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THE EFFECT OF THE EARLY WARNING INDICATORS OF BANKING CRISIS ON BANKING FINANCIAL POLICY: EVIDENCE FROM IRAQ

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Abstract:

This research seeks to identify crisis early warning systems (EWS) to predict the likelihood of banking and to see how early warning systems affect banking policies. The paperaims to study the efficiency of early warning systems for banking crises to predict the likelihood of the Iraqi banking system being exposed to banking crises.This can be explained by the rise in the ratio of private sector credit to GDP because of increased financial services and improved financial intermediation.This indicator highlights the financing role of banks in stimulating economic activity by contributing to GDP.It also demonstrates the reform directives in the banking sector towards supporting the private sector to contribute to economic development and emphasizes the high performance and developments of the banking sector at the level of its effectiveness and efficiency.Theresults alsoshow the success of the deposit policy for the banking sector in Iraq, as the ratio of total deposits to total assets reached an increasing general trend during the duration of thestudy. The rise in this ratio indicates the ability of banks to use savers' money to cover the needs of the economic sectors, reflecting the absolute improvement in the ability to attract deposits.It also means the ability of assets to cover deposits for the Bank or to maintain a fixed percentage of them, which means that the Bank controls its deposits.The results also reveal the failure of the liquidity policy of the banking sector in Iraq as a result of the increase in liquid amounts held by theBank in its coffers with the Central Bank compared to the volume of deposits and other obligations.This may affect the Bank's ability to achieve its profitability target because the high liquidity rate will have an

adverse impact on profits as it reflects the low rate of loan recruitment from deposits as well as the reduced risk of bank liquidity. The results of this study provide a better understanding of the nature of the relationship between the banking crisis early warning system and banking policies.This is done by identifying leadership indicators that include a range of economic, banking, financial and monetary variables that issue signals before the crisis occurs, thereby reducing their repercussions and effects.

Introduction:

The last decade of the twentieth century saw many developed and developing countries subjected to financial crises, which differed in severity and extent depending on the institutional and structural circumstances of eachcountry. Since late 2007, the world economy has also been hit by a severe financial crisis caused by a lackof discipline in the basics of soundbanking(Al-Wattar, Almagtome, & AL-Shafeay, 2019). As a result, many of the world's major banks suffered heavy losses reflected in liquidity problems, financial insolvency, and bankruptcy, so these banking crises had to be taken care of and work to find and develop early warning indicators. So that appropriate measures can be predicted and predicted. The regulatory authorities have developed new regulations for the ongoing control process, namely the development of early warning systems to predict the future conditions of banks, especially those that may suffer from potential challenges in the future(Amusawi, Almagtome, & Shaker, 2019). Consequently, its stumble negatively affects financial stability and the economy in general. Given the importance of crisis forecasting and the role of early warning systems in detecting or anticipating them, reducing their cost, control or reducing their effects, the development of appropriate systems requires thatthey be able to detect crises before and after theyoccur(M. N. Ali, Almagtome, &Hameedi, 2019). The importance of research stems from the fact that early warning indicators provide a permanent and ongoing tool for directing and warning decision-makers and policymakers that the banking system may be affected by the financial crisis before it occurs to take the necessary preventive policies and measures to protect banks from the impact of such crises(HAMEEDI, AL-FATLAWI, ALI, & ALMAGTOME, 2021). Therefore, the issue (early warning system for banking crises) is of interest to many institutions such as the World Bank, the International Monetary Fund, and the Bank of Settlements.

Literature Review:

The importance of the magnifying warning systems for predicting banking crises highlights the fact that their presence allows policymakers to monitor economic weaknesses immediately and on-site and gives hints to supervisors of bad and good events related to the financial system at an earlystage(Kbelah, Amusawi, &Almagtome, 2019). The need of the supervisors of these systems to understand the environment of banking institutions to conduct an adequate assessment of banking risks(Khaghaany, Kbelah, &Almagtome, 2019). The supervision approach to these systems focuses on the overall hedging aspects of supervision using hedge macros (Kaminsky,Carmen,1999.89). Early warning plays an important role in helping to avoid, minimize, or manage crises(Amagtome & Alnajjar, 2020).It is the result of the pre-crisis tribal planning process, which makes crisis management an initiative, not reaction management, and represents the preventive management of crises that are at the heart of crisis management(A. Almagtome, Khaghaany, &Önce, 2020).Early warning is the task of immediately informing the imminent occurrence of the danger using a variety of means, enabling it to recognize the dimensions of the situation and take the necessary action before it deteriorates and turns into a crisis (Al-Lahidan, 2017).The early warning system can be defined as such a tool capable of predicting crises by assessing the file of economic, social, political, and environmental risks and population pressures of a country. The early

warning system "indicates the ability to absorb signals related to the possibility of crises, enabling measures to be taken to avoid them, and the process is based on monitoring and recording signals indicating that a crisis is nearing." Here operational steps must be taken for the crisis early warning system:

- Providing efficient and effective early warning systems in the development of analysis tools,
- Predicting crises,
- Providing the information base,
- Training the tires responsible for managing crises on an ongoing basis,
- Providing communication and coordination systems with all institutions related to financial crisis topics at home and abroad,
- Providing communication systems with regional and international institutions for consultation

Banking crisis forecasting systems "are systems that assess and measure risks early, in order to take preventive steps to reduce the impact of these risks on the financial system, and the ability to monitor financial safety, with indicators used as a basis for analyzing the health and stability of the financial and banking system" (186,1999Borenszteins, Berg).Early warning systems are based on five dimensions: variables, sample period, sample countries or institutions defining the crisis, and the way it is applied. Each early warning system is a combination of these five dimensions, and the application method is usually a standard model.) 2006,169 (Lukas, Daniela. According toDieter Gramlich,they are "practical, data-based approaches that draw attention to variables associated with previous crises in order to alert decision-makers to the possibility of future crises, and can be used to extrapolate the dangers of a single banking institution, or the banking system as a whole." Dieter Gramlich, (2010) as the Asian Development Bank(ADB) notesthat they are "surveillance systems that detect the possibility of future financial and economic crises to alert decision-makers to take preventive measures" (Hyungmin Jung,2011).**The**design of early warning systems for banking crises requires defining the scope of the banking system, some methodological concepts, and issues and based on the scope of choice.Early warning systems for predicting banking crises must contain an accurate definition of the Bank's crises or failures(Almagtomea, Shakerb, Al-Fatlawic, &Bekheetd, 2019).It is also important to determine what results are required and possible for these systems, whether an assessment of the distress of the banking system is required or only a signal of potential crises, and if the system has the ability to generate crisis timing forecasts and unity(A. H. Almagtome, Al-Yasiri, Ali, Kadhim, &Bekheet, 2020).The crisis is defined as a binary event, while the Bank Severity Index can take a continuous series of values (Hassiba, 2018).The following steps can be followed in the design of the early warning system:

The first step is to choose leadership indicators through which they can reflect and represent the risk situation appropriately, and the process of selecting leadership indicators depends on economic theory and pre-crisis practical experiences, and these indicators are classified into structural indicators, accelerated indicators, and exciting indicators.

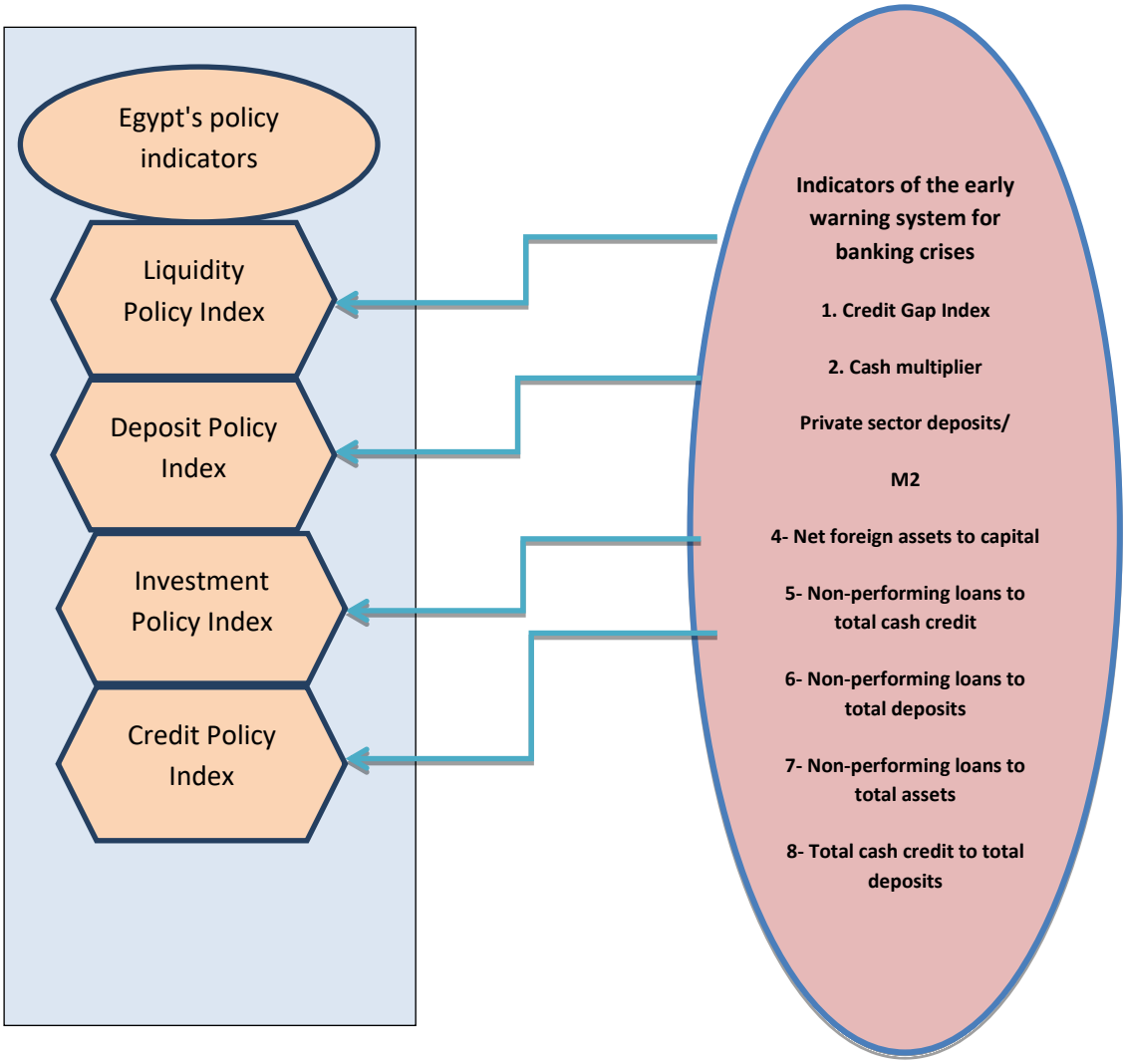
Step 2: The collection of data on building variables is the indicator used in the risk assessment process, and the data collection process is important in determining the system's ability to predict acceptably.

Step 3: Includes the statistical evaluation process and the prediction of digital estimates, discussed by experienced and competent people to determine the realism and interdependence of these results.

Alarm systems can include variables aimed at measuring the root or consequences of the problem in the banks' budget, as well as the role of regime change in increasing the weakness of the banking system, which has a strong interpretive capacity in bankingcrises(M. Ali, Hameedi, &Almagtome, 2019). The choice of interpretive variables to predict banking crises is severely restricted by the availability and accuracy ofthe requireddata. In the end, the efficiency of any early warning model should be assessed in forecast accuracy (Hassiba, 2018).

Data and methodology:

This paper examines the impact of the independent variable (early warning system for banking crises) in the variable indicators of the Iraqi banking sector (banking policies) for the period (2010-2019) using financial analysis.



Early warning indicators in the banking sector:

A- Credit Gap Index:

The credit gap means the difference between cash credit and deposits to cash credit (Financial Stability Report, 2018). The standard value of this indicator ranges from (2-10), and the closer the estimated ratio approaches or exceeds the upper limit, this indicates the possibility of a banking crisis due to increased credit growth at a greater rate than the increase in GDP growth and therefore requires the preparation of sufficient bumpers to avoid potential risks.

B- Private deposit index / M2:

This indicator is measured by dividing private sector deposits with banks to offer cash in the broad sense of M2 (and can be considered a bank liquidity indicator). The rise in this ratio is a good indicator of individual confidence in banks. It means that banks perform well, are attractive to deposits, and their deposit volume is stable, and therefore are not vulnerable to a liquidity crisis.

C- Cash multiplier:

The monetary multiplier is one of the most important indicators through which the volume of banking activity can be identified and the stability of the bankingsector. Reflects the ability of banks to grant credit and thus increase the services provided by the banking system to the public.Shows the ability of banks to attract deposits. The credit granting process requires sufficient liquidity, of which deposits are an important part.The multiplier is therefore defined as the desire and ability of banks to convert deposits into credit. It is measured by division (Mo/cash base in the broad sense of M2),so the stable rise in this indicator is a positive sign of the work of the banking system.The depreciation of the money multiplier is an indicator of the banking system's weak response to monetary policy changes.

D- Non-performing loans/ total assets:

This indicator is measured by the division of non-performing loans on the total assets of banks, as the experiences of countries and literature revealed that exceeding this percentage (10%) Warning of a banking crisis (Asli Demirguc-Kunt, 1998).

E. Total cash credit/total deposits:

This indicator is measured by dividing the total cash credit into total deposits with operating banks, which reflects the long-term liquidity situation of the bankingsector. According to the instructions of the Central Bank of Iraq, this percentage should not exceed (70 percent) (Early Warning Report for the Banking Sector,2018).

F- Non-performing loans/total cash credit:

This indicator is measured by dividing non-performing loans into total cashcredit. The low rate of non-performing debt is positive forthe safety and stability of the bankingsector. This indicates that banks are becoming more cautious in granting credit, which increases the sobriety of financial banks and reduces the possibility of default in the short term (Banking Sector Early Warning Report,2019).

P-non-performing loans/ total deposits:

The Index is measured by dividing non-performing loans into total deposits withbanks. The decline in the proportion of this indicator is a positive indicator of the performance of the banking sector(Early Warning Report for the Banking Sector,2018).

H- Net foreign assets/bank capital

This indicator is measured by dividing the net foreign assets of commercial banks into the capital of commercialbanks. The high proportion of foreign assets of commercial banks could put them at risk of devaluation if there are fluctuations in the value of the national currency against the dollar(Early Warning Report for the Banking Sector, 2019).

Bank policy indicators:

One of the most important factors on which it is based in judging the efficiency and skill of the management of a bank is the policies pursued by the Bank in its various fields (investment, deposit, liquidity, credit, Etc.). The more crisis management overcomes,the more trust it will have in this Bank.This diversification helps him manage his liquidity, thus avoiding many risks, as well as in diversifying his land activity (Sultan, 2005). Here are the most important indicators that measure each banking policy:

1- Deposit policy: The ratio of total deposits to total assets can be considered an indicator of deposit policy, and this percentage benefits us in knowing the extent to which the Bank contributes to the collection of deposits. It also means the ability of assets to cover deposits for the Bank or to maintain a fixed percentage ofthem. This means that the Bank controls its deposits, i.e., even if it goes bankrupt, customer deposits can be covered and guaranteed through the Bank's assets.

2- Investment policy: There are many indicators to measure investment policy, the most important of which is the ratio of return on assets, which measures the net income that shareholders receive from investing their money and depends largely on the number of profits earned from these assets. This is also called net profit after investment tax because it measures the profitability of all the Bank's short- and long-term investments. The high percentage indicates the efficiency of investment and operational management policies.

3- Liquidity policy: There are many indicators used to measure liquidity policy and reflect the ratio of assets at the Central Bank and commercial banks on deposits and other obligations as an indicator to measure liquidity policy, a means that provides a degree of security. It also takes into account other obligations, not deposits alone, which the Bank may have to meet immediately or in the near future, such as cheques, remittances, periodic letters of credits, balances owed to banks, and amounts borrowed from the Central Bank.

4. Credit policy: The credit-to-GDP ratio index is a reference indicator along with some other indicators in the decision-making of the relevant regulatory decisions in this regard. In seeking to determine additional capital requirements, regulatory authorities can use the global standards adopted in this area as a reference indicator, and the regulatory authorities should disclose the value of this indicator periodically.

The Results:

The analysis of Iraq's banking sector credit gap index for the period (2010-2019) shows that this gap falls below the Basel committee's minimum of 10%-2%) and is less than one. This indicates that bank credit can increase without creating instability in the Iraqi financial system, taking into account the well-known rules for granting proper credit, and therefore any rise in the credit gap does not damage the Iraqi economy and does not need bumpers to meet those risks. The analysis of the Index of net foreign assets to the capital of the banking sector. Hepoints out that the Iraqi banking sector has sufficient bumpers against exchange rate fluctuations by maintaining high capital, in addition to the success of the Central Bank to

maintain the stability of exchange rates. The average price of one dollar against the dinar(1,292 dinars in the first quarter of 2017 to be in the same quarter for 2018 (1,246)dinars per dollar and in 2019 amountedto(1,200)dinars per dollar. This relative stability in the exchange rate leads to stability in the value of foreign assets of operating banks. Therefore, the retention of foreign assets in operating banks does not entail high risksbecause of the stability of exchange rates, and on the contrary,in 2020, the exchange rate changed.By analyzing the banking sector's monetary multiplierindex, it is clear that the banking system has no signs of a domestic crisis, and this applies to 2016and2017. The depreciation of the money multiplier in recent years is due to an increase inthe proportion of surplus reserves of commercialbanks. These reserves are inversely linked to the work of the multiplier because the increase in these reserves is reducing the rate of credit growth granted. This decline reflects the low contribution of banking activity to the economy through creditgrants. Banks have adopted a conservative policy in the process of granting credit, which is the basis for creating a monetary multiplier, resulting in a decrease in the value of the monetary multiplier. The depreciation of the money multiplier is also an indicator of the banking system's poor response to monetary policy changes. Therefore, according to this indicator, it may indicate the instability of the work of banks and the possibility of being exposed to a banking crisis. Analysis of the private sector deposit index to M2shows that the Index took a positive general trend duringthe duration of thestudy.It is mostly due to the high credit granted to increase the percentage of deposits compared to the current ratio intrading. The rise is positive and indicates the confidenceof depositors inbanks.It is also an indication that banks perform well and are attractive to deposits.According to the Index, Iraqi banks do not suffer from a liquidity crisis, and their deposit volume isstable. While the Index ofnon-performing loans to total depositsis received,the index values during the study period did not exceed the standard ratio (10%).Banks are therefore not experiencing any crisis, according to thisindicator.Also, theIndex of non-performing loans to total assets did not exceed(5%) during the study period (2010-2019), i.e., did not exceed the standard value (10%).Banks are therefore not experiencing any crisis according to thisindicator.Through the total cash credit index to total deposits, it is noted that the ratios of this Index did not exceed the standard rate set by the Central Bank (70%).That is, commercial banks based on this indicator are not at risk in the event of any sudden withdrawals, and their policy in the credit granting process is stable and within limits approved by the Central Bank.

Table 1. Early Warning System Indicators for Banking Crises.

Early Warning System Indicators for Banking Crises								
Years	Net foreign assets/bank capital	Credit Gap Index	Private Sector Deposits / M2	Total cash credit to total deposits %	Non-performing loans to total cash credit%	Non-performing loans to total deposits %	Non-performing loans to total assets	Monetary Multiplier Index
2010	1.75	-3.090525004	22.70586804	24.4467397	2.341647233	0.572456404	0.083413271	89.10965185
2011	1.15	-1.759140986	25.21503832	36.24316428	2.256678933	0.817891853	0.393768991	81.32394337
2012	1.24	-1.18033	27.35616625	45.8644612	1.750682029	0.80294088	0.398891423	91.33760355

		7398						
2013	1.46	-1.298860157	27.31476589	43.49981869	6.65884816	2.896586876	1.472095149	92.50698085
2014	1.58	-1.170770171	26.56514743	46.06659946	6.919463013	3.187561311	1.626995726	76.92111043
2015	0.81	-0.750730845	27.96364231	57.11900279	8.379395726	4.786227279	2.95768093	74.58955495
2016	0.54	-0.678282049	26.20688771	59.58474029	9.000750213	5.363073638	3.379614787	75.9589359
2017	0.47	-0.766630651	28.10056409	56.60492755	11.43674428	6.473760814	4.213672331	70.7436938
2018	0.69	-0.997922231	28.6866307	50.05199825	12.68006787	6.346627348	4.518537907	70.4061941
2019	1.72	-0.952498247	29.68729987	51.21643523	9.862733286	5.051340406	3.453645657	75.65059615
Arithmetic average	1.141	-1.264569774	27.20706294	47.06978874	8.00648901	3.835060094	2.249831617	79.8548265
Max	1.75	-0.678282049	29.68729987	59.58474029	11.60494554	5.943639417	4.518537907	92.50698085
MIN	0.47	-3.090525004	22.70586804	24.4467397	2.341647233	0.572456404	0.083413271	70.4061941

Summary of financial analysis ofbanking policies in Iraq:

Analysis of the liquidity policy of the Iraqi banking sector, we find that the ratios of the liquidity policy index for the period (2010-2019) varied these ratios by rising and decreasing from year to year. It is clear from the highest percentage reached by this Index is a very weak percentage that reflects the low rate of loan employment from deposits as well as the low risk of bank liquidity, which indicates the failure of the liquidity policy of the banking sector in Iraq.About investmentpolicyanalysis, we note that the overall rate of investment policy index for commercial banks in Iraq for theperiod (2010-2019) was0.918%.Itslowest value in 2010was0.231%.It took an upward trend during the period (2010-2013).However, we note that the Index fell in 2014 as a result of the decline in the profitability of banking institutions due to the decline in their investments and the contraction of their financial employment during that period as a result of the political conditions and security events witnessed in the country, as well as the growing budget deficit of the state caused mainly by low oil prices. There are also significant impacts and repercussions that have been reflected in one way or another on the results of the business of all economic sectors, particularly

financial and banking institutions, both reducing their gains and limiting their annual profits. At the end of 2017, it took an upward trajectoryto 1.28 percent. It is the highest rate of return seen in the banking sector during the period (2010-2019).This decrease was the result of the depreciation of the return of banks, as well as the high value of assets, which indicates that banksare reducing their investmentactivities. The total revenue did not cover the total expenses, which indicates the weaknessof investment policies in the Iraqi bankingsector.

By analyzing the credit policyof the Iraqi bankingsector, we note that the ratio increased from 2010 to 2019 because of commercial banks granting individuals housing loans as well as consumer loans to large segments of employees as well as granting investors in the hotel sector. This period witnessed a marked improvement, as the credit ratio granted increased from(5.2%) to(8%) for the period above due to the abolition of some credit controls and the high level of income. It also demonstrates the reform directives in the banking sector towards supporting the private sector to contribute to economic development and emphasizes the high performance of the banking sector and the developments it is witnessing at the level of its effectiveness and efficiency. The highest percentage was in 2017 at 9.7%. The rise in the ratio of credit to the private sector to GDP can be explained by more financial services and improved financial intermediation. It should be noted that this indicator highlights the financing role of banks in stimulating economic activity by contributing to GDP. That is, there is an expelled relationship between the credit provided and the GDPoutcome. Through the above, we conclude the success of credit policies in the Iraqi banking sector.

It is clear from the analysis of the deposit policy of the Iraqi banking sector for the period (2010-2019), there was a growing general trend duringthe duration of thestudy. The rise in this ratio indicates the ability of banks to use savers' money to cover the needs of the economic sectors, reflecting the absolute improvement in the ability to attract deposits. This shows the success of the deposit policy for the banking sector inIraq.

Table 2. Banking policy indicators for the banking sector in Iraq.

Banking policy indicators for the banking sector in Iraq				
Years	Deposit Policy Index	Credit Policy Index	Liquidity Policy Index	Investment Policy Index
2010	14.57111321	5.261564118	0.019667905	0.231720818
2011	48.14438362	5.229615006	0.074061339	0.807354815
2012	49.6788036	5.762640874	0.088015647	1.268512556
2013	50.82171575	6.194556112	0.109733244	1.087433097
2014	51.04202138	6.66277329	0.075556076	0.845965314
2015	61.79566405	9.281881998	0.077566181	1.007349811
2016	63.01637858	9.23247394	0.060535637	1.134351173
2017	65.08847719	8.617795644	0.097085834	1.283444778
2018	71.19589128	7.93190976	0.095328075	0.607818347
2019	68.37087545	8.003362656	0.092921399	0.907703767
Arithmetic average	54.37253241	7.21785734	0.079047134	0.918165448
Max	71.19589128	9.281881998	0.109733244	1.283444778
MIN	14.57111321	5.229615006	0.019667905	0.231720818

Table 3. Results of regression analysis (The investment policy index.)

Adopted variable	**y1**					
Independent variable	The teacher.	value t	SIG.	value F	SIG.	R2
x1	B0=1.256	4.91	0.000	2.04	0.192	0.20
	B1=-0.296	0.192-	0.001			
x2	B0=1.151	1.05	0.323	0.05	0.853	0.01
	B1=-0.292	-0.215	0.835			
X3	B0=1.354	3.43	0.009	11.93	0.000	0.59
	B1=0.345	9.37	0.000			
X4	B0=-1.486	1.15-	0.285	3.46	0.100	0.03
	B1=8.708	0.100	0.835			
X5	B0=1.151	0.258-	0.805	8.28	0.021	0.51
	B1=2.145	2.88	0.021			
X6	B0=2.004	6.22	0.000	11.88	0.009	0.60
	B1=-1.807	-3.45	0.009			
X7	B0=0.766	3.85	0.005	0.794	0.399	0.09
	B1=4.173	0.891	0.399			
X8	B0=0.903	4.44	0.002	0.602	0.460	0.07
	B1=5.108	0.780	0.460			

Table 4. Results of regression analysis (The liquidity policy index.)

Adopted variable	y2					
Independent variable	The teacher.	value t	SIG.	value F	SIG.	R2
x1	B0=0.093	4.28	0.003	0.503	0.604	0.06
	B1=-0.013	0.71-	0.499			
x2	B0=0.124	8.90	0.179	0.292	0.604	0.04
	B1=-0.057	-0.54	0.604			
X3	B0=0.111	8.90	0.000	8.41	0.020	0.51
	B1=0.025	2.90	0.020			
X4	B0=-0.210	3.180-	0.285	19.26	0.002	0.71
	B1=1.071	4.39	0.002			
X5	B0=0.019	0.55	0.598	3.37	0.104	0.30
	B1=1.84	0.104	0.104			
X6	B0=0.145	6.22	0.002	4.49	0.067	0.36
	B1=-0.110	-2.12	0.067			
X7	B0=0.062	4.15	0.005	4.490	0.067	0.21
	B1=0.477	1.38	0.207			
X8	B0=0.064	4.84	0.001	1.95	0.200	0.20
	B1=0.672	1.39	0.200			

Table 5. Results of regression analysis (The credit policy index.)

Adopted variable	y3					
Independent variable	The teacher.	value t	SIG.	value F	SIG.	R2
x1	B0=0.097	9.15	0.000	6.36	0.036	0.44
	B1=-0.022	2.52-	0.036			
x2	B0=0.189	5.58	0.001	11.12	0.010	0.58
	B1=-0.146	-3.34	0.010			
X3	B0=0.093	12.82	0.000	11.03	0.011	0.58
	B1=0.017	3.32	0.011			
X4	B0=-0.056	0.89-	0.396	4.26	0.073	0.35
	B1=0.473	2.07	0.073			
X5	B0=0.009	0.83	0.432	07.33	0.000	0.81
	B1=0.134	5.75	0.000			
X6	B0=0.128	8.60	0.000	14.78	0.005	0.65
	B1=-0.093	-3.85	0.005			
X7	B0=0.050	11.11	0.000	34.80	0.000	0.81
	B1=0.620	5.90	0.000			
X8	B0=0.053	12.03	0.000	27.11	0.001	0.77
	B1=0.840	5.21	0.001			

Table 6. Results of regression analysis (The deposit policy index.)

Adopted variable	y3					
Independent variable	The teacher.	value t	SIG.	value F	SIG.	R2
x1	B0=76.653	6.48	0.000	4.16	0.076	0.34
	B1=-19.527	2.03-	0.077			
x2	B0=164.275	5.58	0.003	7.72	0.024	0.49
	B1=-137.635	-2.78	0.024			
X3	B0=81.267	19.76	0.000	55.13	0.000	0.87
	B1=-21.267	7.43	0.000			
X4	B0=-144.754	4.10-	0.003	31.99	0.000	0.80
	B1=737.747	5.66	0.000			
X5	B0=-9.44	0.781-	0.457	19.29	0.001	0.79
	B1=135.571	5.75	0.001			
X6	B0=117.558	9.75	0.000	28.75	0.001	0.78
	B1=-105.128	-5.36	0.001			
X7	B0=33.433	5.43	0.001	15.75	0.004	0.66
	B1=575.26	3.97	0.004			
X8	B0=36.006	12.03	0.000	17.92	0.001	0.69
	B1=816.840	5.21	0.001			

Granger causal test results between independent variables and investment policy index

Pairwise Granger Causality Tests
Date: 03/31/21 Time: 19:48
Sample: 2010 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
X1 does not Granger Cause Y1	8	0.11085	0.8986
Y1 does not Granger Cause X1		0.83140	0.5161
X2 does not Granger Cause Y1	8	0.18021	0.8435
Y1 does not Granger Cause X2		4.44135	0.1269
X3 does not Granger Cause Y1	8	0.40613	0.6981
Y1 does not Granger Cause X3		1.33117	0.3856
X4 does not Granger Cause Y1	8	5.32430	0.1031
Y1 does not Granger Cause X4		0.59559	0.6056
X5 does not Granger Cause Y1	8	0.97939	0.4706
Y1 does not Granger Cause X5		2.40086	0.2384
X6 does not Granger Cause Y1	8	4.10846	0.1383
Y1 does not Granger Cause X6		1.38334	0.3752
X7 does not Granger Cause Y1	8	0.32726	0.7438
Y1 does not Granger Cause X7		0.95191	0.4785
X8 does not Granger Cause Y1	8	1.01608	0.4603
Y1 does not Granger Cause X8		2.98949	0.1931

Figure 1. Granger causal test results between independent variables and investment policy index

Through the table above, we accept all the zero assumptions that independent variables { Net Foreign Assets Index /BankCapital (X1),Monetary Multiplier Index(X2),Credit GapIndex (X3), Private Sector Deposit Index/(X4) M2,and Index Total cashcredit/totaldeposits (X5), non-performing loan index/totalcash credit (X6, non-performing loanindex/totaldeposits (X7),non-performing loan index /totalassets {(X8) do not cause investment policy because the probability of counting (F) is greater than 5. Investment policy also does not cause any of the independent variables.

Pairwise Granger Causality Tests
Date: 03/31/21 Time: 20:03
Sample: 2010 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
X1 does not Granger Cause Y2	8	10.3526	0.0450
Y2 does not Granger Cause X1		0.78380	0.5323
X2 does not Granger Cause Y2	8	0.30891	0.7551
Y2 does not Granger Cause X2		0.83434	0.5151
X3 does not Granger Cause Y2	8	0.25883	0.7876
Y2 does not Granger Cause X3		1.44645	0.3632
X4 does not Granger Cause Y2	8	0.02755	0.9731
Y2 does not Granger Cause X4		0.04646	0.9553
X5 does not Granger Cause Y2	8	0.23854	0.8014
Y2 does not Granger Cause X5		1.82791	0.3026
X6 does not Granger Cause Y2	8	0.34191	0.7349
Y2 does not Granger Cause X6		0.84699	0.5109
X7 does not Granger Cause Y2	8	0.63033	0.5908
Y2 does not Granger Cause X7		3.10308	0.1860
X8 does not Granger Cause Y2	8	3.83467	0.1491
Y2 does not Granger Cause X8		0.07240	0.9317

Figure 2. Granger causal test results between independent variables and liquidity policy index

Through the table above, we accept all non-existent assumptions that independent variables {, monetary multiplier index(X2),credit gap index (X3), private sector deposit index (X4) M2/, total cashcredit/totaldeposit index (X5), and non-performing loan index /total cash credit (X6),non-performing loan index/totaldeposits (X7)and non-performing loan index /totalassets {(X8) do not cause liquidity policy because the probability of counting (F)is greater than 5 0.0 as well as the investment policy does not cause any independent variables. We also reject the hypothesis that the variable is the Index of net foreign assets/bankcapital (X1) does not cause liquidity policy because the probability of counting(F)is less than 0.05as well as the investment policy does not cause variable x1.

Pairwise Granger Causality Tests
Date: 03/31/21 Time: 20:09
Sample: 2010 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
X1 does not Granger Cause Y3	8	14.4660	0.0288
Y3 does not Granger Cause X1		1.91824	0.2907
X2 does not Granger Cause Y3	8	2.27789	0.2502
Y3 does not Granger Cause X2		49.2489	0.0051
X3 does not Granger Cause Y3	8	1.03311	0.4557
Y3 does not Granger Cause X3		2.23941	0.2541
X4 does not Granger Cause Y3	8	1.43205	0.3659
Y3 does not Granger Cause X4		4.37774	0.1289
X5 does not Granger Cause Y3	8	0.58428	0.6105
Y3 does not Granger Cause X5		1.63281	0.3313
X6 does not Granger Cause Y3	8	0.01286	0.9873
Y3 does not Granger Cause X6		0.85002	0.5100
X7 does not Granger Cause Y3	8	0.20270	0.8269
Y3 does not Granger Cause X7		2.81679	0.2048
X8 does not Granger Cause Y3	8	0.22925	0.8079
Y3 does not Granger Cause X8		5.00249	0.1108

Figure 3. Granger causal test results between independent variables and liquidity policy index

Based on Table(6), we accept all zero hypotheses that state that independent variables,{monetary multiplier index(X2),credit gapindex (X3), private sector deposit index/ (X4) M2, total cashcredit/totaldeposit index (X5), and loan index Distressed/total cash credit (X6), non-performing loan index/totaldeposits (X7),non-performing loan index /totalassets {(X8) do not cause credit policy because the probability of counting(F)is greater than 5 0.0 as well as the investment policy does not cause any of the independent variables.We also reject the hypothesis that the variable is the Index of net foreign assets/bankcapital (X1)does not cause credit policy because theprobability of counting(F)is less than 0.05as well as the investment policy does not cause variable x1

Pairwise Granger Causality Tests
Date: 03/31/21 Time: 20:13
Sample: 2010 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
X1 does not Granger Cause Y4	8	0.09057	0.9158
Y4 does not Granger Cause X1		1.93096	0.2891
X2 does not Granger Cause Y4	8	16.8015	0.0235
Y4 does not Granger Cause X2		4.43413	0.1271
X3 does not Granger Cause Y4	8	0.18839	0.8374
Y4 does not Granger Cause X3		0.54504	0.6282
X4 does not Granger Cause Y4	8	0.06275	0.9404
Y4 does not Granger Cause X4		0.66163	0.5780
X5 does not Granger Cause Y4	8	0.39145	0.7062
Y4 does not Granger Cause X5		0.02897	0.9717
X6 does not Granger Cause Y4	8	0.35410	0.7277
Y4 does not Granger Cause X6		0.11442	0.8956
X7 does not Granger Cause Y4	8	3.79980	0.1506
Y4 does not Granger Cause X7		1.30215	0.3917
X8 does not Granger Cause Y4	8	3.53278	0.1627
Y4 does not Granger Cause X8		1.26586	0.3994

Figure 4. Granger causal test results between independent variables and deposit policy index

Through Table(24), we accept all non-existent hypotheses that state that independent variables { Net Foreign Assets Index /Bank Capital (X1),Monetary Multiplier Index (X2),Credit Gap Index (X3), Private Sector Deposit Index /X4) M2), and M2 Total cash credit/totaldeposits (X5), non-performing loan index /totalcash credit (X6),non-performing loan index/totaldeposits(X7),non-performing loan index /totalassets (X8) } do not cause deposit policy because the probability of counting (F) is greater than 0.05. The deposit policy also does not cause any of the independent variables.

Conclusions and discussion:

By assessing and analyzing the relationship between the independent variable and the banking policy early warning system, it isclear tous under the Credit Gap Index that this gap falls below the Basel Committee's minimum of 10%-2% and it's less thanone. This indicates that bank credit can increase without creating instability in the Iraqi financial system, considering more well-known sound credit rules.Therefore, any rise in the credit gap does not damage the Iraqi economy and does not require bumpers to meet thoserisks. Also, for the Index of net foreign assets to bank capital, the banking sector, due to the retention of large capital by banks, as well as the success of the Central Bank in maintaining the stability of exchange rates, has sufficient bumpers to accommodate sudden crises. The results also show the success of credit policies in the Iraqi banking sector, which can be explained by the rise in the ratio of credit to the private sector to GDP because of increased financial services and improved financial intermediation.It should be noted that this indicator highlights the financing role of banks in stimulating economic activity by contributing to GDP.It also demonstrates the reform directives in the banking sector towards supporting the private sector to contribute to economic development and emphasizes the high performance of the banking sector and the developments it is witnessing at the level of its effectiveness and efficiency.The success of the deposit policy of the banking sector in Iraq, where the ratio of

total deposits to total assets witnessed an increasing general trend duringthe duration of thestudy.The rise in this ratio indicates the ability of banks to use savers' money to cover the needs of the economic sectors, reflecting the absolute improvement in the ability to attract deposits.It also means the ability of assets to cover deposits for the Bank or to maintain a fixed percentage of them, which means that the Bank controls its deposits.The results of the study show the failure of the liquidity policy of the banking sector in Iraq as a result of the increase in liquid amounts held by the Bank in its coffers with the Central Bank compared to the volume of deposits and other obligations.This may affect the Bank's ability to achieve its profitability target if the high liquidity rate has the opposite effect on profits. Itreflects the low rate of loan employment from deposits as well as the reduced risk of bank liquidity. It isnecessary to create a set of laws and legislation that enable the Central Bank to exercise its oversight role effectively and help to adopt macro-precautionary indicators, as well as to take care of the development of human resources to qualify supervisory cadres by subjecting them to training courses related to the reality of their oversight work, especially the indicators that have been clarified.Study the Bank's weaknesses to reduce their aggravation, especially on the part of liquidity. Early warning indicators for the banking sector should continue to be analyzed for the coming years for use as warning indicators about the possibility of a financial or banking crisis in the country.The change in the behavior of these indicators, particularly as it was not positive, gives an indication of the risk of a potential banking crisis. If this prediction succeeds, it helps banking policymakers take action to prevent a banking crisisthat can becostly.It is important tochoose an appropriate model of the early warning system that corresponds to the environment of the Iraqi banking sector by identifyingleadership indicators that include a range of economic, banking, financial and monetary variables that issue signals before the crisis occurs.Thus, reducing its repercussions andeffects.The banking sector must abide by the laws, controls, and instructions issued by the Central Bank of Iraq, which are the specific ratios on banking activity and banking indicators for the purpose of avoiding risks and strengthening the strength of the financial system against risks to which it may be exposed.

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