



Analyzing the Use of the (PATROL) Early Warning Model in Assessing the Financial Performance of The Banking Sector in Iraq

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Abstract:

This paper describes the financial performance of the banking sector in Iraq using the PATROL early warning model. The research found the strengths and weaknesses in bank operations and forecasted the financial crises using data from 2018 to 2022 to enhance performance. The indicators included capital adequacy, credit risk, profitability, organizational efficiency, and liquidity, with performance rated on a scale from "very good" to "poor." Related findings proved that the Iraqi banks would be entirely successful in financial performance regarding most indicators and scaling-high in capital adequacy, profitability, organization, and liquidity, in accordance with sound management and robust operations. However, credit risk posed challenges because the assets demonstrated lower quality compared to other indicators. Findings from the research suggest the importance of the PATROL model in guiding regulatory authorities in monitoring financial health, correcting imbalances, and improving stability. Overall, the empirical study tends to validate the effectiveness of the model as a strategy for improving and assessing financial outcomes in the banking sector.

The research study has been geared towards the analysis of the financial performance of the banking sector in Iraq using the PATROL early warning model. The research found strengths and weaknesses in bank operations and predicted the financial crises using data from the years 2018 to 2022 to enhance performance. The indicators included capital adequacy, credit risk, profitability, organizational efficiency, and liquidity which were rated with respect to performance on a scale from "very good" to "poor." Related findings proved that the Iraqi banks would be entirely successful in financial performance regarding most indicators and scaling-high: capital adequacy, profitability, organization, and liquidity according to sound management and robust operations. However, credit risk posed challenges, which showed lower quality assets compared to other metrics. The research points out the usefulness of the PATROL model in guiding regulatory authorities to monitor the financial health, correct imbalances, and improve stability. In general, the empirical study seems to affirm the efficacy of the model as a scheme for assessing and improving financial outcomes not just for the banking sector, but for all sectors.

Keywords: Financial Performance,PATROL Model,Banking Sector,Early Warning Systems,Iraq

1. Introduction:

The banking sector represents foremost importance in economic and social life, given that it is one of the main elements that consolidate confidence in the state's policy and care for economic interests. Due to that importance, countries' interest in improving the conditions of banks and the banking sector increased (Hossain et al., 2017), which called for the use of supervisory systems for banks called (early warning systems) whose mission is to evaluate the performance of banks and predict the financial crises that may ravage banks according to a set of standards (Vijayalakshmi, n.d.).

Assessing the financial performance of commercial banks is a broad and multi-functional process, and represents the ability of banks to manage and control their resources and the efficiency of banking operations using a set of measures (Daher Bashatweh & Ahmed, 2020), The assessment of financial performance reflects the extent to the success of the banking department in balancing high returns and risks by achieving high returns coupled with acceptable risks (Ibrahim & Khaimah, 2015), The process of performance evaluation is of great importance for commercial banks because it plays a major role in detecting defects and deviations in the activities of banks and determining their causes for the purpose of correcting errors and reducing their effects or preventing their recurrence in the future (Qasim et al., 2017), The financial performance evaluation aims to detect imbalances and weaknesses in the activity of banks, conduct a comprehensive analysis of them, reveal their causes and contribute to developing the necessary solutions for them and correcting them in a timely manner, as well as detecting strengths and working to support, strengthen and maintain them (Ahmed Daho et al., 2017).

There are several early warning regulatory standards used to measure the safety of the bank's financial position. These criteria are used to evaluate the performance of banks and then classify them and detect financial imbalances in their performance early so that they are not exposed to large and sudden financial problems that may lead to their collapse, as well as to show the positive aspects in the performance of banks. These important standards or models include the (PATROL) model, a regulatory system used to evaluate the performance of banks by relying on several indicators (Balaji & Praveen Kumar, 2017). The indicators of this model are measured by several quantitative measures that accurately evaluate the financial and operational performance of banks according to a composite numerical classification from (1 best performance) to (5 worst performance). The final classification of the bank is determined based on the evaluations of each major variable of the model, which considers all factors affecting the evaluations of its component elements (Biswas & Bhattacharya, n.d.).

The (PATROL) model was used to evaluate the financial performance of the banking sector in Iraq by relying on the indicators of this model to identify weaknesses and strengths in each of its indicators that reflect the level of financial performance of banks, which contribute to financing economic projects in all their forms and raise the economic growth rate of the country. The research period was also chosen from 2018 to 2022; Table (1) shows the financial ratios adopted according to the PATROL model indicators to evaluate the financial performance of commercial banks.

Table 1: Financial ratios of (PATROL) model indicators.

The indicator	Financial ratios	The source
Capital adequacy (PAT)	(equity rights / total deposits) x 100	(Zaman et al., n.d.)
Credit risk (R1)	(non-performing loans / total cash credit) x 100	(Narkunienė & Ulbinaitė, 2018)
Profitability (R2)	(net profits / equity rights) x 100	(Balaji & Praveen Kumar, 2017)
Organization (O)	(total expenses / total profits) x 100	(Samuel, 2018)
Liquidity (L)	(cash reserve at the Central Bank / total deposits) x 100	(Rahman & Nitu, n.d.)

2. Literature review and Hypothesis Development:

(Biswas & Bhattacharya, n.d.) (2020), the study aimed to show the impact of the application of the (CAMEL) system in evaluating bank performance according to its six elements and the indicators of each element, as well as studying and analyzing the results of the evaluation of bank performance according to the CAMEL model) as inputs to the balanced scorecard and a statement of its reflection on the performance evaluation. The study reached several conclusions, the most important of which is that the indicators of the (CAMEL) system used in this research are one of the best regulatory tools. However, they rely more on the digital evaluation method than the structural one. It is more objective because it reflects many aspects of banking work by highlighting the negative and positive points of the work. The study also recommended that banks evaluate Periodic performance using the (CAMEL) system on all government, private, and foreign banks because of its support in the control process and providing comprehensive information that helps the management of banks to identify and address the strengths and weaknesses.

(Balaji & Praveen Kumar, 2017), This study confirmed that public banks have a capital adequacy ratio and a higher trading rate than private sector banks. Private banks have a higher return on assets than public sector banks. The study aimed to analyze the financial performance of Indian commercial banks using the (CAMEL) model and compare the performance of new private and public sector banks. The study reached several results, the most important of which is that there is no significant difference in capital adequacy, the quality of assets, and liquidity between new private and public sector banks. These banks have complied with capital requirements, asset quality, and liquidity. The most important recommendation recommended by this study is that the Central Bank must maintain the capital adequacy rate at (10%) by the Basel 3 standard.

(Khaled et al., n.d.) (2023), the research was based on the premise that the patrol model's indicators significantly impact bank performance in the research sample banks. The research aims to estimate tablet data models to determine the effect of the indicators and variables of the (patrol) model on the banking performance of the research sample banks. The research reached several conclusions, the most significant of which was that the adequacy of capital, credit risk, and liquidity had a significant impact on the performance of banks in the research sample. The research recommends that banks, the study sample, do not maintain a high liquidity rate because this will be at the expense of the profitability they achieve.

3. Research Methodology:

The research methodology is selected based on the main variables and objectives. In this context, the two researchers rely on the deduction approach that uses standard methods and analytical mathematical equations to measure and analyze research variables, as this allows for collecting data and information in an integrated way to understand the research problem and ensure the correctness of the relationship between the variables and achieve the desired goals.

3.1 Research Tools:

The two researchers relied on the use of the ratios of the indicators of the (PATROL) model indicators, which are (the ratio of capital to deposits, the ratio of non-performing loans to credit, the ratio of return on property rights, the ratio of expenses to profits, the ratio of legal reserve) to evaluate the financial performance of the banking sector in Iraq during the research period (2018-2022) by knowing the developments of financial performance indicators and knowing the role of the (PATROL) model in evaluating the financial performance of the banking sector in Iraq, and reaching conclusions that clarify whether the research hypothesis is correct or not.

Ector to reach conclusions that illustrate whether the hypothesis is true or not.

4. Results:

4.1 The Concept of the PATROL Model and its Indicators:

The (PATROL) system is one of the important models in evaluating the financial performance of commercial banks through its five elements (capital adequacy, profitability, credit risk, regulation, liquidity), which enables it to guide decision-makers in banks by revealing strengths and weaknesses in their performance in order to take appropriate measures at the right time (Ferrouhi, 2014). It is an early warning system used by the regulatory and supervisory authorities to evaluate the methods of internal control of commercial banks and helps to identify and know the troubled banks. This reduces the effects of the crisis that may occur or be exposed to the bank (Bansal & Mohanty, 2013). (PATROL) is one of the classification systems provided by the Central Bank of Italy in 1993 as an off-site supervision tool to give a systematic representation of the financial health of banks and to provide support in determining the priorities for the use of regulatory resources by scheduling tests within the bank based on the information provided by this model (Çelen, 2014), and because the Italian Central Bank does not subject commercial banks to periodic checks within banks until they are subject to an off-site evaluation (Masood et al., 2016). The results of their evaluation are inappropriate are subjected to internal examination to identify the problems they suffer from for the purpose of overcoming them (Abusharbeh, 2020).

The (PATROL) system, as we indicated earlier, consists of five main elements, which are financial indicators on which this model depends to express the level of financial performance of commercial banks (Hassan & Adam, 2014). These indicators are, capital adequacy, which is a measure of the bank's capital expressed as a financial ratio, and is an indicator of financial health and determines whether the bank has capital capable of withstanding unexpected losses that it can face in the future (S. AlAli & Al-Yatama, 2019). The second indicator is the risk (quality) of credit, and means the possibility of the bank's borrowing customers not comply with their obligations to the bank when these obligations are due or non-payment as agreed. Therefore, it is necessary to protect credit and take the necessary precautions measures to avoid the bank's loss (Karri et al., 2015), as for the third indicator of the (PATROL) model, it is profitability, which reflects how the bank obtains its profits and explains the sustainability and growth of these profits in the future (Majeed et al., 2023). Profitability measures the operational efficiency of the bank and expresses the efficiency of the banking administration in investing the available capabilities of liquidity, services and business (Jassim, 2021). Regulation is one of the criteria of this model and one of the main components to measure the health and durability of the bank, as the success or failure of the bank is mainly due to the structure of the formation of its board of directors (Hamad et al., 2022). Regulation is a necessary indicator for any successful management to know the functions it performs well for the purpose of controlling, measuring and controlling risks to ensure that the commercial bank exercises its activities in a safe and sound manner and in line with regulations and laws (Al-Mousawi & Al-Safi, 2019). as for the fifth and last indicator adopted by the (PATROL) system is bank liquidity, which represents the bank's ability to fulfill its obligations urgently by converting part of its assets into liquid cash quickly and without loss (Kaur et al., 2015).

Liquidity is one of the important indicators that the bank must manage properly, as it must balance between the amount of liquidity held and the invested funds (Sahajwala & Van Den Bergh, n.d.).

4.2 The mechanism of applying a model (PATROL) to evaluate the performance of banks:

The composite classification methodology is used to evaluate and classify the five components of the (PATROL) system, which are (capital adequacy, credit quality, organization, profitability, liquidity). Each component of the system is classified by giving a digital classification that rates from (1), which represents the best performance to (5), which reflects the worst performance of banks. The ratings are collected for all components of the system and each year, and an accounting average is extracted for them to reach a general rating that reflects the annual financial performance of banks or the banking sector. Then the banks are rearranged based on the new classifications obtained (Zaman et al., n.d.). and the classification begins with the bank that obtained the best performance rating (1) and ends with the bank that received the worst rating performance (5), and In order to reach a final evaluation of the performance of banks for the entire years of study, the new classifications are collected, and an arithmetic average is extracted for them and classified according to the classification levels. Table (2) represents the grades and criteria of the classification of the (Patrol) model.

Table 2: ratings and levels of classification according to the (PATROL) model

Components	levels of classification				
	Rating 1	Rating 2	Rating 1	Rating 1	Rating 1
capital adequacy	$\geq \% 15$	$\% 12 - 14.9$	$\% 8 - 11.9$	$\% 7 - 7.9$	$\leq \% 6$
credit quality	$< \% 5$	$\% 15 - 5$	$\% 35 - 15$	$\% 60 - 35$	$> \% 60$
Organization	$\leq \% 25$	$\% 26 - 30$	$\% 38 - 31$	$\% 45 - 39$	$\geq \% 46$
Profitability	$\geq \% 1$	$\% 0.8 - 0.9$	$\% 0.35 - 0.7$	$\% 0.25 - 0.34$	$\leq \% 0.24$
Liquidity	$\leq \% 55$	$\% 62 - 56$	$\% 68 - 63$	$\% 80 - 69$	$\geq \% 80$

Source: Preparing researchers based on (Zaman et al., n.d.)

4.3 model classification levels (PATROL):

The total classification depends on evaluating the performance of banks at all administrative and financial levels, and the extent of banks' compliance with the regulations and instructions issued by the regulatory authorities. As we mentioned earlier, the classification scores according to the composite classification methodology range from (1 - 5) each score indicate a certain level of financial performance. The following is a detailed explanation of each degree or level of classification, table (3) shows the levels of composite evaluation of the (PATROL) system.

Table 3: Composite classification of the (PATROL) model

Degree classification	Compound weight for classification	Classification type
1	1 - 1.49	Strong or very good
2	1.5 - 2.49	Satisfactory or good
3	2.5 - 3.49	Acceptable or average
4	3.5 - 4.49	Marginal or weak
5	4.5 - 5	Unsatisfactory or limit

Source: Preparing researchers based on (Ahsan, 2016)

The composite classification grades of the (PATROL) model can be described as follows:

1- The first classification (very good): The bank's obtaining the first classification means that it falls within the category (1.49 - 1), and this indicates the strength of banks and the lack of weaknesses in their performance, and if any, the management of banks can deal with them, and banks that fall within this category can face any changes in the conditions of the external environment affecting them, and are characterized by their adherence to laws, instructions, and regulations. Therefore, banks that fall within this classification do not need strong supervision by the regulatory authorities because they have strong performance and efficient risk management.

2- The second classification (good) means that banks fall into the category (2.49 - 1.5), indicating that banks enjoy satisfactory financial performance. Some banks in this category suffer from minor problems. However, they are rather stable and can deal with economic changes due to their compliance with instructions, regulations, and laws. Their operations are safe and safe, and they enjoy satisfactory risk management, which limits the intervention of the authorities in these banks because their financial basis is solid.

3- The third classification (average): that the bank falls into the category (3.49 - 2.5) means that its performance ranges from average to marginal, that is, the inability of the bank's management to deal quickly with weaknesses in its performance, in addition to its inability to deal with economic fluctuations and is affected by the surrounding economic conditions, and its risk management is less than satisfactory. As a result, banks that fall within this classification need the attention of the regulatory authorities. There is hope to improve their performance, as the possibility of the bank is uncertain, and this depends on the bank's strength and safety.

4- **The fourth classification (weak):** Banks that fall within the category (4.49 - 3.5) suffer from great problems at the administrative and financial level. This is reflected in their performance and poses a great risk of their non-compliance with laws, instructions and regulations. Therefore, they are vulnerable to economic fluctuations and the inability of the administration to deal with these fluctuations. The probability of the failure of these banks is very high if no quick treatments are found for the weaknesses they suffer from, and they need the intervention of the regulatory authorities significantly.

5- **The fifth classification (limit):** The fall of the masts in the category (5 - 4.5) means that they suffer from a great weakness in their financial performance and risk management and constitute a great concern for the supervisory authorities and the possibility of their survival is almost non-existent.

4.4 Evaluation of model indicators (PATROL):

4.4.1 Assessing the capital adequacy index:

Capital adequacy is one of the important indicators in banking work that measures the extent of banks' ability to face problems and the risk of financial bankruptcy. This ratio is used to develop the performance and efficiency of the banking system, protect depositors, and promote financial stability. This ratio is one of the most important indicators of the safety of the banking sector. The capital adequacy ratio has been determined according to the decisions of the Basel II Committee at (8%) and (Basel III) by (10.5%). In comparison, a ratio (12%) for the capital adequacy index was determined by the Central Bank of Iraq, and capital adequacy can be measured according to the following ratio (Khaled et al., n.d.):

$$\text{Capital} - \text{to} - \text{deposit ratio} = (\text{Entitled} / \text{Total deposits}) \times 100$$

It is noted from the table (4) the commitment of banks operating in Iraq to the standards of capital adequacy issued by the Central Bank, where the average ratio of capital adequacy of the banking sector during the period of study reached (39.4), as well as the mathematical average of the classification of the capital adequacy index (1) according to the classification of the (PATROL) model. This means that the performance of the banking sector within the classification of capital adequacy index enjoys a strong performance, and falls within the first classification (very good) according to the classification of the model (PATROL), The highest ratio of the capital adequacy index for the banking sector was achieved in 2020 compared to the

research years, reaching (48.77%), which means that banks retain a capital of (0.4877) dinars to meet every dinar of the volume of deposits they have, which indicates the ability of banks to face the losses resulting from deposit withdrawals without being exposed to the problems of failure, and this is reflected positively on the performance of the banking sector, while the lowest capital adequacy ratio (29.48%) in 2018, which means that banks maintain a capital of (0.1506) dinars to meet each dinar of the deposit withdrawals they have, and although this percentage is low compared to other years, it is a good percentage because it is higher than (12%) specified by the Central Bank and the decisions of the Basel Committee (10%).

Table 4: The ratio of capital to deposits for the banking sector in Iraq for the period(2018-2022)

Year	Property rights	Total deposits	Capital adequacy %	Classification
2018	22,670,462	76,893,927	29.48	1
2019	24,599,066	82,106,425	29.96	1
2020	41,416,646	84,924,168	48.77	1
2021	46,127,107	96,071,378	48.01	1
2022	52,663,655	129,083,322	40.8	1
Arithmetic average			39.4	1

Source: Preparing researchers based on the data of the statistical website, Statistical Bulletin, Department of Statistics and Research, Central Bank of Iraq.

4.4.2 Assessing the credit risk index:

Quality of assets is significant importance in evaluating the financial performance of banks, because it is considered the crucial part in the bank's activity that leads its operations towards achieving revenues, because the bank's possession of good assets means generating more income and better evaluation of both bank liquidity, management and capital. The optimal limit of the asset quality index is less than (5%), and the quality of assets is measured by the following ratio (Ferrouhi, 2014):

- Non-performing loans to credit = (non-performing loans / total cash credit) x 100

Table 5: The ratio of non-performing loans to credit for the banking sector in Iraq for the period (2018-2022)

Year	non-performing loans	total cash credit	credit risk %	Classification
2018	4,862,730	38,486,947	12.63	2
2019	4,147,527	42,052,511	9.86	2
2020	4,450,990	49,817,737	8.93	2
2021	4,668,546	52,971,508	8.87	2
2022	4,355,587	60,576,014	7.19	2
Arithmetic average			9.5	2

Source: Preparing researchers based on statistical website data, Central Bank of Iraq.

It is noted from Table (5) that the highest ratio of the volume of non-performing loans to total cash credit was (12.63%) in 2018, and the reason for the increase in the volume of non-performing loans compared to the years of study, reaching about (4.86) trillion dinars, while the lowest ratio of asset quality was (7.19%) in 2022. The reason for this decrease is due to the high volume of cash credit granted compared to the volume of non-performing loans resulting from the success of some banks in recovering part of the loans that were not paid in their dates. This is a good indicator of the efficiency of the proper management of banks in terms of risk management. The average ratio of asset quality for the Iraqi banking sector during the study period was (9.5), as well as the average classification level of the asset quality index (2), This indicates that the

performance of the banking sector according to the credit risk index falls within the second classification (good) and is characterised by satisfactory performance according to the classification of the (PATROL) model.

4.4.3 Evaluation of the profitability index:

The profitability index is an important factor and the most common indicator to measure the performance of commercial banks, as it measures the efficiency of the management of banks in achieving profits. The ratio of return on property rights is an important measure of the percentage of return achieved from each dinar invested from the funds of shareholders. When measuring this ratio, it becomes easy to know the amount of return (net profits) from bank shareholders. The higher this percentage indicates the efficiency of the bank's management to achieve a good percentage of profits. If this percentage decreases, this is a dangerous indicator of banks' inability to meet their obligations to others. The ideal ratio of the profitability index ($1\% \leq$) (Gul Zeb, 2011 p. 54), and the profitability index can be measured by the following ratio:

- The ratio of return on property rights = (net profit after tax / property rights) x 100

Table 6: The ratio of return to property rights of the banking sector in Iraq for the period (2018-2022)

Year	net profit after tax	property rights	Profitability %	Classification
2018	656,464	22,670,462	2.9	1
2019	1,078,387	24,599,066	4.38	1
2020	1,240,230	41,416,646	2.99	1
2021	912,168	46,127,107	1.98	1
2022	2,111,546	52,663,655	4.01	1
Arithmetic average			3.25	1

Source: Preparing researchers based on the data of the statistical bulletin, Department of Statistics and Research, Central Bank of Iraq

This percentage measures the amount of profit achieved as a percentage of equity and is used to measure the efficiency of the management in employing shareholders' funds. Table (6), it is noted that the profitability rates of the banking sector in Iraq during the period of the research reached the highest percentage of the profitability index (4.38%) in 2019 due to the increase in the volume of net profits, which amounted to about (1.08) trillion dinars resulting from the increase in the volume of total profits, while the lowest percentage of the profitability index (1.98%) in 2021, as a result of the decrease in net profits reached about (912) billion dinars, as well as the high volume of total equity, which amounted to about (46.13) trillion dinars, this indicates that banks retain a high percentage of capital, reserves, and undistributed profits to achieve safety for depositors and face withdrawal risks, which is reflected negatively on the profits of banks, as these funds must be used to achieve greater financial returns. It is clear from the table that despite the varying profitability rates during the study period, they did not achieve a rate less than the standard ratio of the profitability index, which is ($1\% \leq$). The arithmetic average of the profitability index was (3.25%), which is higher than (1%). On this basis, the performance of the banking sector during the study period is classified according to the profitability index as the first classification (very good) according to the PATROL model classification; that is, the banking sector enjoys strong performance.

4.4.4 Evaluation of the organisation index:

This percentage measures the efficiency of the banking management in investing the funds obtained by commercial banks from all sources of financing, both internal and external. This percentage is an indicator to measure the financial performance of commercial banks. It reflects the ability and efficiency of the management of banks in running their business and managing their risks. The quality and efficiency of management can be measured by the ratio of

total expenses to banks' total assets. The lower this percentage indicates the efficiency of the department and its ability to deal with its banking operations and activities. The ratio ($25\% \geq$) is the best ratio for the organization index (Samuel, 2018).

- *The ratio of expenses to profits = (total expenses / total profits) × 100*

Table 7: The ratio of expenses to assets for the banking sector in Iraq for the period (2018-2022)

Year	total expenses	total profits	organisation %	Classification
2018	1,942,511	2,253,960	1.58	1
2019	1,961,904	2,522,623	1.47	1
2020	3,103,403	3,951,639	2.24	1
2021	2,355,711	2,721,719	1.48	1
2022	2,391,999	3,859,548	1.2	1
Arithmetic average			1.59	1

Source: Preparing researchers based on the data of the statistical website, Statistical Bulletin, Department of Statistics and Research, Central Bank of Iraq.

It is noted from table (7), which reflects the ratio of total expenses to the total assets of the banking sector during the period (2018-2022), that the arithmetic average of the organisation index was (1.59), while the arage of the classification of the organisation index (1), which means that the banking sector enjoys strong performance, and falls within the first classification (very good) according to the model (PATROL) according to the regulation index, as the lowest percentage of this indicator (1.2%) in 2022, and the reason for this decrease is due to the increase in the volume of total assets, reaching about (3.86) trillion dinars, and this indicates the efficiency of the efficiency of the banking department in reducing operational costs , While the highest percentage of the management efficiency index was (2.24%) in 2020, due to the high volume of total expenses compared to other years of study, as it reached (3.1) trillion dinars resulting from high operational expenses, and despite the increase in this percentage compared to other years of study, it is a good percentage because it is less than the standard ratio of the management efficiency index.

4.4.5 Liquidity Index Assessment:

Bank liquidity represents the ability of banks to face their obligations, which mainly include meeting the requests of depositors to withdraw from their deposits, as well as meeting the requests for cash credit, i.e. loans and advances for the purpose of meeting the needs of individuals or institutions. This requires providing liquid cash with banks adequately and on time, in addition to the ease of obtaining cash quickly and without loss. Liquidity is the ability of banks to meet their obligations in cash and immediately, as the lack of liquidity can expose the bank's reputation to the risks of losing the confidence of depositors in it. The ratio of bank liquidity is an indicator of the ability of cash flows and cash reserves to cover the total deposits. The higher this percentage, the more this indicates that the bank does not face any liquidity problem. The minimum bank liquidity index (30%), which was determined by the Central Bank of Iraq (Financial Stability Report, 2022: 67). Bank liquidity is measured

- *The ratio of legal reserve = (Central Bank's cash reserve / Total deposits) × 100*

Table 8: The ratio of bank liquidity for the banking sector in Iraq for the period (2018-2022)

Year	cash reserve	Total deposits	Liquidity%	Classification
2018	24,710,919	76,893,927	32.14	1
2019	30,555,494	82,106,425	37.21	1
2020	27,221,950	84,924,168	32.05	1
2021	37,545,751	96,071,378	39.08	1
2022	61,514,213	129,083,322	47.65	1
Arithmetic average			37.63	1

Source: Preparing researchers based on the data of the statistical bulletin, Department of Statistics and Research, Central Bank of Iraq.

It is found from Table (8) that the highest level of liquidity index of the banking sector in Iraq during the period of research was achieved in 2022, as the ratio of cash reserve to total deposits reached (47.65%), which means that commercial banks maintain liquid cash assets of (0.4765) dinars to face each dinar of the volume of deposits they have. This indicates the preference of commercial banks to retain a high liquidity ratio to achieve safety for depositors and face withdrawal risks. The reason for the increase in this ratio is due to the high volume of cash reserves of banks at the Central Bank, as it reached about (61.51) trillion dinars as a result of the high surplus reserves, while the lowest ratio of bank liquidity reached (32.05%) in 2020, due to the decrease in the size of cash reserve, which amounted to about (27.22) trillion dinars as a result of the decrease in the legal reserves of banks, as well as the high volume of deposits, which amounted to about (84.92) trillion dinars, this ratio indicates the efficiency of the banking administration in balancing between the volume of liquidity it has and its use of funds to achieve profits. It is also clear from the table that the average liquidity index for the banking sector during the period (2018-2022) amounted to (37.63). The arithmetic average of the bank liquidity index's classification level (1). This indicates that the banking sector enjoys a strong performance and falls within the first classification (very good) according to the classifications of the model (PATROL).

4.5 Evaluating the financial performance of the iraqi banking sector according to the (PATROL) model:

The financial performance of the banking sector in Iraq was evaluated during the period (2018-2022) using the indicators of the (PATROL) system according to the methodology of the composite classification, through which each element of the (PATROL) system is classified on a scale of (1-5) as it represents (1) the best performance, but (5) represents the worst performance. These classifications are collected for each year of the study. An arithmetic average is extracted, and the classification of these averages again on a scale of (1-5) according to the final classification of the (PATROL model). An arithmetic average of the averages is extracted, or an accounting average is extracted for the final classification of the (PATROL) model to evaluate and classify the financial performance of the banking sector in Iraq during the research period (Balaji & Praveen Kumar, 2017).

The evaluation results were presented according to the methodology of the composite classification in Table (9). It is noted from the table that each of the indexes of capital adequacy, profitability, liquidity, and organization has achieved the highest ratings (very good) according to the classification of the (PATROL) model and was characterized by strong performance during the research period. As for the credit risk index (quality of assets) of the banking sector in Iraq, it was characterized by satisfactory performance because it fell into the second classification (good) according to the classification of the PATROL model. It is clear from the table that the final classification of the PATROL model indicators reached (1.2). It is clear from the final classification of the financial performance of the banking sector came in the first level (very good) of the classification during the period (2018–2022), and this indicates the strong performance and sound management of the banking sector, and indicates the strength of banks

and the lack of weaknesses in their performance, and if any, the management of banks can deal with them, and that banks can face any changes in the conditions of the external environment affecting them, and are characterized by their adherence to laws, instructions and regulations. Therefore, banks operating in Iraq do not need strong supervision from regulatory authorities because they have strong performance and efficient risk management.

Table 9: Final evaluation of the performance of the banking sector in Iraq for the period (2018-2022) according to the classification of the Patrol model

Year	Index classification scores					Arithmetic average	Classification (PATROL)
	PAT	R1	R2	O	L		
2018	1	2	1	1	1	1.2	1
2019	1	2	1	1	1	1.2	1
2020	1	2	1	1	1	1.2	1
2021	1	2	1	1	1	1.2	1
2022	1	2	1	1	1	1.2	1
Arithmetic average	1	2	1	1	1	1.2	1

Source: Preparing the researcher based on data extracted from previous tables.

The arithmetic average of the rating scores of the indicators (PATROL) was extracted to evaluate the financial performance of the banking sector in Iraq for each year through the following equation:

$$\text{Average rating score 2018} = \frac{1+2+1+1+1}{5} = 1.2$$

$$\text{Average rating score 2019} = \frac{1+2+1+1+1}{5} = 1.2$$

$$\text{Average rating score 2020} = \frac{1+2+1+1+1}{5} = 1.2$$

$$\text{Average rating score 2021} = \frac{1+2+1+1+1}{5} = 1.2$$

$$\text{Average rating score 2022} = \frac{1+2+1+1+1}{5} = 1.2$$

The computational medium of the averages of the classification scores and the arithmetic medium of the final classification of the (PATROL) model was also extracted through the following:

$$\text{The arithmetic mean of the averages of the ratings} = \frac{1.2+1.2+1.2+1.2+1.2}{5} = 1.2$$

$$\text{The arithmetic medium of the final classification} = \frac{1+1+1+1+1}{5} = 1$$

It is clear from the final results of the classification of the (PATROL) model according to the composite classification methodology reflected in Table (8) that the arguing averages of the classification scores amounted to (1.2), and the computational average of the final classification of the (PATROL) model (1), and this indicates that the financial performance of the banking sector in Iraq during the period (2018 - 2022) fell into the first classification (very good) according to the classification of the (PATROL) model, that is, the banking sector in Iraq during the study period as a whole enjoys strong performance.

5. Discussion of the Results:

The research results showed the importance of applying the PATROL model to assess the financial performance of the banking sector and identify the strengths and weaknesses of banking systems to address them and that the application of this model requires transparency in the reports resulting from the field inspection and control carried out by the regulatory authorities.

The banking sector in Iraq (2018 - 2022) enjoyed strong performance. According to the results of the final evaluation model (PATROL), it was characterized by safe and sound banking operations and efficient risk management. The average final evaluation of the banking sector reached (1), and the sector obtained the first ranking (very good) according to the classification of the PATROL model.

The banking sector in Iraq achieved high rates for both the index of capital adequacy, profitability, organization, and liquidity during the research period, as the average capital adequacy index reached (1.2%), as well as the average of liquidity, profitability, and organization index (1.2%), and this indicates the safety of the financial position of banks operating in Iraq, and the efficiency of the banking administration in balancing bank liquidity and profitability.

Banks operating in Iraq obtained the second classification (good) in the classifications of (PATROL) about credit risk management, as the average credit quality index of the banking sector (2); this indicates the low quality of the assets of the banking sector in Iraq

6.Conclusion:

According to the final results of the research, the banking sector in Iraq during the research period enjoys strong financial performance and its banking operations are characterised by a high rate of security. The management of banks operating in Iraq is efficient in terms of risk management and balancing between the amount of bank liquidity and the volume of profits achieved by banks through their activities. Banks also have assets that carry a degree of risk, and the use of the Patrol model reflects positively on the performance of commercial banks as it determines strengths and imbalances in banking performance and helps the regulatory authorities to make decisions and develop the necessary remedies for the imbalances in the banking business, which was reflected in the success of banks in achieving high rates of profitability while maintaining high liquidity rates.

Through the descriptive approach used to analyse the data for the purpose of evaluating the financial performance of the banking sector, the hypothesis from which the research was launched is validated, and the final evaluation results proved that there is an impact through the use of the PATROL model to evaluate the performance of banks operating in Iraq. The use of this model leads to knowledge of the financial situation of banks and the ability and efficiency of banking management in achieving high profitability at the lowest possible cost while retaining a sufficient amount of liquidity and reducing future risks or reducing their risk to banks.

Authors Declaration:

Conflicts of Interest: None

-We Hereby Confirm That All The Figures and Tables In The Manuscript Are Mine and Ours. Besides, The Figures and Images, which are Not Mine, Have Been Permitted Republication and Attached to The Manuscript.

- Ethical Clearance: The Research Was Approved by The Local Ethical Committee in The University.

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