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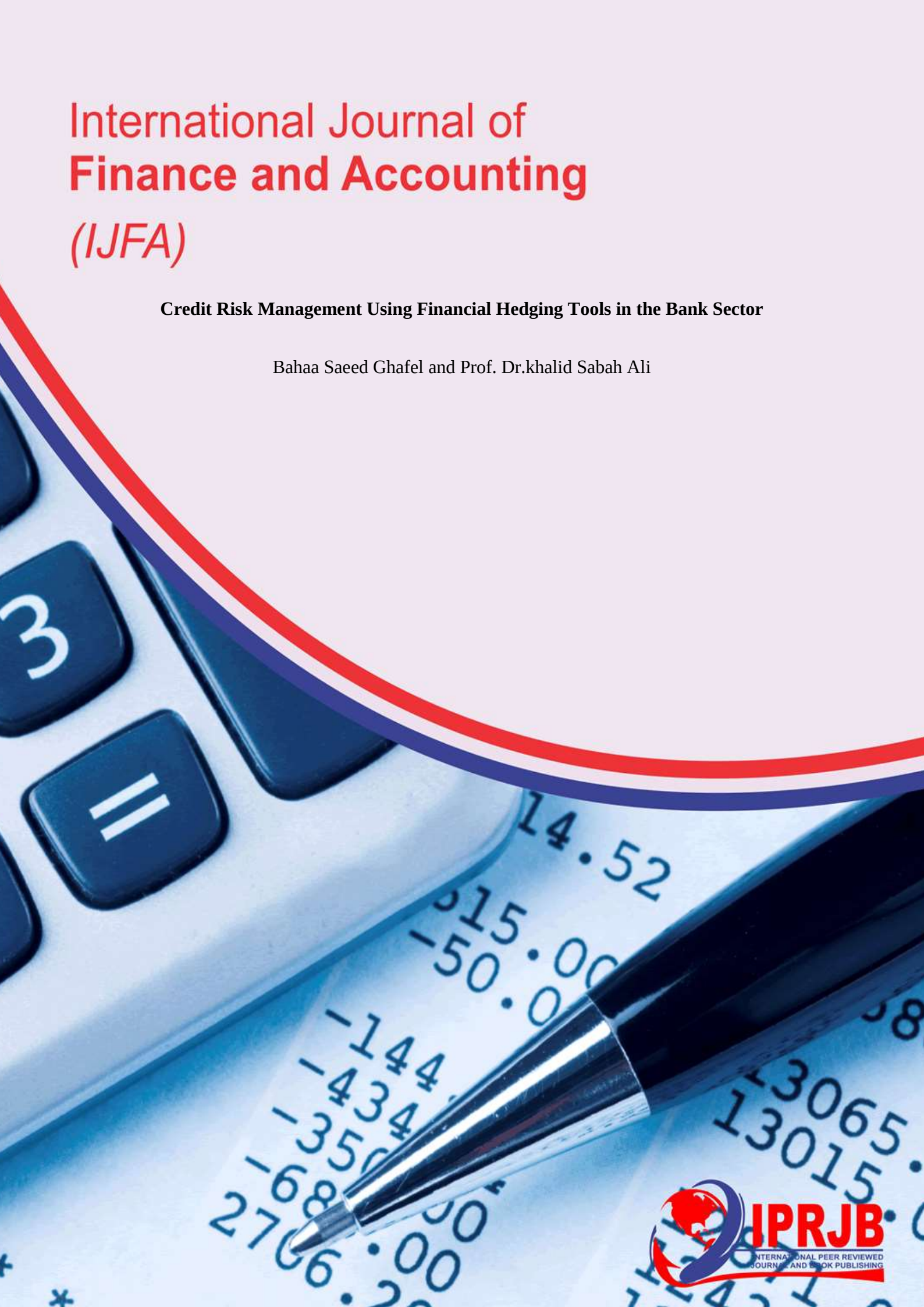

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Credit Risk Management Using Financial Hedging Tools in the Bank Sector

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Abstract

Purpose: To understand the concept of financial hedging tools and credit risk management identify the relationship between hedging tools and credit risk in the banks studied, and measures the impact of using different hedging tools in reducing credit risk. This leads to a set of recommendations for the banks studied

Methodology: The research adopted descriptive-analytical approach, which is one of the most common scientific research methods due to its flexibility and comprehensiveness in presenting and analyzing indicators related to the research variables. In addition, it employed econometric analysis, descriptive statistics, and quantitative hypothesis testing, tailored to the nature of the data from the banks under study, and then drew conclusions to solve the research problem.

Finding: There is significant variation among the five banks in their hedging levels; however, the overall trend shows a clear inverse relationship between the two variables. Banks that achieved higher values on the hedging index recorded lower levels on the credit risk index. This variation reflects differences in internal strategies and the effectiveness of hedging tools in mitigating credit risk and promoting financial stability among the banks.

Unique Contribution to Theory, Practice and Policy: Enhancing awareness of the importance of financial hedging tools in risk management through the development of academic frameworks and the establishment of training programs in this field. This also includes developing theoretical models that explain how financial hedging tools work and their impact on reducing credit risk and achieving financial stability for banks.

Keywords: *Financial Hedging, Credit Risk Management, Banking Sector*

JEL Codes: *G53, G21, L25, M41*

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INTRODUCTION

Credit risk management is a fundamental function for companies and banks. It is defined as the procedures banks implement to reduce and mitigate credit risk. It is also considered a key and important part of a bank's strategic management. Banks are responsible for participating in various investment activities to reduce the credit risk they face, rather than the risk to borrowers, when extending repayment periods. (Naresh& Rao, 2015) Therefore, it is essential for banks to enhance their credit analysis capabilities and develop policies and guidelines for loan management, thus mitigating the negative impact of credit risk on the stability of their financial operations. (Muriithi et al., 2016) This has led to the need for financial hedging instruments. Financial hedging is defined as a precautionary measure whereby risk management develops strategies to avoid major future risks. Examples include commodity hedging, interest rate hedging, and foreign exchange rate hedging. A hedging instrument protects against the risks to which the covered asset is exposed and is often a derivative instrument (such as options, futures, forwards, and swaps); (Sabina & Chimere, Augustine, 2023). For example, a bank that hedges a loan with a variable rate in an interest rate swap, where a variable interest rate is paid and a fixed interest rate is received; the loan becomes the covered asset and the swap the hedging instrument (Milvydiene, 2022), This financial instrument is used by participants in financial activity, including investors, lenders, and bankers, to protect themselves from financial risks. Hedging, therefore, involves individuals and financial institutions seeking to mitigate potential future risks (Ramirez, 2015).

The primary objective of hedging is to transfer anticipated risks to other entities capable or willing to bear them, whether a bank, company, or individual. A good hedging strategy involves selecting the appropriate credit instrument to minimize the costs of hedging risks (Alamad, 2017) and the importance of financial hedging indicators in credit risk management. Since 2007, the banking sector has witnessed significant economic transformations, especially after the global economic crisis, which revealed the complex relationship between different banking risks and rearranged their severity. This led to significant changes in the way's banks respond to and contain these risks that they may be exposed to and that threaten their profitability. Integrated risk management, which allows banks to measure and manage all risks, emphasizes the importance of observing the interactions that occur between different types of risks, which are mainly related to profitable operations and invested funds. Since credit risk is one of the most important risks that banks are exposed to due to its connection to the most important part of their assets and its impact on their profitability (Amnia & Bashir, 2022: 88), it is considered an unavoidable matter when granting loans, as every bank bears a degree of loss when it fails to recover the loan amount or part of it (Fadila, 2015: 252). As has been observed recently, there has been a clear shift in the ways of dealing with credit risks, especially after 2020 and the emergence of the Corona pandemic and the effects it had on the foundations of life in general and on the investment activities of institutions and individuals in particular.

Banks' attention was focused on analyzing the positions of borrowers individually without focusing on a specific economic sector. Now, the attention of bank management has been directed to the loan portfolio in its entirety, which has led to an increase and expansion in the use of new technologies and tools for managing credit risks, for example, transferring risks to other centres capable of bearing these risks, or the process of selling loans, in addition to the creation of other modern types such as credit derivatives, which increase the ability of banks to reduce and manage the credit risks to which they are exposed (Naifar & Shahzad, 2022:1-2).and Credit risk, as defined in recent literature, is the potential for financial losses resulting

from a borrower's inability to meet their obligations. However, this concept has seen significant expansion during and after the COVID-19 pandemic, with credit risk becoming closely linked to unexpected economic shocks, uncertainty in financial markets, and changes in monetary policy. Modern models have also increasingly adopted dynamic analytical tools powered by artificial intelligence and big data to improve default prediction and enhance risk management in volatile environments (Hossain et al., 2025).

LITERATURE REVIEW

Concept of Financial Hedging Instruments

The term "financial hedging instruments" has multiple definitions and can be considered fundamental pillars that banks resort to in order to protect themselves from financial risks arising from unforeseen events or whose likelihood increases over time in the absence of an appropriate policy response(Balmer,2018). Financial risks affect their operations in terms of changes in investment value due to market factors (stock prices, foreign exchange rates, interest rates, and commodity prices), in addition to credit risks resulting from a debtor's failure to meet their obligations according to the agreed terms, as well as liquidity problems that demonstrate the difficulty in accessing the required cash (i.e., the inability to sell an asset quickly enough and at the right time to avoid losses or achieve the desired return). Financial hedging methods fall into two main approaches: the natural hedging approach, which relies on protecting the institution from unsystematic investment risks by adopting diversification through the formation of a securities portfolio. An investor who puts their money into a single investment will be exposed to greater risks than an investor who diversifies their investments (Aven, 2015), the second approach is the financial hedging approach, which relies on entering into financial transactions with the aim of reducing losses.

The risks or price fluctuations resulting from financial instruments known as derivatives can be mitigated by transferring these risks to other parties capable of predicting market volatility and absorbing the resulting losses. (Saharan&Rajendran,2024) Financial hedging strategies include: short-term hedging, which is used to hedge against future price declines in financial instruments or investment portfolios. In this context, the investor takes a short position by selling a futures contract on a futures exchange, committing to deliver the underlying asset at a fixed price on a future date. This transfers the risk of price fluctuations to the buyer. Consequently, if the price falls in the spot market, the future price will also fall, thus providing some protection against losses. Long-term hedging is used to hedge against rising prices of financial instruments and investment portfolios by purchasing futures contracts to ensure price stability upon future delivery. (Badshah et al., 2024), the investor takes a long position in the futures contract to hedge against future price increases. This approach is suitable when an institution is aware of its desire to acquire the asset. A specific asset is being hedged in the future, and the goal is to stabilize its current price. The core idea of a cross-hedging strategy is to use an alternative futures contract that shares similar characteristics with the underlying asset and has a price relationship with it. (Hull, 2016).

The relationship between the two assets is evaluated through statistical analysis, particularly regression analysis, to determine the size and type of position in accordance with the contract terms. The success of this strategy depends on the level of economic stability and the relationship between the two currencies involved in the contract (Shapiro, 2019). And a hedging instrument protects against the risks to which the covered asset is exposed. There are several methods that can be used to manage and reduce bank credit risks, including:

- Diversification, which refers to the bank's approach to mitigating risks arising from concentrating its dealings with a single client, economic sector, or specific geographic region. The bank also monitors the client's activity to verify their ability to fulfil the terms of the credit agreement, such as maintaining liquid assets that contribute to their financial stability, providing necessary information for granting credit, or offering facilities like guarantees.
- Accurate risk assessment by the bank is crucial, as it directly impacts the desired return on the loan. The loan amount and interest are determined according to prevailing market interest rates, along with fees and administrative expenses, considering any applicable risk premiums.
- Hedging against credit losses using credit derivatives is one of the most important and successful financial innovations of the past decade in financial markets. The concept originated from traditional financial derivatives, allowing for different credit risk management by separating it from other financial risks of the same asset and transferring it to other market participants capable of bearing these risks (Mahri, 2015:110). Examples include credit default swaps, total return swaps, credit-linked bonds, and credit margin options.
- Default management involves banks specifying in their credit policies the presence of a third party (guarantor) to whom recourse is made if the borrower defaults. Examples include credit risk insurance, where the insurance company (the insurer) undertakes to compensate banks (the insureds) for losses they may incur according to the contract between them. This compensation is paid in advance by the bank to the insurance company, known as the insurance premium. Securitization is another tool used by banks to convert debt. The process of converting illiquid assets (loans) into tradable securities in financial markets aims to reduce credit risk, ensure liquidity, and enhance economic efficiency.

The Methods of Managing bank credit risk are as follows:

- Diversification: This is a method that banks can adopt when granting loans to reduce risks arising from concentrating their dealings with a single client, economic sector, or specific geographic region. Diversification protects banks from significant and impactful risks resulting from clients' inability to repay.
- Monitoring: This means that the bank monitors the client's activity to verify their ability to fulfil the terms of the credit agreement, such as maintaining liquid assets that contribute to their financial stability, providing the necessary information to complete the credit process, or offering facilities such as guarantees. (Mahri, 2015:110).
- Risk Pricing: This is implemented by the bank accurately determining the degree of risk, as this is linked to determining the required return on the loan. The loan amount and its interest are determined according to prevailing market interest rates, in addition to setting fees and administrative expenses, considering any applicable risk premium. The required return must cover the additional risk costs borne by the bank, as well as its administrative expenses, to ensure a profit margin.

- Hedging against credit losses using credit derivatives is one of the most important and successful financial innovations of the past decade in financial markets. The concept originated from traditional financial derivatives, allowing for the management of credit risk differently by separating it from other financial risks associated with the asset itself and transferring it to other market participants capable of bearing these risks Credit derivatives are classified into several types, including:

1. Credit Risk Swaps (CRS): also known as credit default swaps, are contractual agreements between two parties: the buyer and the seller of the hedge. The buyer, who is the speculator of the credit risk surrounding the asset, pays a premium of a specified amount to the seller. The seller then undertakes to compensate the buyer with the value of the debt instrument being hedged, whether a loan or bond, in the event of a credit event affecting a third party, known as the investment entity (Choudhry, 2013:23).
2. Total Return Swaps Contracts: Under a TRS contract, the buyer of the protection (the payer of the return) transfers the total returns to the seller of the protection (the payee of the return) periodically throughout the term of the derivative contract. In return, the seller of the protection pays a total return determined by a base rate or price (such as LIBOR). This return includes a floating interest rate, in addition to any increase or decrease in the market value of the underlying asset (the debt instrument) (Vallabhaneni, 2022:205).
3. Credit Linked Bonds: The issuer of a Credit Linked Bond (CLN) sells it to the investor (the buyer of the protection) in exchange for the returns. Simultaneously, the issuer sells a CDS contract to another party with a financial obligation to the investment bank, which pays the fees to the issuer. The CLN is then partially converted into a coupon.
4. The investor in the Credit Linked Bond also pays a previously deducted fee in exchange for the returns. The floating interest rate (LIBOR), plus any differences at maturity to compensate for the risk of default, is then arranged in another contract with another company specializing in insuring against default, such as a Special Purpose Vehicle (SPV). Although the investor represents a risk to the collateral

Concept of Credit Risk

This refers to the expected losses incurred by a bank when a borrower (the counterparty) fails to meet their credit obligations according to the agreed-upon terms. Credit risk arises from various sources, most notably those related to the borrower or the lending institution, or those stemming from factors beyond the control of either party. Consequently, the bank incurs actual losses resulting from the failure to recover the loan and its interest, impacting the efficiency and financial standing of banks (Demiralay, 2022). Sources of credit risk can be unsystematic, related to the internal conditions of the bank or a particular industry, or systematic, which affects all banks regardless of their internal circumstances, arising from external factors such as economic, political, or social ones that are difficult to control. (Scott et al., 2024). Several methods exist for managing credit risk, including: avoiding risk by granting high-risk loans; reducing risk by using hedging instruments such as credit derivatives or merging units exposed to credit risk; transferring risk, i.e., shifting it from one party to another willing to bear the risk through the use of financial contracts; and voluntarily or involuntarily retaining risk. Voluntary, or risk diversification, credit risk management aims to reduce credit risk in line with the bank's efficiency and capacity, ensuring compliance with all laws and procedures under various circumstances; It also assists in making appropriate decisions to guarantee the bank's stability by maximizing returns and reducing risks within capital requirements, minimizing risk

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management costs, and stabilizing cash flows to enhance the bank's competitiveness and increase customer confidence. Before a bank determines the appropriate hedging strategy for credit risk management, it must consider three fundamental pillars: First, it should not focus solely on borrower data but also analyse expected credit risks. (Oduro et al., 2019), Second, it should consider environmental risks, risks associated with the bank's operations, and the bank's age.

Third, it should consider the loan repayment rate, repayment time, and the likelihood of borrower default. From a practical standpoint, managing all credit risks is difficult. Therefore, banks focus on managing their loan portfolios by managing their exposure to risk, enabling them to then direct their efforts accordingly (Farhat, 2019). Its financial resources are directed towards applying hedging methods against potential credit risks. Credit risks are managed through various hedging methods, which are divided into two main types: traditional methods and modern methods. Traditional methods are represented by banks relying on a set of precautionary measures such as diversifying the loan portfolio, requesting guarantees, pricing risk, and creating provisions to address non-performing loans, as well as setting credit limits for customers. Traditional methods aim to reduce the probability of credit default before it occurs. Modern methods have emerged with the development of financial markets, and include the use of financial derivatives and various financial instruments to transfer risks to other parties willing to bear these risks, such as credit risk swap contracts (CDSs), total return swap contracts (TRSs), credit-linked bonds (CLNs), credit margin options (CSOs), insurance, and securitization. (Doumpos,et al.,2019)) And the following figure illustrates the key steps for credit risk management

Figure 1: Key Steps for Credit Risk Management

Source: Prepared by Researchers

The Importance of Credit Risk Management

Based on the organizational and procedural foundations, the importance of credit risk management becomes clear. Its primary objective is to assess risks and take hedging measures against them without impacting bank profits. It provides knowledge regarding the causes of risk exposure, and a comprehensive, systematic approach to accurate information helps in making sound decisions, thus reducing operational disruptions. It also fosters a clear vision upon which to base decisions, define methods and strategies, and act accordingly. Furthermore, it assists in pricing policy decisions and enhances the competitive advantage of banks by

managing current and future expenses. To ensure the effectiveness of risk management and achieve the desired objectives, banks rely on a set of fundamental principles that define the procedures and steps to be followed in dealing with credit risks.(Abdul Hadi,2016) . These principles are as follows (Rehman et al., 2019).

- A thorough risk analysis by studying the borrower's financial situation, credit history, and ability to generate continuous cash flows.
- Diversifying the loan portfolio: by distributing loans across a range of clients and different economic activities instead of concentrating them on a single entity or activity. One Economist
- Appropriate Risk Pricing: When the risk associated with the borrower is high, a higher credit cost, such as interest, is set to compensate the bank for the potential risks (EY,2017)
- Requiring Collateral: Banks require collateral from borrowers, such as mortgages or other assets, which can be reclaimed in case of default.
- Continuous Monitoring: The bank continuously monitors borrowers after the loan is granted to ensure their ability to repay and to monitor any fluctuations in their economic circumstances that could affect their ability to do so. The principles include establishing a clear administrative structure, distributing tasks and responsibilities, privatizing and organizing operations, and defining the responsibilities of each entity within the bank and the matters assigned to it (Asadi, et al., 2025)

In recent years, the use of hedging instruments has expanded beyond simply mitigating volatility or managing market risks. It has become pivotal in supporting regulatory compliance, particularly within the framework of the Basel Committee on Banking Supervision's requirements and the Basel III and Basel IV standards. These standards mandate that banks maintain sufficient capital levels to mitigate various risks, primarily credit risk, through capital adequacy ratios based on risk-weighted assets. In this context, hedging instruments such as derivatives and risk transfer contracts contribute to reducing net risk exposure, thereby lowering the value of risk-weighted assets and improving capital adequacy ratios. Furthermore, effective hedging mechanisms enable banks to improve the management of both economic and regulatory capital by reducing capital requirements for specific risks, provided that the hedging instruments meet the regulatory recognition criteria stipulated in the Basel framework. However, the effectiveness of these tools remains contingent on their compliance with transparency and disclosure requirements, as well as the limited baseline risks that could reduce hedging efficiency Thus, financial hedging can be viewed as a strategic tool that extends beyond risk management to include enhancing regulatory compliance and improving capital utilization efficiency, particularly in the contemporary banking environment characterized by stringent regulatory requirements and high levels of uncertainty.

METHODOLOGY

Descriptive analysis: The research adopted the descriptive-analytical approach due to its flexibility and comprehensiveness in presenting and analysing indicators related to the research variables. The results were analysed for a sample of five private Iraqi banks listed on the Iraq Stock Exchange, as shown in the following table

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Table 1: Banks Sample for Research

Bank Name	Year of Establishment	Capital at Establishment
Bank of Baghdad	1992	**100 million Iraqi dinars**
Iraq Middle East Investment Bank	1993	**400** million Iraqi dinars
National Bank of Iraq	1995	**400** million Iraqi dinars
Gulf Commercial Bank	1999	**600** million Iraqi dinars
Ashur International Investment Bank	2005	**250** million Iraqi dinars

Source: Researchers, based on Official Bank Reports

From the previous table, we observe that the oldest bank was established in 1992 and that its minimum capital is 100 million Iraqi dinars .

RESULTS AND DISCUSSION

The researchers will analysis of the metadata and results for the banks in the research sample, based on the Hedging Ratio (HCR) for the independent variable and the Non-Performing Loan Ratio (NPLR) is as follows:

- **Hedging Ratio (HCR):** It is possible to transfer risk from a bank to other entities willing to bear this risk. One excellent method for transferring risk is hedging. This is a means of transferring risk through the purchase and sale of assets and their future delivery. Hedging protects itself from any changes in market prices from the moment the financial product is purchased until the moment it is sold. Risk is often transferred to other parties through a specific contract whereby one party bears the losses on behalf of another It is calculated using the following formula: (Al-Marsoumi, 2017).
    - {Hedging Ratio (HCR) = Hedging Instrument / Total Non-Performing Loans * 100}

Table 2: Hedging Ratio for Banks in Research Sample Period from (2014-2024)

Years	Bank of Baghdad	Iraq Middle East Investment Bank	National Bank of Iraq	Gulf Commercial Bank	Ashur International Investment Bank
2014	1,398	14,588,24	28,401	20,067,0	0,137
2015	0,908	5,037,000	0,979,0	115,497	0,033
2016	0,023	6,982,000	0,849,0	112,293	0,013
2017	0,030	0,768,000	0,236,0	13,011,0	0,012
2018	0,170	0,503,000	0,312,0	9,4420,0	0,024
2019	0,155	0,720,000	0,945,0	14,326,0	0,014
2020	0,213	0,061,000	0,676,0	16,849,0	0,093
2021	0,198	0,085,000	1,089,0	2,0580,0	0,221
2022	0,158	0,662,000	1,263,0	2,3050,0	0,078
2023	0,324	186,605,0	1,533,0	5,7980,0	0,048
2024	0,150	0,153,000	1,093,0	11,745,0	0,028
MIN	0,0230	0,061,000	0,236,0	2,0580,0	0,0120
MAX	1,3980	14,588,24	28,40,1	115,497	0,2210
AVERAGE	0,3390	1,344,529	3,398,0	29,399,0	0,0640
SD	0,004,056	41,883,65	0,0791,52	0,401,965	0,000,624

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Source: Researchers, based on official bank reports

The results of the table above show that there is a variation in the hedging ratio (HCR) of banks over the years of the study, as it increased in some years and decreased in others. The table data also shows that Iraq Middle East Investment Bank recorded the highest overall average among the other banks at 1,344,529 and the highest standard deviation of 41,883,645. This indicates that despite the bank's good policy in managing credit risks, there is a significant variation in the degree of hedging between the years. It is also noted that Ashur International Bank recorded the lowest average at 0.064% and the lowest deviation at 0.000624. This is the opposite of Iraq Middle East Investment Bank results, as it indicates the stability of the hedging level for Ashur Bank over the years of the study. However, at the same time, it reflects its conservative approach to managing credit risks and the limited use of hedging tools. That is, the bank seeks to maintain a stable and consistent level of coverage against risks, despite its weakness, when compared to other banks.

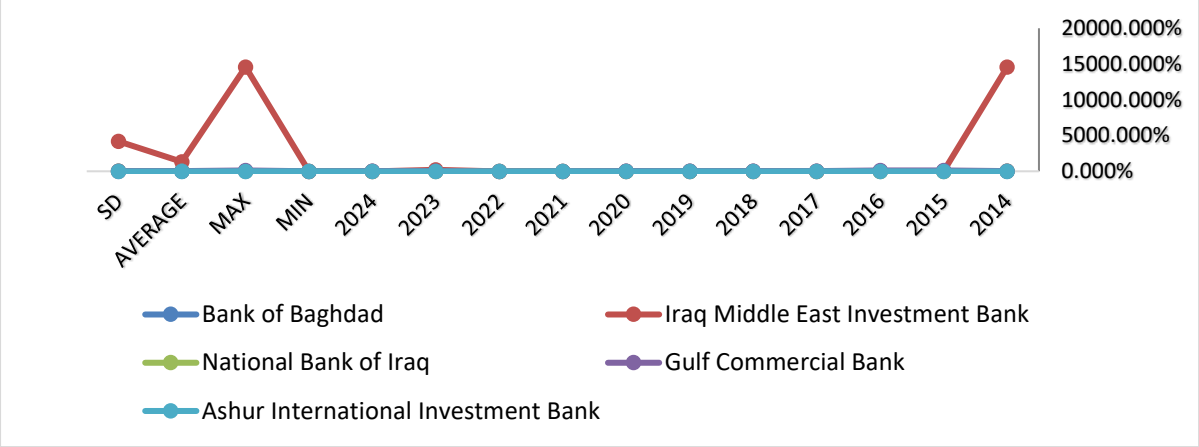

Figure 2: Shows Hedging Trend of Banks in Research Sample for Period (2014-2024)

Source: Researchers, based on the Data in Table (2).

- **Non-Performing Loan Ratio (NPLR):** The non-performing loan (NPL) ratio is a key indicator for measuring credit risk in commercial banks. This ratio reflects the bank's credit quality and serves as an indicator of credit risk management due to its role in determining the ratio of loan losses to total outstanding loans. (Al-Rubaie, 2018) It is calculated using the following formula:

{**(NPLR) = Total NPLs / Total Outstanding Loans) * 100}**

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Table 3: Non-performing Loans Ratio

Years	Bank of Baghdad	Iraq Middle East Investment Bank	National Bank of Iraq	Gulf Commercial Bank	Ashur International Investment Bank
2014	2,11	1,40	7,32	7,10	2,08
2015	2,51	3,89	1,01	1,61	4,60
2016	3,74	9,19	1,84	1,37	7,09
2017	4,19	1,04	3,79	2,19	4,09
2018	9,69	1,75	2,04	3,02	3,37
2019	9,51	1,15	8,26	1,75	1,30
2020	1,16	1,83	7,01	1,44	1,77
2021	1,26	1,75	2,86	1,45	2,99
2022	1,41	6,56	2,57	1,71	3,07
2023	8,63	7,93	2,33	6,33	2,85
2024	1,53	5,98	4,23	4,94	3,82
MIN	1,41	1,15	2,04	1,71	2,08
MAX	4,19	3,89	4,23	6,33	4,60
AVERAGE	1,77	9,04	1,47	1,87	2,10
SD	1,26	1,07	1,42	1,68	1,65

Source: Researchers, based on Official Bank Reports

The data in the table above shows that Iraq Middle East Investment Bank recorded the lowest non-performing loan ratio at 1,15 %, indicating the bank's good efficiency in loan management and consequently lower default rates. Gulf Commercial Bank, on the other hand, recorded the highest non-performing loan ratio at 6,33%, indicating its exposure to loan defaults by customers National Bank of Iraq average ratio of 1,47% is the best compared to other banks, The Middle East Investment bank achieved the lowest standard deviation of 1,07%, indicating stable performance and a lower default rate compared to other banks.

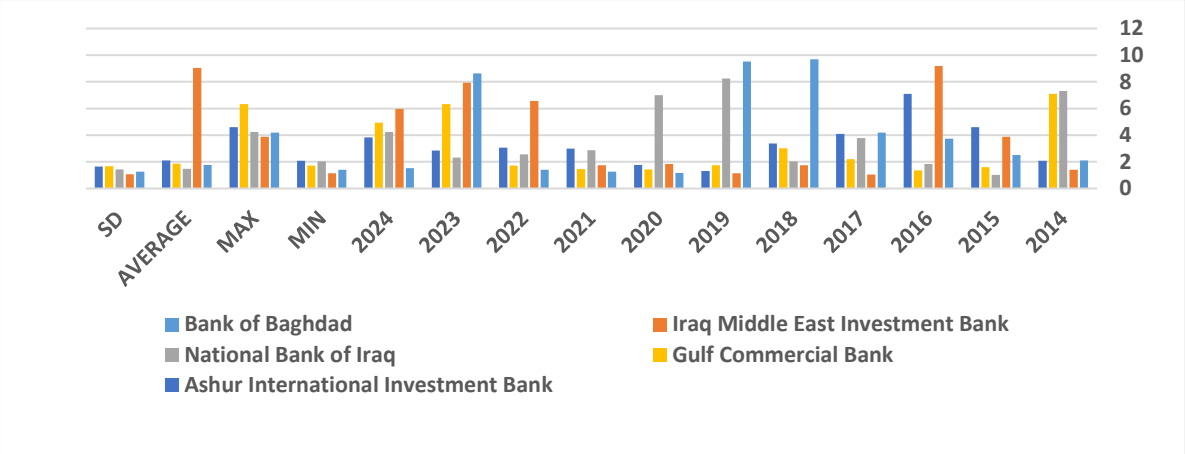

Figure2. Shows Trend of Non-Performing Loan Ratio for banks in Research Sample for Period (2014-2024)

Source: Researchers, based on the Data in Table (3)

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Table 4: Hedging Ratio HCR% and Non-Performing Loan Ratio NPLR% for Banks in Research Sample for Period (2014-2024)

Years	Bank of Baghdad		Iraq Middle East Investment Bank		National Bank of Iraq		Gulf Commercial Bank		Ashur International Investment Bank	
	HCR	NPLR	HCR	NPLR	HCR	NPLR	HCR	NPLR	HCR	NPLR
2014	1,398	2,11	14,588,24	1,40	28,401	7,32	20,067,0	7,10	0,137	2,08
2015	0,908	2,51	5,037,000	3,89	0,979,0	1,01	115,497	1,61	0,033	4,60
2016	0,023	3,74	6,982,000	9,19	0,849,0	1,84	112,293	1,37	0,013	7,09
2017	0,030	4,19	0,768,000	1,04	0,236,0	3,79	13,011,0	2,19	0,012	4,09
2018	0,170	9,69	0,503,000	1,75	0,312,0	2,04	9,4420,0	3,02	0,024	3,37
2019	0,155	9,51	0,720,000	1,15	0,945,0	8,26	14,326,0	1,75	0,014	1,30
2020	0,213	1,16	0,061,000	1,83	0,676,0	7,01	16,849,0	1,44	0,093	1,77
2021	0,198	1,26	0,085,000	1,75	1,089,0	2,86	2,0580,0	1,45	0,221	2,99
2022	0,158	1,41	0,662,000	6,56	1,263,0	2,57	2,3050,0	1,71	0,078	3,07
2023	0,324	8,63	186,605,0	7,93	1,533,0	2,33	5,7980,0	6,33	0,048	2,85
2024	0,150	1,53	0,153,000	5,98	1,093,0	4,23	11,745,0	4,94	0,028	3,82
MIN	0,0230	1,41	0,061,000	1,15	0,236,0	2,04	2,0580,0	1,71	0,0120	2,08
MAX	1,3980	4,19	14,588,24	3,89	28,40,1	4,23	115,497	6,33	0,2210	4,60
AVERAGE	0,3390	1,77	1,344,529	9,04	3,398,0	1,47	29,399,0	1,87	0,0640	2,10
SD	0,004,056	1,26	41,883,65	1,07	0,0791,52	1,42	0,401,965	1,68	0,000,624	1,65

Source: Researchers, based on Official Bank Reports

The results indicate that the five banks vary significantly in their hedging levels. However, the overall trend shows a clear inverse relationship between the two variables. Banks that achieved higher values on the hedging index recorded lower levels on the credit risk index. This disparity reflects differences in internal strategies and the effectiveness of hedging tools in reducing credit risk and enhancing financial stability among the banks. Furthermore, some banks may only partially adopt hedging or implement it in specific sectors, making its impact on credit risk less pronounced. From this perspective, the importance of accurately evaluating each bank's hedging strategy becomes clear in order to maximize its effectiveness in mitigating risk.

Conclusion

- Financial hedging tools help protect banks from credit losses that occur when customers or institutions borrow money and are unable to repay due to market fluctuations or unforeseen economic conditions. This allows banks to expand their lending.
- Appropriate hedging methods give banks flexibility in making lending decisions to stabilize cash flows and profits.
- Hedging methods enhance the bank's efficiency in using capital, as well as boosting customer confidence in the bank due to its competence and preparedness to face potential risks.
- Hedging is not merely a means of reducing losses, but a strategic tool that contributes to financial planning, risk management, and sound credit decisions.

Recommendations

- Enhancing awareness of the importance of financial hedging tools in risk management through the development of academic frameworks and the establishment of training programs in this field.
- Highlighting the importance of modern hedging tools within the theoretical frameworks of financial risk management.

- The senior management of the banks studied should shift from general defensive hedging to proactive, targeted risk hedging, and conduct a cost-benefit analysis of hedging tools before implementing them.
- Measuring the concentration level of the bank's loan portfolio, designing specialized hedging programs for highly concentrated sectors, and reducing general, untargeted hedging across diversified portfolios, as this creates a false sense of security and may increase moral hazard.

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