The Relationship Between Financial Maturity (Financial Development) and the Effectiveness of Monetary Policy in Iraq (1990-2021)

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Abstract

The research aims to study the relationship between financial maturity (financial development) and the effectiveness of monetary policy in Iraq and the relationship between financial maturity and the development of Gross Domestic Product (GDP). The study utilized the annual data in the form of time series for the period from (1990 to 2021). The transmission channels were identified through the money supply, the Consumer Price Index, and the Gross Domestic Product. The local credit standard was also used as a percentage of GDP as an independent variable. The data was analyzed using the static model, where the results of the preliminary tests and reading the graphic character of the variables showed the possibility of applying the ARDL model after verifying the conditions of its use.

The test results showed a significant functional relationship between the Gross Domestic Product, the general level of consumer prices, and the broad money supply with financial maturity. This aligns with theoretical propositions that confirmed the validity of these relationships through measurement and estimation.

Keywords: *Financial Maturity, Monetary Policy, Gross Domestic Product (GDP).*

Introduction

The emergence of monetary policy dates back to the early 19th century by the Arab Scholar ibn Khaldun in his book (Al- Muqaddimah, 1377 AD), in which he presented an analysis of the nature of money and its relationship with the stability of the value of gold and silver. He also discussed the value of money and the speed of its circulation. As Al-Maqrizi (1405 AD), in his book, explained that an increase in issuing cash leads to a decrease in its purchasing power, and poor-quality currency could drive better-quality money out of circulation in the market, a concept later known as the Gresham's Law (1860 AD). In the classical economic school of thought, the role of monetary was limited to maintaining the money supply at a level that ensures price stability within the national economy. This view continued until the Great Depression (1929-1933) and the inadequacy of monetary policy to develop appropriate solutions with the emergence of Keynesian thought, which called for the necessity of state intervention by increasing government spending to stimulate aggregate demand within the economy, addressing economic recession and achieving the required economic growth.

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Economic studies have affirmed that the relationship between financial maturity (financial development) and the effectiveness of monetary policy can be traced back to the early works of researchers such as Goldsmith in 1955, Ash Demirgiic-Kunt and Ross Levin in 1969, and Shaw in 1973. They introduced the concept of financial maturity. Shaw (1973) defined it as an accumulation of financial assets at an accelerated pace, surpassing the accumulation of non-financial assets. The economic literature also encompassed various concepts about financial maturity (financial development). Researchers like Levine (1997, 2005) explained that the concept of financial maturity (financial development) involves the role of financial intermediaries and financial markets in reducing the costs of obtaining data and information, executing contracts, and completing transactions. This enables the financial system to fulfill its functions efficiently.

In 1955, Gold Smith proposed a set of financial maturity criteria, which are as follows:

1- Providing a banking apparatus with assets at least one-tenth of the national wealth.

2- The spread of joint-stock companies capable of issuing high-yield bonds that yield high-interest rates ranging between 5%-6% of the national income.

3- A high savings rate of at least 10% of the national income.

4- Undistributed profits constitute a fundamental and essential source of project financing.

Accordingly, the monetary policy, among the overall economic policies, aimed to develop the financial sector to achieve financial maturity (financial development) in the banking sector to enhance the effectiveness of the performance of the banking system and the financial sector in providing financial services and operations by efficiently utilizing the channels of monetary policy transmission.

Based on this, the objective of this research is to measure the extent of financial maturity (financial development) and, secondly, to assess the impact of the effectiveness of monetary policy in Iraq on financial maturity (financial development).

The theoretical framework for financial maturity:

In developing countries, monetary policy differs from that in developed countries. Developing countries are characterized by the underdevelopment of their financial and banking institutions. Their role primarily revolves around controlling the money issuance, which constitutes the most significant part of their monetary supply. Most changes in the money supply in these countries result from a new monetary issuance determined by the size of foreign assets and gold holdings with the monetary authority. Therefore, increases in the money supply tend to be rather specific, and their impact on financial maturity is limited.

In contrast, developed countries are characterized by the development of their financial and banking institutions. In their monetary policy, they rely on the role that banks play in creating bank money through credit extension, which is considered one of the indicators of financial maturity. An increase in bank credit as a percentage of the gross domestic product(GDP) indicates financial development. Therefore, the increase in bank money created by commercial banks contributes to achieving financial maturity (Al-Sayed Ali and Al-Issa, 2004, 418).

The relationship between inflation and financial maturity (financial development) is intertwined. Most studies have supported the idea of the negative impact of inflation on financial development. Therefore, price stability must be a fundamental condition for financial development. Moderate inflation has a negative impact on financial development, as high inflation rates lead to a decrease in the real rate of return for various financial assets and, thus, result in a reduction of the return on invested funds. This

prompts banks to reduce the volume of loans they grant, which negatively affects the ability of the financial sector to allocate credit efficiently. As a result, the size of invested capital decreases, leading to long-term implications for financial development.

Furthermore, the inflation rate rise affects financial development by imposing additional costs on banks to attract savings. This is in addition to the impact of the nominal interest rates controlled by regulatory laws. Consequently, high inflation rates, on the one hand, and low-interest rates, on the other hand, necessarily lead to a decrease in invested funds and, thus, a reduction of returns achieved by the central bank (Bittencourt, 2011,92) (Camilia, 2021, 572- 573).

Increases in GROSS DOMESTIC PRODUCT (GPD) result from innovation and investment, which play a fundamental role in achieving financial development. An increase in investment spending leads to double increases in gross domestic product, which is determined by the size of credit provided by banks. Therefore, an increase in credit as a percentage of GDP (which is one of the indicators of financial maturity) contributes to increased financial maturity, the relationship between GDP and financial maturity (financial development), and the term innovation may be attributed to the Austrian economist Schumpeter (1912) who was the first to define it, where Creativity is defined as the result of applying a new method or technique in production, as well as a change in all elements of the product or how it is designed (Abdul Rahman, 2008,148).

There are five cases of innovation as highlighted by (Abdul Rahman, 2008, 150_149), (Şener, Sarıdoğan, 2011, 816) and (Mir, 2020, 318) :

1- Producing a new product or offering the same product but with a higher quality

2- A new production method that has not been used before is implemented in the Production Department to benefit from it in increasing productivity.

3- Opening new markets by allowing the Production Department to enter markets previously inaccessible.

4- Using new sources for raw materials.

5- Establishing a new institution (such as the case of a monopoly)

Schumpeter (1912) emphasized that a country with a developed financial system can promote economic expansion by encouraging technological change and innovation of products and services. This, in turn, leads to increased demand for financial arrangements and services. The response of banking institutions to these changes will stimulate higher economic growth, indicating a positive relationship between financial development and economic growth, which is one of the objectives of monetary policy (Durusu-ciftci et al,2017,5)(Aenisan Akinlo & Olufisayo Akinlo, 2017,3).

The Econometric and Empirical Study

First: Data and Variables

The research data for Iraq for the period (1991-2021) was obtained through Central Iraqi Bank and the World Bank website, and it includes financial maturity as a dependent variable which represents the ratio of monetary credit to GDP at current prices, the first independent variable is GDP at current prices, the second independent variable is the ratio of inflation to GDP, while the third independent variable is the ratio of broad money to GDP. Table (1) presents the evolution of data for these variables during the period (1990-2021).

Table (1): Evolution of research variables during the period (1990-2021)

Years	Monetary Credit (million IQ)	GDP (million IQ)	Financial Maturity (%)	M2 (% of GDP)	Inflation (% of GDP)
1990	131	55,926.50	0.0023	108.846	73.645
1991	345	42,451.60	0.0081	165.371	111.126
1992	425	115,108.40	0.0037	113.201	104.501
1993	1,000	321,646.90	0.0031	94.247	114.468
1994	2,348	1,658,325.80	0.0014	44.619	396.438
1995	6,101	6,695,482.90	0.0009	39.378	295.368
1996	4,222	6,500,924.60	0.0006	4.516	-12.544
1997	10,827	1,509,314.40	0.0072	40.776	91.499
1998	18,859	17,125,847.50	0.0011	38.420	-15.861
1999	67,008	34,464,012.60	0.0019	30.986	71.148
2000	170,004	50,213,699.90	0.0034	4.812	24.612
2001	243,821	41,314,568.50	0.0059	6.794	-19.147
2002	312,200	41,022,927.40	0.0076	9.441	8.162
2003	396,418	29,585,788.60	0.0134	23.503	13.859
2004	622,476	53,235,358.70	0.0117	23.019	17.312
2005	950,287	73,533,598.60	0.0129	19.969	35.858
2006	1,881,014	95,587,954.80	0.0197	22.053	23.045
2007	2,387,433	111,455,813.40	0.0214	24.185	14.442
2008	3,978,301	157,026,061.60	0.0253	22.238	30.175
2009	4,459,434	130,643,200.40	0.0341	34.780	-19.521
2010	5,097,350	162,064,565.50	0.0315	37.261	16.587
2011	6,075,505	217,327,107.40	0.0280	33.212	24.689
2012	8,851,134.50	254,225,490.70	0.0348	29.685	2.670
2013	10,061,830.42	272,587,529.20	0.0369	32.048	-0.012
2014	10,640,483.67	266,332,655.10	0.0400	34.054	-2.843
2015	10,266,252.92	194,680,971.80	0.0527	42.426	-30.200
2016	10,537,642.92	196,924,141.70	0.0535	44.729	-11.104
2017	11,416,234.00	221,665,709.50	0.0515	40.350	14.650
2018	12,889,941.92	268,918,874.00	0.0479	34.063	18.204
2019	12,979,061.67	276,157,867.60	0.0470	35.799	-2.674
2020	16,128,898.67	219,768,798.40	0.0734	51.320	-10.256
2021	19,268,041.50	301,439,533.90	0.0639	46.406	33.448

Source:

1. Central Bank of Iraq, General Directorate of Statistics and Research, Annual Bulletins for the years 2003-2022.

2. World Bank, www.data.albankaldawli.org

1. Financial Maturity (FM):

The monetary credit witnessed an increase throughout the research period, and this indicates an increase in the relative importance of the role of government banks in granting credit with the decline in the importance of private banks as a result of the security situation and the banking sector's fear of problems of defaulting on credit repayment, in addition to the Central Bank's policies in expanding the granting of loans and advances, and this means that the banking system contributes significantly to generating the money supply by employing its existing deposits to grant credit to individuals, and thus the money supply will increase significantly (Al-Fahdawi & Al-Dulaimi, 2022, 286).

It also appears from table (1) and figure (1) that both monetary credit and GDP are moving in the same direction with time, and there is a very strong positive relationship between them, as the correlation coefficient reached (0.93), which is close to one, and this means that monetary credit will be very sensitive to any change in the GDP, and the financial maturity curve, which represents the monetary credit ratio to the GDP, takes a shape close to the shape of the GDP curve, and this is what figure (1) shows. It also appears from the table and figure that the financial maturity is increasing in a fluctuating manner throughout the period of the research, which reflects the turmoil of the economic environment and the fear of banks in many cases to finance economic activities due to the conditions of economic and security instability that Iraq witnessed throughout the mentioned period. In (2019) there was a slowdown in the growth of monetary credit and, consequently, in the financial maturity due to the impact of the Corona pandemic, which affected all global economies (Hassan, 2022, 115).
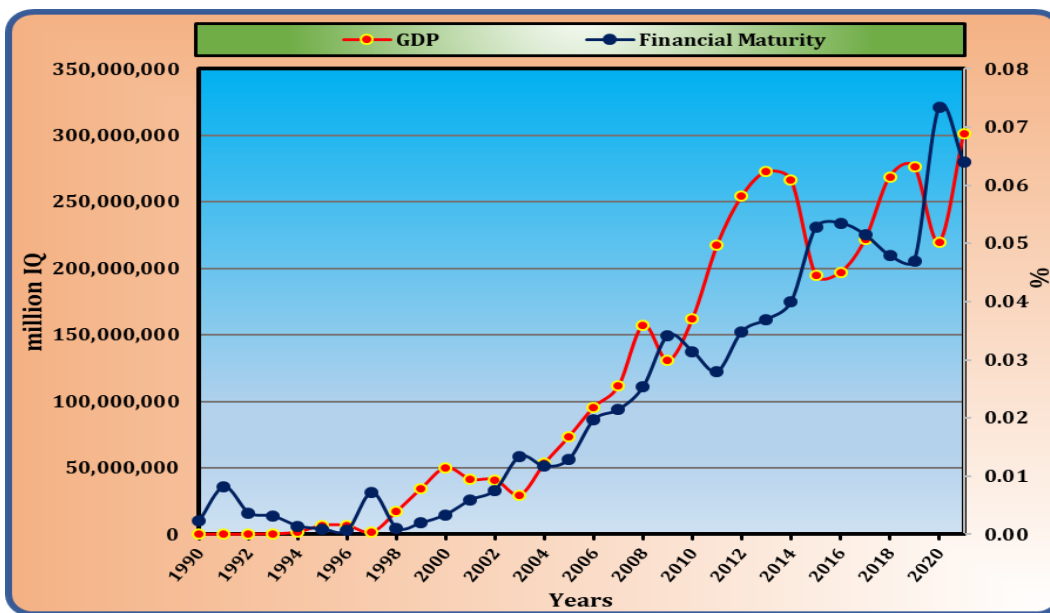

Figure (1). Evolution of GDP and financial maturity for Iraq during (1990-2021)

2. Gross Domestic Production (GDP):

From table (1) it can be noted that the GDP, which was recorded in (1990), amounted to (55,926.5) million Iraqi dinars, to rise after that to (6,695,482.9) million dinars in (1995), to decline sharply in (1997) to (1,509,314.4) million dinars, achieving a growth rate of (-77.4%), then it rises to (50,213,699.9) in (2000), then the GDP fluctuates to reach (301,439,533.9) in (2021), and this fluctuation is due to several reasons, including the second Gulf War and the economic blockade that was imposed on Iraq, as well as the entry of US forces into Iraq and the fall of the regime Governor General in (2003) as well as fluctuations in world oil prices. It is also noted that the GDP was exposed to economic

shocks as a result of the rentier nature of the Iraqi economy, which depends on crude oil exports, which are prone to decline and rise due to demand, supply and price setting.

3. Broad Money Supply (M2):

The money supply is one of the basic monetary factors that have a fundamental role in influencing the economic variables. During the period (1990-2021), the Iraqi economy witnessed difficult conditions, including wars and economic sanctions, which forced the monetary authorities at the time to resort to issuing new cash and increasing the money supply, which exacerbated the phenomenon of inflation. It is clear from table (1) and figure (3) that the indicator of the ratio of the broad money supply to the GDP witnessed a significant increase between the years (1990 and 1991), as it increased from (108.846%) to (165.371), achieving a growth rate of (51.9%). Then the index took a significant decline to reach its lowest percentage during the study period (4.516%) with a growth rate of (-97.3%) from the year (1991). This was followed by a period of large fluctuations in the index values between (1996) and (2000). As for the period (2001-2021), the ratio of the broad money supply to the GDP witnessed continuous increases accompanied by some fluctuations, bringing the ratio to (46.406%) in (2021). This wide increase does not reflect a real increase in the money supply, but rather it is apparent. Its real origin is a significant rise in the general level of prices and the exposure of the Iraqi economy to waves of mass inflation (Central Bank of Iraq, 2012, 4).

4. Inflation Rate:

The large discrepancy between money supply and GDP was reflected in large increases in inflation rates, especially during the period (1990-1995). In (1996) the inflation index (% of GDP) dropped dramatically to (-12.544%) after the Memorandum of Understanding was concluded allowing Iraq to export oil within the limits of food and medicine. While the index values witnessed a clear fluctuation between rise and fall in subsequent years, until it reached)33.448%(in)2021(. Through table (1) and figure (3), it is clear that there is a negative relationship between the inflation rate (% of GDP) and financial maturity, so it is expected that the sign of this variable coefficient will be negative when estimating the financial maturity model.
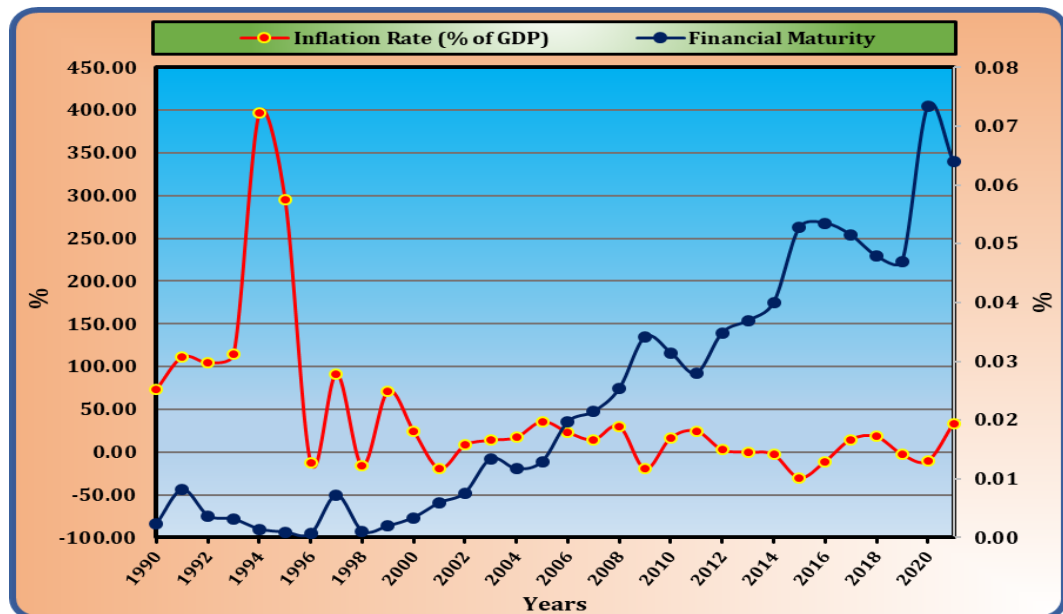

Figure (3). The evolution of the inflation rate (% of GDP) for Iraq during (1990-2021)

Table (2) presents the most important descriptive statistics of the research variables.

Table (2). Descriptive statistics of research variables for the period (1990-2021)

Variable	Code	Min	Max	Mean	STD
Financial Maturity	FM	0.00065	0.07339	0.02334	0.02138
Gross Domestic Production	GDP	42,452	301,439,534	115,756,289	104,286,934
Inflation Rate	INF	-30.20	396.44	44.12	89.14
Broad Money Supply	M2	4.52	165.37	41.64	33.93

Source: Eviews-12 output based on research data

Table (2) summarizes the most important descriptive statistics related to the variables of the financial maturity model in Iraq, the results indicate that:

☐ The average financial maturity was (2.33%) with a standard deviation of (2.138%) during the research period (1990-2021), which is a very low percentage that clearly indicates a weak contribution of the banking sector in financing the development process when compared to other countries, it is very far from posing a threat to financial stability in Iraq. The minimum financial maturity value for the year (1996) was (0.065%), while the year (2020) witnessed the maximum financial maturity value, which reached (7.34%).

☐ With regard to the GDP, it averaged during the study period (115,756,289) million dinars with a standard deviation (104,286,934) million dinars, the highest GDP in (2021) was recorded by (301,439,534) million dinars, while the lowest GDP was in (1991) at (42,452) million dinars.

☐ The average of inflation rates as a ratio to GDP was (44.12%) with a standard deviation of (89.14%) during the research period (1990-2021). The highest ratio was about (396.14%) in the year (1994), while the lowest ratio was in (2015) at (-30.20%).

☐ The average of broad money supply as a ratio to GDP was (41.64%) with a standard deviation of (33.93%) during the research period, where the highest ratio was (165.37%) in the year (1991), while the lowest ratio was in (2000) at (4.52%).

Second: The Model

Based on the research hypothesis, financial maturity will be a function of the GDP, the inflation rate, and the broad money supply. Therefore, the following model will be estimated:

$$MR_t = F(GDP_t, INF_t, M2_t)$$

$$MR_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 INF_t + \alpha_3 M2_t + U_t \quad ; t = 1,2,\dots,n ; n=32 \quad \dots\dots\dots(1)$$

To avoid the heterogeneity of variance problem in the model due to the presence of a large discrepancy in the values of financial maturity on the one hand, and to achieve stationarity in the variable on the other hand, the natural logarithm of this variable was taken, and thus the model (1) becomes:

$$Log(MR_t) = \alpha_0 + \alpha_1 GDP_t + \alpha_2 INF_t + \alpha_3 M2_t + U_t \quad \dots\dots\dots(2)$$

The expression of financial maturity values in terms of the natural logarithm was not new, as some studies used this approach, such as the study of (Abuka et al., 2019) and the study (Ademokoya et al., 2020) that dealt with monetary credit in terms of the natural logarithm and not the actual values.

Third: Results and Discussion

1- Stationarity test of the variables

Testing the stationarity of time series for model variables is the first step in estimating time series and panel data models. This requires the unit root test. Despite the many unit

root tests, the most important and common one is the Augmented Dickey Fuller test (ADF), the null hypothesis in this test states that the time series data of the variable includes the unit root, i.e. it is not stationary, while the alternative hypothesis indicates that the time series is stationary (Gujarati & Porter, 2009: 748). Table (3) presents the results of ADF test for financial maturity model.

Table (3) ADF Results of unit root test for model variables

Variables	Level		First Difference		Stationarity Degree
	Intercept	Trend & Intercept	Intercept	Trend & Intercept	
Log(FM)	-4.7053*** (0.001)	-3.4154* (0.073)	___	___	0
GDP	-0.1337[n.s] (0.937)	-2.6399[n.s] (0.267)	-4.9595*** (0.000)	-4.9800*** (0.000)	1
INF	-2.9874** (0.047)	-3.7095** (0.037)	___	___	0
M2	-1.2883[n.s] (0.618)	-4.2648** (0.011)	-3.7714*** (0.009)	-4.8872*** (0.003)	1
*** **significant at 1% level** ** **significant at 5% level** * **significant at 10% level** **n.s not significant** **( ) stands for P-value**					

Source: Eviews-12 output based on research data

It is clear from the results of table (3) that the probability value of the (ADF) test for the time series of the variables (Log(MR) and INF) in both cases (intercept and trend and intercept) together at level was less than the significance level (10%) and so the null hypothesis is rejected, which indicates that the time series of these two variables do not contain a unit root, and therefore they are considered stationary at the level. While the probability value of testing the time series for the two variables (GDP and M2) at the level was greater than (10%), meaning that these series are not stationary and contain the unit root, but when taking the first differences they become stationary, therefore, these variables will be entered of their first differences in model (2), noting that the first difference form for each of them is:

$$\Delta GDP_t = GDP_t - GDP_{t-1} \quad \text{and} \quad \Delta M2_t = M2_t - M2_{t-1} \quad \ldots\ldots\ldots.(3)$$

So, equation (2) becomes:

$$Log(MR_t) = \alpha_0 + \alpha_1 \Delta GDP_t + \alpha_2 INF_t + \alpha_3 \Delta M2_t + U_t \quad \ldots\ldots\ldots.(4)$$

substituting (3) into (4) and rename the parameters, we get:

$$Log(MR_t) = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_{t-1} + \beta_3 INF_t + \beta_4 M2_t + \beta_5 M2_{t-1} + U_t \quad \ldots.(5)$$

2-   Model estimation

Model (3) was estimated using the ordinary least squares (OLS) method, and the results are as shown in table (4).

Table (4). The results of estimating financial maturity model

ARDL Long Run Form
Dependent Variable: Log(FM$_t$)
Method: Least Squares
Sample: 1990 2021
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP$_t$	3.06E-09	3.99E-10	7.67909**	0.000
GDP$_{t-1}$	1.52E-09	9.49E-10	1.604528[n.s]	0.121
INF$_t$	-0.000808	0.000308	-2.61877*	0.014
M2$_t$	0.008300	0.001467	5.65583**	0.000
M2$_{t-1}$	-0.006829	0.002709	-2.52057*	0.018
C	-2.446605	0.173078	-14.1358**	0.000
R-squared	0.8280		F-Stat.	24.0739**
Adjusted R-squared	0.7936		Sig. (F-Stat)	0.000

**   significant at 1% level
*   significant at 5% level
n.s not significant

Source: Eviews-12 output based on research data

The results of table (4) show the following:

•   GDP has a positive and very weak significant effect on the financial maturity of Iraq, as an increase in GDP by one million dinars corresponds to an increase in financial maturity by (0.00000003%). The increase in GDP boost up the general peoples earning, which leads to higher domestic deposits, hence increase the liquidity of banks and they can lend more for investment needs. So GDP has a positive association with the growth of bank credit to private sector and then financial maturity (Imran & Nishat, 2012).

•   Inflation significantly and negatively affects the financial maturity of Iraq, when the inflation rate increases (1%), the financial maturity will decline by (0.081%). The high rate of inflation leads to an increase in the cost of maintaining liquid cash balances, which leads to individuals and projects converting money into real commodities, which leads to a decrease in the money supply ratio to the GDP and thus harms the performance of the banking sector through a decrease in monetary credit. The high rate of inflation also affects financial maturity through banks incurring additional costs in order to attract savings, in addition to affecting the nominal interest rates that are controlled by regulatory laws, and thus necessarily leads to a decrease in the invested funds and thus a decrease in the returns achieved by the bank (Dzturk & Karagoz, 2012: 82).

•   The broad money supply has a positive significant effect on the financial maturity of Iraq, when the money supply increases (1%), the financial maturity will increase by (0.83%). While the broad money supply in the previous year had a significant negative impact on financial maturity in the current year by (0.683%). This implies that more effort to bring an increment to the amount of money in circulation will result to an increment in monetary credit creation and then financial maturity in Iraq. This is consistent with the economic theory, especially that the increase in the monetary mass leads to an increase in liquidity in banks, and thus increases the ability of banks to grant loans, and this is reflected in an increase in monetary credit and then financial maturity.

3-   Diagnostic checking of estimated model

Table (5) below shows the results of the diagnostic tests of the financial maturity model, including the normal distribution test for the model's residuals or errors, the

autocorrelation test of the model's residuals, in addition to the heterogeneity test of the residual variance.

Table (5). Diagnostic tests' Results of the financial maturity model

Test		Statistic	Value	Prob.
Normality	Jarque-Bera	Jarque-Bera	$3.2852^{n.s}$	0.193
Autocorrelation	Breusch- Godfrey	F-Statistic	$2.6370^{n.s}$	0.075
		Chi-Square	$8.1990^{n.s}$	0.052
Heteroskedasticity	ARCH	F-statistic	$0.3209^{n.s}$	0.576
		Chi-Square	$0.3399^{n.s}$	0.560
n.s not significant				

Source: Eviews-12 output based on research data

It can be seen from table (5) and figure (4) that the probability value of the Jarque-Bera test for the model is (0.193), which is greater than the significance level (5%), which means that the test is not significant, i.e the residuals generated from the model follow a normal distribution (Jarque & Bera, 1980: 257).

Table (5) also shows that the residuals of the estimated econometric model are not correlated with each other based on the Breusch-Godfrey autocorrelation test, where the probability value of the (F) and (χ^2) tests were greater than (5%) (Breusch, 1978: 343).

With regard to detecting the problem of heteroscedasticity among the model's residuals, the Autoregressive Conditional Heteroscedasticity (ARCH) test was used, which relies on the regression procedure of the squared residuals resulting from the model in the period (t) as a dependent variable on the residual square in the period (t-1) as an independent variable, and in order for the residual variance to be homogeneous, there must be no significant effect by the independent variable on the dependent variable, then the (F) statistic is calculated as well as the chi-square statistic (χ^2) by multiplying the number of observations by the coefficient of determination for this the model, the probability value of the two tests, respectively, was (0.567 and 0.560), which are greater than the significance level (5%), which indicates that the residuals generated by the estimated financial maturity model are of homogeneous variance (Engle, 1982: 987).
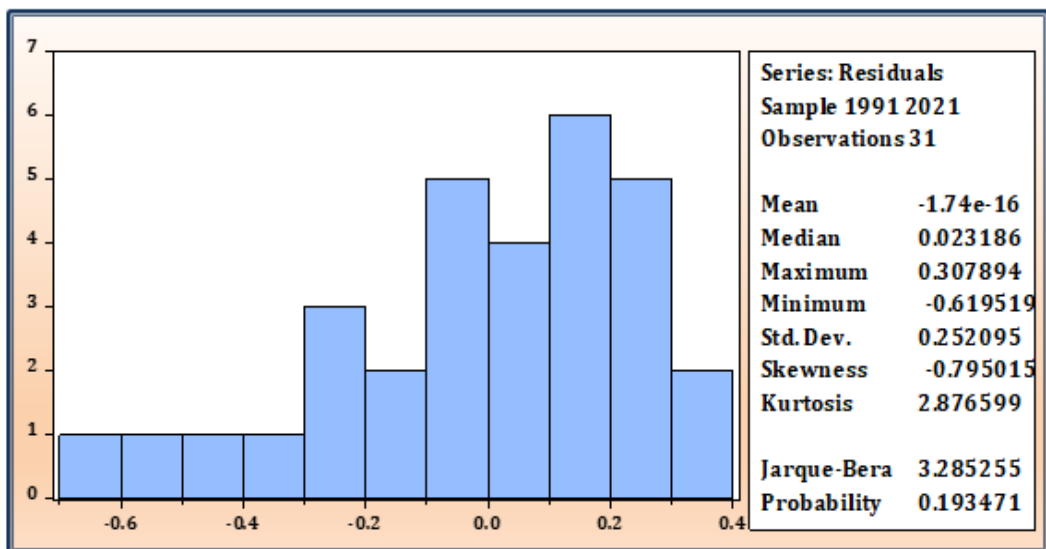

Figure (4). Normal distribution of model residuals

As for testing the multicollinearity problem between the independent variables, the Kline test is used, which is based on comparing the coefficient of determination of the estimated model with the square of the simple correlation coefficient between each two independent variables. If the coefficient of determination is greater than the square of the simple correlation coefficient between any two independent variables, then the estimated model does not include the multicollinearity problem (Kline, 1962: 64). Based on this test, when comparing the coefficient for determining financial maturity, whose value is given in table (4) which is (83%), with the squares of the correlation coefficients in the matrix presented in table (6) below, we find the coefficient of determination is greater than all squares of simple correlation coefficients, and this indicates that the financial maturity model is free from the multicollinearity problem.

Table (6). Correlations matrix among model variables

	$Log(FM_t)$	$\Delta(GDP_t)$	INF_t	$\Delta(M2_t)$
$Log(FM_t)$	1.000	0.074	-0.533	0.414
$\Delta(GDP_t)$		1.000	0.030	-0.183
INF_t			1.000	-0.327
$\Delta(M2_t)$				1.000

Source: Eviews-12 output based on research data

To ensure the stability of the model and the absence of any structural changes in the data used in its estimation, the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUM of squares) tests are applied. Figure (5) presents the test results for the financial maturity model, it is clear from the figure that all the values of the CUSUM and CUSUM of Squares functions are lies within a confidence interval (95%), therefore the estimated model is stable over the entire time period and there are no structural discontinuities (Galpin & Hawkins, 1984: 101).
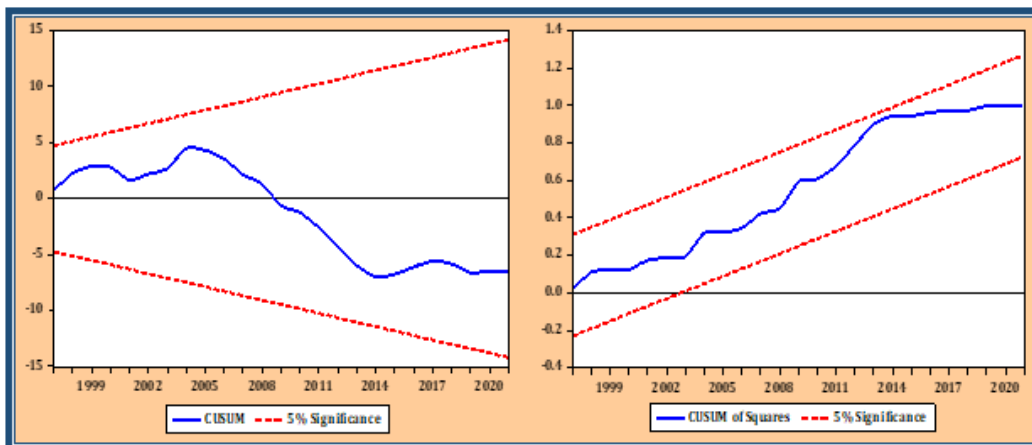

Figure (5). CUSUM and CUSUM of Squares functions of the financial maturity model

Figure (6) shows the model's estimated representation of the study's data to a large extent, as it shows the large convergence between the curve of the actual values of financial maturity, which is expressed in red, and the curve of fitted values through the model, which is expressed in green. The figure also shows the curve of the residuals or errors resulting from the model (the difference between the actual and fitted values) expressed in blue, as the range of these errors is relatively narrow and confined between the lowest error (-0.62) for the year (1998) and the largest error (0.31) for the year (2006).
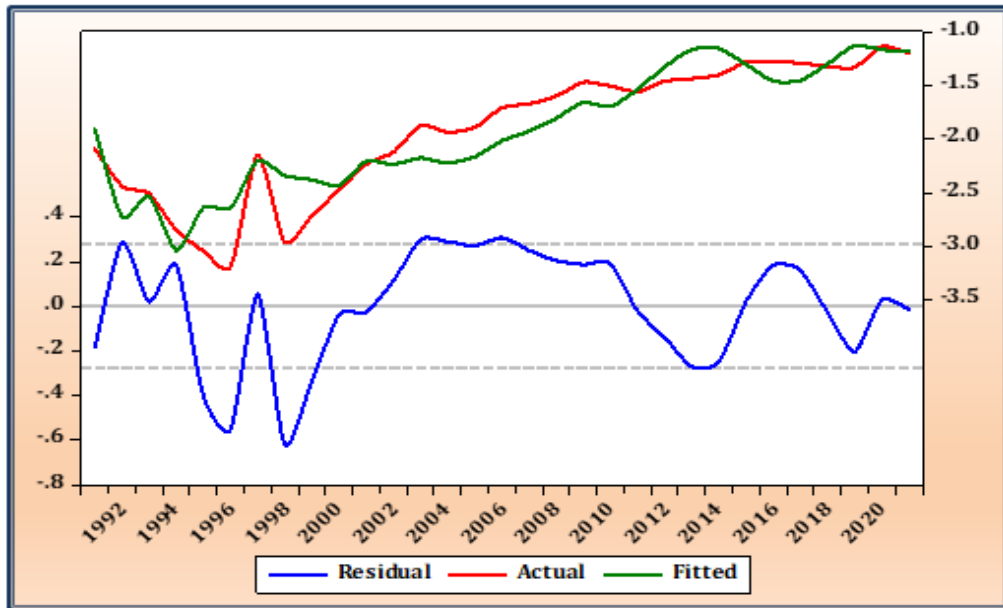
Figure (6). Actual and fitted financial maturity by model, and residuals

The predictions of the estimated financial maturity model were evaluated through a set of criteria such as: the square root of the mean squared error (RMSE), the mean absolute value of the error (MAE), and Theil Inequality Coefficient., Bias Proportion., Variance Proportion., Covariance Proportion., and Theil U2 Coefficient., where the values of all these criteria were acceptable and relatively low as shown in figure (7), especially those criteria related to the part of the bias between the actual and predicted values of financial maturity, which was very close to zero, indicates the efficiency and accuracy of the financial maturity predictions given by the estimated econometric model.
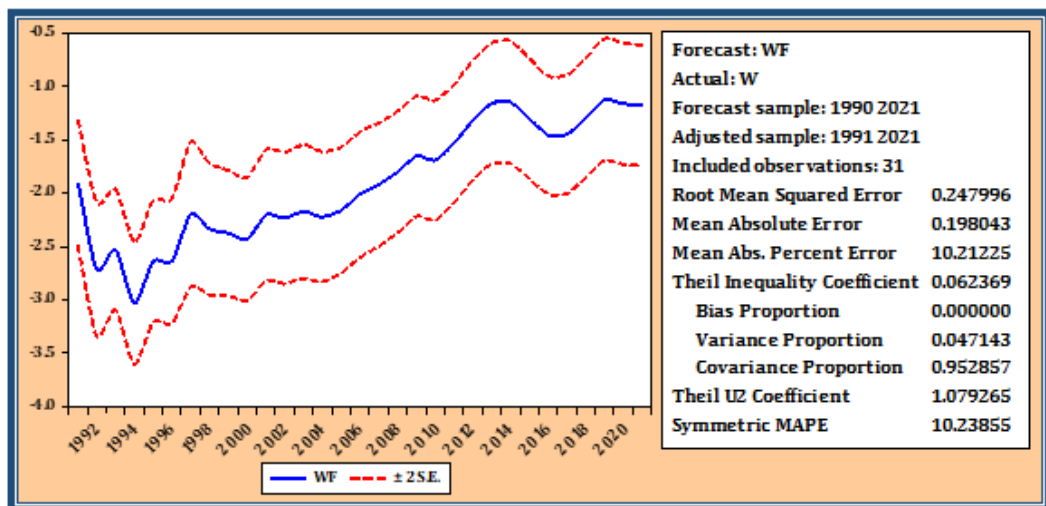

Figure (7). Evaluating of financial maturity model predictions

Conclusions

1.   The average of financial maturity, expressed by the ratio of monetary credit to GDP, was (2.33%) during the research period (1990-2021), which is a very low percentage that clearly indicates the weak contribution of the banking sector in financing the development process when compared to other countries, and that it is very far away from posing a threat to the financial stability in Iraq.

2.   The suitability of the semi-logarithmic linear model to represent the financial maturity function of Iraq during the period (1990-2021). Depending on the ordinary least squares method, the estimated model showed high significance and great explanatory ability, in addition to being free from econometric problems, which allows the possibility of using this model to predict future financial maturity.

3.   The results of testing the main hypothesis of the study showed that the quantitative monetary policy tools represented by the broad money supply and inflation in addition to the GDP are effective in developing the financial maturity of Iraq, where the broad money supply is the most influential variable in financial maturity, followed by inflation in the second place, and then the GDP, thus achieving the main hypothesis of the research.

4.   According to the model, it can be considered that the monetary policy variables represented by the broad money supply and inflation represent major determinants of the financial maturity function of Iraq, while the effect of the GDP on financial maturity was very weak, almost negligible.]

Recommendations

1.   The Central Bank of Iraq should pay more attention to increasing money supply and then financial maturity in order to engender banks credit creation ability and further stimulate the Iraqi's economy for growth.

2.   Continued commitment of the Central Bank of Iraq to apply international standards and requirements in the financial and banking sector in order to prevent the occurrence of financial and banking crises, and to maintain the state of financial stability and strive towards raising financial maturity.

3.   The monetary authorities in Iraq must curb inflation, maintain financial stability, gradually reduce the deficit, raise the level of efficiency of public spending, and implement social and infrastructure reforms to alleviate social gaps and poverty, especially with the increase in the size of the informal sectors in the past years, and this would raise financial maturity.

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