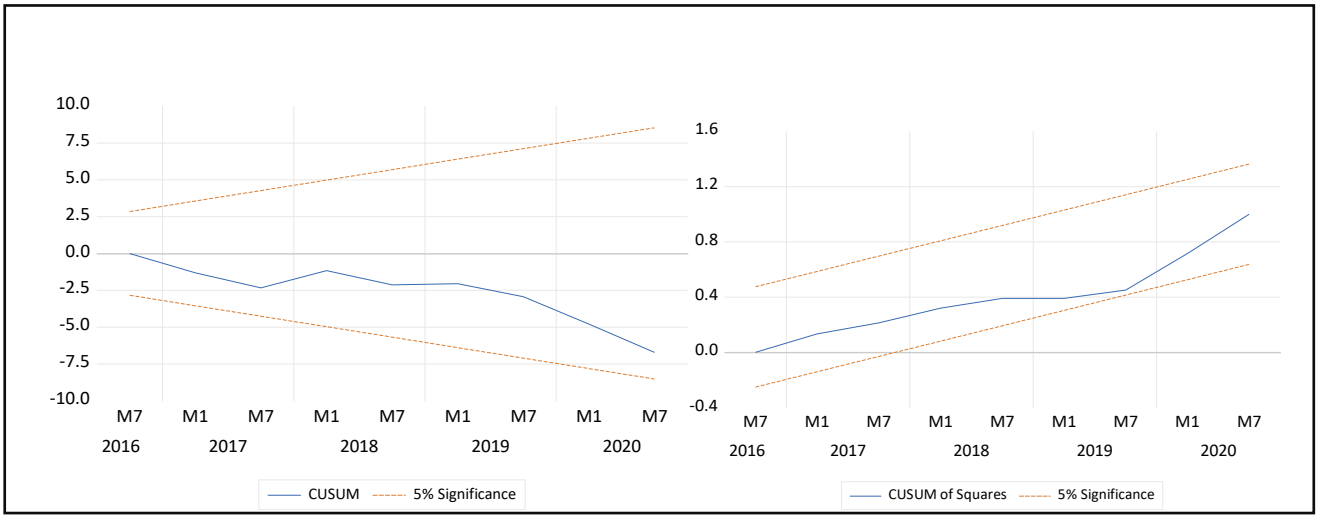
B: Model structural stability tests(Model structure Stationary Tests)

Two tests are conducted to ensure that the model data is free of any structural changes that may negatively affect the quality of the estimated model. Our current study relied on the use of the

cumulative sum test for residuals.(Gusum),The cumulative sum of the squares of the residuals test(Gusum of Squares)To test the stability of the estimated coefficients according to the modelARDL, if the similar line falls on each of theGusumAnd theGusumof SquaresBetween the two critical value terms, the null hypothesis will be accepted, and the model will be unstable

As we notice from the figure below for the two tests the static parameters in the short and long terms because the curve according to the two tests falls within the critical limits and varies around the zero value at the 5% level.

Figure (2) Test(Gusum of Squares)And the(Gusum)



Source: Prepared by the researcher based on the outputs of the 12 . programEViews

6- Border Test(Bound Test)

toTesting for the existence of a common complementarity, i.e. the existence of a long-run equilibrium relationship, by means of a boundary test (Bounds Test)By comparing the value ofF computed for the time-delayed coefficients of the independent variable with the critical F-statistic value, and the test is carried out based on the hypothesisnonwhich states that there is no long-run equilibrium relationship between the variables.

Table (7) Border Test Results

Test Statistic	Value	k
F-statistic	7.41111	3

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.47	4.45
5%	4.01	5.07
2.50%	4.52	5.62
1%	5.17	6.36

Source: Prepared by the researcher based on the outputs of (EViews 12)

note fromTheScheduleaboveStatistical value has been estimatedF-statistic for models with (7.411106) which leads to rejecting the null hypothesis that there is no long-term relationship that goes from the explanatory variables to the dependent variable and accepting the alternative hypothesis, which states that there is a long-term relationship at a level of 5% betweenlogarithmMMeaning of money supplythe narrowthe wideand the widerand GDP at pricesfixed, and this can be done by choosing the co-integration of the equilibrium relationship in the long runThere is a logical relationship between the dependent variable and the independent variables

6- Estimation of the error correction modelARDL Error Correction Model

The table below shows the results of the error correction vector between the GDP at constant prices and the components of the money supply

Table (8)ECM Regression

ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	std. Error	t-Statistic	Prob.
C	22.60725	3.640574	6.209803	0.0001
@TREND	0.019527	0.004530	4.311077	0.0012
D(LNGDP (-1))	0.786342	0.243145	3.234040	0.0080
D(LNGDP(-2))	1.175264	0.206898	5.680408	0.0001
D(LNGDP(-3))	1.023418	0.199719	5.124283	0.0003
D(LM1)	-2.319721	0.411349	-5.639307	0.0002
D(LM1(-1))	2.635091	0.463365	5.686861	0.0001
D(LM1(-2))	1.662976	0.233370	7.125930	0.0000

D(LM1(-3))	1.647779	0.253266	6.506114	0.0000
D(LM2)	2.827370	0.552524	5.117186	0.0003
D(LM2(-1))	-3.942938	0.643033	-6.131780	0.0001
D(LM2(-2))	-2.889709	0.374969	-7.706536	0.0000
D(LM2(-3))	-2.814238	0.419948	-6.701392	0.0000
D(LM3)	0.079924	0.122919	0.650217	0.5289
D(LM3(-1))	1.274567	0.225890	5.642417	0.0002
D(LM3(-2))	0.791540	0.126962	6.234454	0.0001
D(LM3(-3))	0.789444	0.143139	5.515236	0.0002
CointEq(-1)*	-1.729016	0.281488	-6.142415	0.0001

Source: Prepared by the student based on the outputs (EViews 12)

We note from table (8)The results showed that the correction parameterThe errorshe1.729- cointEq(-1)*= is negative and significant at 5% i.e. the condition for the value of the error correction coefficient is met, whichIt confirms the existence of a long-term equilibrium relationship, that is, there is a correction relationship from the short term to the long term at a speed of 172.9%.

8-short term relationship testKranger's causal test):

After making sure that there is a co-integration between the model variables, the Kranger causality test was adopted to reveal the existence of a causal relationship between the variables as follows:

Table (9) TestSasabi Kranger

Pairwise Granger Causality Tests
Date: 08/19/22 Time: 23:59
Sample: 2003S1 2020S2
Tags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
LM1 does not Granger Cause LNGDP	32	3.63744	0.0194
LNGDP does not Granger Cause LM1		2.58624	0.0638
LM2 does not Granger Cause LNGDP	32	4.55342	0.0074
LNGDP does not Granger Cause LM2		1.79535	0.1642

LM3 does not Granger Cause LNGDP	32	1.58123	0.2129
LNGDP does not Granger Cause LM3		0.7379	0.5757

The source was prepared by the researcher based on the outputs (EViews 12)

Table shows(9)The results of the causal relationship between the two variables used in the model using the Kranger method in the causal relationship test, where the hypothesis states(H:b=0)°There is no causal relationship between the variables used, but the hypothesisalternative(H1: b)≠ *0* It states that there is a causal relationship between the variables, and if the hypothesis is rejected (H0)This means that there is a causal relationship, but in the case of acceptance, it means that there is no causal relationship between the two variables, and the results showed

There is a one-way causal relationship from the narrow money supply to the GDP at constant prices, by comparing the value of(F)The calculated amount of (3.63744) with tabular values (0.0194) which is less than 5%, as it is clear that the alternative hypothesis is accepted and the null hypothesis rejected, and then there is a one-way relationship from the wasted money supply to the output, that is, the change in the narrow money supply affects the output.

As for the relationship between the broad money supply and the constant GDP, the results indicated that there is a causal relationship in one direction.(F)The calculated (4.55342) is greater than the tabular at the 5% level, meaning that the broad money supply affects the output and not the other way around.

As for the relationship between the broader money supply and the current GDP, the results indicated that there is no causal relationship between them, meaning that the broader money supply affects the output and vice versa.

9-long-term relationship testToda Yamamoto's causality testTooda Yamamoto test)

has been testedToda Yamamoto test in the long run to find out the trend of causation between the growth of outputGDPat pricesThefixedand showncash(M1,M2,M3),and to measuredirectionCausal relationship The appropriate deceleration periods were chosen, namely (4),The maximum degree of homogeneity of the variables taken into account is one (1). i.e. thatThe number of decelerations included in Toda Yamamoto's test is (1) periods.cameThe results are as follows:

Table (10)Toda Yamamoto's causality test

significant level 5%	p-value	Chi-sq	df	explanatory variables	dependent variable

lack of causation	0.0926	9.445579	5	LM1	**LNGDP**
existence of causation	0.0016	19.37464	5	LM2	
existence of causation	0.0084	15,52070	5	LM3	
lack of causation	0.2996	6.069044	5	LGDP	**LM1**
lack of causation	0.4141	5.014890	5	LM2	
lack of causation	0.2957	6.109402	5	LM3	
lack of causation	5.372882	0.3721	5	LGDP	**LM2**
lack of causation	7.233494	0.2038	5	LM1	
lack of causation	7.594641	0.1800	5	LM3	
lack of causation	0.4907	4.419381	5	LGDP	**LM3**
lack of causation	0.4027	5.109046	5	LM1	
lack of causation	0.4368	4.831167	5	LM2	

Source: Prepared by the student based on the outputs (EViews 12)

Through the results we note

The absence of a causal relationship between GDP at constant prices as a reactive variablepAnd the narrow money supply as an independent variable in the long run, as the above table shows insignificance and rejection of the null hypothesis as theLNGDPdon't swearBLM1At a significant level of 5%, and there is a causal relationship betweenGDP at constant prices as a TAP variablepThe money supply in the broadest senseLNGDPcursingBWhoeverLM2,LM3at a significant level of 5%.

-The absence of a causal relationship between the money supply in the narrow sense as a repentant variablepAnd gross domestic product at constant prices and money supply in the broadest and broadest

sense as independent variables in the long run, as the above table shows insignificance and rejection of the null hypothesis asLM1don't swearB(LNGDP,LM2,LM3) AboutDrSignificant level of 5%.

-The absence of a causal relationship between the money supply in the broad sense as a repentant variablepAnd gross domestic product at constant prices and money supply in the narrow and broader sense as independent variables in the long run, as the above table shows insignificance and rejection of the null hypothesis asLM2don't swearB(LNGDP,LM1,LM3) AboutDrSignificant level of 5%.

-The absence of a causal relationship between the money supply in the senseThe widest as a tab variablepAnd GDP at constant prices as an independent variable and the existence of a causal relationship between the broader money supply and the money supply in the narrow and broad sense as independent variables in the long term, as the above table shows insignificance and rejection of the null hypothesis, as theLM3don't swearB(LNGDP, LM2, LM1) AboutDrMoral level 5%.

Conclusions:

1- It is evident through the results of the stability test for the study variables according to the developed Dickey Fuller test that the two variables(LNGDP,M3)They are stable at their original level, so they are considered integrals of degree zero(M1,M2)They are not stable at the level, so the first difference was taken for them, and thus the two variables became stable and integrated of the first degree.

2- The results of the optimal deceleration period indicate that period (4) is the optimal period for time delays because its value is the lowest according to the tests(AIC,SC,HQ)So it was adopted in the model.

3- By estimating the model using the . methodology(ARDL)And conducting a boundary test, it was found that there is a co-integration relationship at the level of .(5%), which means that there is a long-term equilibrium relationship between the variables.

4- The error-correction model showed that the error-correction parameter was large, that is, when any shock occurs, it takes the GDP at constant prices 172.9 to reach the equilibrium position in the long run

5- The results of the Kranger test indicate the existence of a vector causal relationship from the money supply in the narrow sense to the output, the existence of a vector causal relationship from the broad money supply to the output, and the absence of a causal relationship between the broader money supply and the output.

Recommendations:

1-The monetary authority should use its efforts to control the growth of the money supply in line with the requirements of economic activity,and soIn proportion to the growth rates of domestic product in order to avoid excessive monetary issuance with no equivalent on the part of real production, in order to maintain monetary stability and raise economic growth rates, in addition to the necessity of

providing the necessary liquidity for the economy to reach the rates of this desired economic growth on the one hand, and from On the other hand, all highly qualified moral and human potentials must be harnessed and given the tasks of managing the various economic sectors.

2- Creating a developed and stable financial environment for the success of policy toolscash,and keep it up to date with developmentscurrent,As well as coordination between monetary policy and other economic policies to increase the degree of their effectiveness in influencing the volume of GDP.

3-Because of the great importance of relying on and using statistically superior methods in the processForecasting,We see the need for economic policy makers to obtain information about the nature of the relationship between money supply and economic growth in the short termand long,To find out the effectsand adopt appropriate and consistent policies to achieve the desired economic objectives.

Sources:

1-Ministry of Planning and Development Cooperation, Statistical Totals for the Years (2003-2020), BaghdadDr: Central Agency for Statistics and Information Technology.

2- Central Bank of Iraq, Al-NashraTannual for years(2003-2020), Baghdad, circulareStatistics and research

3- Ali, M.Dr..whatgenerous,2021, Standards of Economic Growth in Iraqfor a while2000-2012),Studies Journaleducational,Number 55.

4- Al-Mahi, MahmDr, 2010, Planning and Financing Development (Curriculums - Models - Application), 1st Edition, Orchard Al Maarifa Publishing, Egypt.

5- Al-Quraishi,Mr. Dr. Ali Hatem,2017, Economicsdevelopment, basinEuphratesNajaf,editionFirst.

6-Khushnaw, Prof. Dr. Sabah Saber Muhammad, 2019, Analyzing and measuring the causal relationship between money supply and GDP in Iraq for the period (1988-2018), Anbar University Journal of Economic and Administrative Sciences, Volume 11, Issue 26.

7-Al-Jubouri andothers,Mr. Dr. Mahdi SoheirJubouri,Mr. Dr. Kazem SaadAl-Araji, mM.Khudair Abbas Al-Waeli, 2017, Modeling and Analysis of Fiscal Policy in Iraq Using Autoregressive Modelto slow downdistributor(ARDL) (Autoregressive distributed lag model) for the period (1990–2015), Management Journaland economyVolume Six, Issue Twenty-One.

8-Shendi, Abdel-Khader, a. Dr.. Adeeb Qassem Shendi and Nagham Hamid Abdel-Khader, sizeRelationshipBetween the money supply and indicators of economic stability in Iraq for a period (1980-2014Al-Kout Journal of Economic and Administrative Sciences, No21,2016

9-Abdel Samad, Dr. Abdel Basset Abdel Samad, 2018, the role of money supply growth in the growth of the private sector in Algeria during the period 1990-2012 (a prospective study with Malaysia),

PhD thesis in the economics of finance and banking, Department of Economic Sciences, University M'hamed Bougara, Algeria.

10- Janabi, heytoAjami, 2014, Money, Banking and Monetary Theory, 2nd Edition, Wael Publishing House, Amman.

11-Khader, Taan, 2018, sizeand analysisThe relationship of money supply with some macroeconomic variables in Iraq for the period (2004-2016).

12-Lashmari, Shrouf, Nazim and Muhammad Musa, 2009, Introduction to Economics, Zahran Publishing House, Amman - Jordan.

13-Al-Fatlawi, Hussein Majid Thamer Al-Fatlawi, 2017, fiscal policy and its impact on the money supply in Iraq for the period (1990-2014), a master's thesis in economic altitude, Al-Qadisiyah University, College of Administration and Economics.

14- -weight andAl Rifai,Dr.. maternal uncleDrWassef andDr.. ahemDrHussein, 2007, Principles of Macroeconomics between Theory and Practice, Wael Publishing House, third edition, Amman.

15th-Al-Afandi, Muhammad Mahmoud Al-Afandi, 2012,principlesMacroeconomics, University Book House, Sana'a, second edition.

16- Dagher, Farhan, 2017, Monetary policy in Iraq through the analysis of the two gaps, Al-Kut Journal of Economics and Management issued by the College of Administration and Economics, Wasit University, No. 26.