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The Role of Interest Rate Sensitivity in Determining the Quality of Bank Assets
(An Analytical Study of Sample Data from Banks in a Number of Gulf Cooperation Council Countries for the Period 2013-2023)

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Abstract
This research aims to conduct an in-depth analysis of the decisive impact of interest rate sensitivity on asset quality in Gulf Cooperation Council (GCC) banks, exploring this relationship within a volatile economic environment characterized by rapid fluctuations in interest rates. The fundamental research problem lies in understanding the mechanisms through which interest rate fluctuations and banks' classification of their sensitivity to these fluctuations affect the quality of their core asset portfolios, particularly loans and investments, and the resulting potential challenges to banks' financial stability. To achieve this objective, the research focuses on a population comprising 40 commercial banks listed on major stock exchanges in GCC countries (Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates-Dubai). A purposive sample of 12 banks was selected, representing 30% of the population, with data analysis conducted over a full decade from 2013 to 2023. The research reached a pivotal conclusion confirming that banks' sensitivity to interest rate fluctuations is not merely an important factor, but rather a principal and statistically significant determinant of their asset quality, where asset quality is directly affected by the extent of the bank's exposure to these risks. Based on these fundamental findings, the research recommends that banks in the region adopt more sophisticated and proactive strategies for interest rate risk management that extend beyond traditional hedging to include continuous restructuring of asset portfolios and enhancement of internal assessment mechanisms for credit and investment quality, with the aim of maintaining asset resilience and strength in facing market volatilities, thereby strengthening the overall banking sector's robustness.

Keywords: *Interest rate sensitivity, Asset quality, Non-performing loans, Asset-liability sensitivity, Risk assessment.*

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دور حساسية أسعار الفائدة في تحديد جودة الموجودات المصرفية (دراسة تحليلية لبيانات عينة من المصارف في عدد من دول مجلس التعاون الخليجي للفترة (2013 – 2023))

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المستخلص

يهدف هذا البحث إلى تحليل عميق للتأثير الحاسم لحساسية أسعار الفائدة على جودة الموجودات في المصارف بدول مجلس التعاون الخليجي، مستكشفاً هذه العلاقة في ظل بيئة اقتصادية متقلبة تتسم بالتغيرات المتسارعة في أسعار الفائدة، وتكمن المشكلة الجوهرية للبحث في فهم الآليات التي من خلالها تؤثر تقلبات أسعار الفائدة وتصنيف المصارف المختلفة لحساسيتها تجاه هذه التقلبات، على جودة محفظة موجوداتها الرئيسية وبالأخص القروض والاستثمارات وما ينجم عن ذلك من تحديات محتملة على الاستقرار المالي للمصارف، ولتحقيق هذا الهدف، يركز البحث على مجتمع يضم 40 مصرفاً تجارياً مدرجاً في بورصات رئيسية بدول مجلس التعاون الخليجي (السعودية، الكويت، قطر، والإمارات العربية المتحدة - دبي)، حيث تم اختيار عينة هادفة تشمل 12 مصرفاً، تشكل 30% من المجتمع، مع تحليل بياناتها على مدى عقد كامل من 2013 إلى 2023، وقد توصل البحث إلى استنتاج محوري يؤكد أن حساسية المصارف لتقلبات أسعار الفائدة ليست مجرد عامل هام، بل هي محدد رئيسي ومعنوي لجودة موجوداتها حيث تتأثر جودة الموجودات بشكل مباشر بمدى تعرض المصرف لهذه المخاطر، بناءً على هذه النتائج الجوهرية، يوصي البحث بضرورة قيام المصارف في المنطقة بتبني استراتيجيات أكثر تطوراً واستباقية لإدارة مخاطر أسعار الفائدة لا تقتصر على التحوط التقليدي بل تشمل إعادة هيكلة محافظ الموجودات بشكل مستمر وتعزيز آليات التقييم الداخلي لجودة الائتمان والاستثمار بهدف الحفاظ على مرونة الموجودات وقوتها في مواجهة تقلبات السوق، وبالتالي تعزيز متانة القطاع المصرفي ككل.

الكلمات المفتاحية: *حساسية خطر أسعار الفائدة، جودة الموجودات، القروض المتعثرة، حساسية الموجودات والمطلوبات، تقييم المخاطر.*

1. Introduction

The banking sector in Gulf Cooperation Council countries is experiencing remarkable growth and increasing dynamism, making it a vital component in supporting economic development in the region. With this growth, banks are exposed to a diverse range of risks that require effective management to maintain financial stability and enhance competitive capability. Among these risks, interest rate sensitivity and asset quality emerge as principal factors that significantly impact banks' performance and financial soundness. Interest rate sensitivity arises from fluctuations in market interest rates, which can affect banks' net interest income as well as the value of their assets and liabilities. The importance of this sensitivity increases amid global and regional economic changes, which may lead to increased uncertainty regarding future interest rate trends. Therefore, banks need to develop effective strategies for managing interest rate sensitivity, including the use of derivative financial instruments and effective hedging.

Asset quality refers to the quality of assets held by banks, primarily loans and investments. Asset quality is considered a crucial indicator of banks' ability to generate profits and meet their obligations, as declining asset quality can lead to increased non-performing loans and credit losses, thereby negatively affecting banks' profitability and capitalization. Asset quality is influenced by several factors including economic conditions, lending policies, and risk management practices in banks.

In this context, this study addresses the challenges faced by banks in Gulf Cooperation Council countries in managing these risks. The research problem is to understand the nature of the relationship between interest rate sensitivity and asset quality. This is particularly relevant given the lack of previous studies linking these specific variables in the GCC context.

Therefore, the objectives of this study are to:

- Establish a theoretical model illustrating the nature of the relationship between interest rate sensitivity and asset quality.
- Empirically test this model using actual data from banks in the Gulf region.
- Provide valuable insights and recommendations for practitioners and policymakers to help maintain financial stability.

To achieve these objectives, the study relies on a purposeful sample of 12 commercial banks listed on stock exchanges in Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates, chosen from a population of 40 banks. This sample represents 30% of the population for the period from 2014 to 2023. The selection of this sample was based on the availability of data in their annual reports and their significant influence on the regional financial and economic landscape. The significance of this study lies in its contribution to bridging the knowledge gap on this vital topic, making its findings a valuable resource for academics and financial specialists.

2. First Axis: Research Methodology

2.1 Research Model

The study depends on a number of variables through which the study scheme and directions of correlation and influence relationships between those variables are determined. The study includes the following variables:

1. **Independent Variable:** Interest Rate Risk
2. **Dependent Variable:** Asset Quality

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Figure (1) - Research Model

Source: Prepared by the researchers

2.2 Main Research Hypotheses

The study adopts a number of hypotheses in light of which relationships between its variables will be tested according to the model adopted by the researchers, which were as follows:

B. Financial Analysis Hypotheses:

- **First Hypothesis:** (Difference in interest rate sensitivity levels in the study sample banks)
- **Second Hypothesis:** (Difference in asset quality levels in the study sample banks)

C. Statistical Analysis Hypotheses:

Statistical hypotheses will be tested at a hypothetical significance level (0.05), which were as follows:

A. Correlation Hypotheses:

- **Main Hypothesis:** (There exists a significant correlation relationship with statistical significance between interest rate risks and asset quality for the investigated banks)

B. Impact Hypotheses:

- **Main Hypothesis:** (There exists a direct impact with statistical significance of interest rate sensitivity on asset quality)

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2.3 Research Limitations

A. Temporal Boundaries: The temporal boundaries of the research extended for the period between (2014-2023).

B. Spatial Boundaries: The spatial boundaries of the research are represented by banks in several Gulf Cooperation Council countries.

C. Substantive Boundaries: Represented in interest rate risks and asset quality.

2.4 Analysis Methods

Analysis methods for the current study varied between financial analysis and statistical analysis, the tools of each were as follows:

1. Financial Analysis Methods:

A set of financial indicators was used to analyze the investigated banks' data to test financial analysis hypotheses according to the following indicators:

A. Interest Rate Risk Variable:

- Interest-sensitive assets
- Interest-sensitive liabilities

Interest sensitivity rate can be measured as follows: **Interest Sensitivity Ratio = Interest-sensitive assets / Interest-sensitive liabilities**

B. Asset Quality Variable for banks in the sample, which will be measured using the equation in Table (1):

Table (1) - Asset Quality Measures for Banks

Symbol	Measure	Equation
A	Asset Quality	Total Non-Performing Loans / Total Loans

2. Statistical Analysis Methods:

Several statistical tests will be applied to obtain results related to testing statistical analysis hypotheses according to the following:

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A. Using arithmetic mean to describe and compare financial analysis results among study sample banks, as well as relying on these means data for statistical analysis.

B. Applying simple and multiple correlation coefficients to identify correlation relationships between study variables and their dimensions.

C. Applying simple and multiple regression coefficients to identify the impact of independent variables and their dimensions on the dependent variable.

3. Second Axis: Theoretical Framework

3.1 Interest Rate Risk

3.1.1 Concept of Interest Rate Risk:

The Basel Committee on Banking Supervision provides a widely accepted definition of interest rate risk with three key dimensions: shock (potential interest rate changes), exposure (bank's actual positions), and impact (implications of rate changes on bank positions) (Barkley, 2019).

Interest rate risk occurs when asset and liability maturity periods are mismatched, involving risks of rising borrowing costs or declining deposit returns from interest rate movements and asset-liability mismatches (Onyango & Kalunda, 2023).

Koch and MacDonald define interest rate risk for banks as potential losses from unexpected interest rate changes that can significantly impact bank profitability and equity market value (Håkansson & Åberg, 2012).

Interest rate risk is depositors' exposure to financial loss through rate movements, divided into "general risk" from maturity transformation (taking short-term deposits to finance long-term credit) and "specific risk" from any

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future-dated transactions affecting the bank's position (Håkansson & Åberg, 2012).

While accepting interest rate risk is natural in banking, excessive or poorly monitored levels threaten bank profits through volatilities in net interest income and underlying asset values, requiring effective risk management to maintain prudent levels (Güz, 2020).

Interest rate risk is the potential impact on institutional earnings and net asset values from rate changes, arising when repricing dates vary between principal and interest cash flows, with risk amounts depending on the size and direction of rate changes and mismatch position structure (Choudhry, 2018: 3).

Interest rate risk is the exposure of current or future earnings or capital to rate changes, affecting earnings through interest-sensitive income and expenses, and capital through net present value changes, with excessive levels threatening liquidity, earnings, capital, and solvency (Federal Housing Finance, 2013).

3.1.2 Types of Interest Rate Risk:

Interest rate risk can come in a variety of forms including repricing risk, yield curve risk, basis risk, and optionality, which can be clarified through the following and in Figure (2): (Srivastava, 2020)

A. Repricing Risk: Banks face interest rate risk due to timing differences between when their assets and liabilities mature or reprice at new rates. These mismatches expose banks to income volatility and changes in economic value when interest rates fluctuate unexpectedly.

B. Yield Curve Risk: This risk occurs when changes in the yield curve's slope or shape negatively impact a bank's income or economic value. Even hedged positions can suffer losses if the yield curve shifts in ways other than parallel movements.

C. Basis Risk: Basis risk stems from imperfect correlation between rate adjustments on different financial instruments with similar repricing timelines. When rates change, these correlation differences can cause unexpected cash flow variations and spread changes between similar assets and liabilities.

D. Optionality: Interest rate risk also comes from embedded options in banking instruments that give holders rights to modify cash flows. These include callable bonds, prepayable loans, and demand deposits, which create asymmetric risks that can be significant if not properly managed.

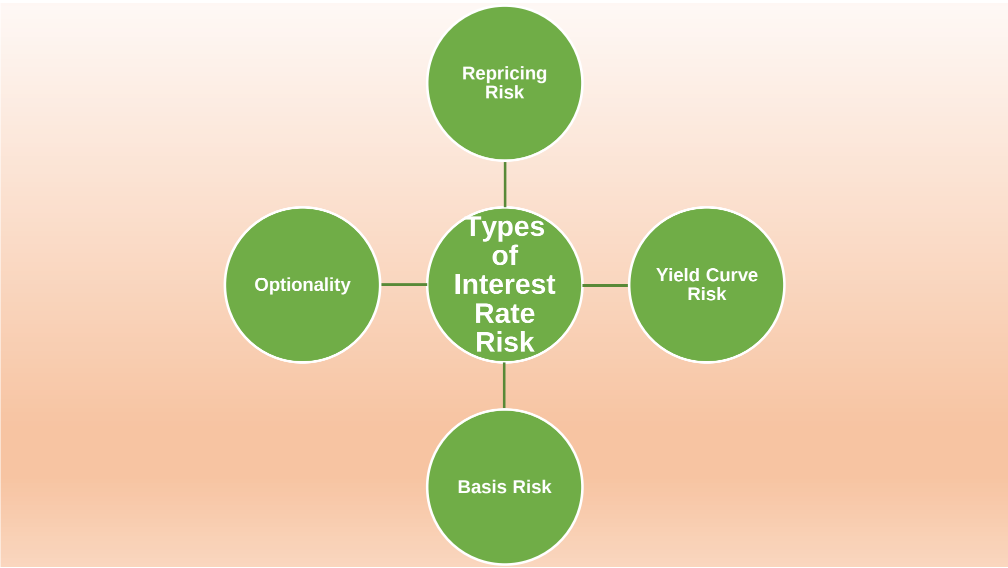

Figure (2) - Types of Interest Rate Risk

Source: Prepared by the researchers based on previous sources.

3.1.3 Interest Rate Risk Measurements:

Interest Rate Sensitivity Gap Management:

Gap management is a widely used hedging strategy for interest rate risk, requiring management to analyze maturity and repricing opportunities by comparing interest-bearing assets with liabilities to determine how net interest income varies with market rate movements, with gap size control depending on management's risk tolerance and interest rate expectations (Asuloos et al., 2019).

Interest rate gap serves as a standard measure of interest rate risk exposure, consisting of two types: fixed interest rate gap (difference between fixed-rate assets and liabilities) and variable interest rate gap (difference between interest-sensitive assets and liabilities), calculated as: Interest-sensitive gap = Interest-sensitive assets - Interest-sensitive liabilities, and Interest Sensitivity Ratio = Interest-sensitive assets / Interest-sensitive liabilities (Hossin & Rahman, 2020).

A negative gap occurs when interest-sensitive liabilities exceed assets, where declining rates improve net interest margin as deposits reprice before assets, while rising rates reduce profits. A positive gap occurs when interest-sensitive assets exceed liabilities, where declining rates reduce net interest margin as assets reprice before liabilities, while rising rates increase margins. The gap concept is central to asset-liability management as the most important measure for interest rate risk and the key model linking rate changes to interest income, with derivatives providing direct methods to modify portfolio interest rate exposure (Bessis, 2002).

3.2 Asset Quality

Asset quality holds special importance for bank profitability and financial system stability, primarily relating to loan quality measured through non-performing loans (NPLs) including overdue and follow-up loans. Poor asset

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quality can delay economic recovery by reducing profit margins and eroding capital bases, ultimately affecting bank profitability and economic financial stability, with large amounts of NPLs potentially leading to bank bankruptcy and economic slowdown, as evidenced in the 2008 global crisis (Badunenko et al., 2022).

Over twenty-five years, national and international institutions established asset quality regulations, including the 1995 US Federal Reserve Board's "Strength and Soundness Standards" requiring periodic asset quality reporting and supervision systems. The Basel Committee on Banking Supervision dedicated seven of its twenty-five basic principles to bank asset quality and loan risk management, with standards evolving from Basel I (2000) through Basel III (2013) following financial market developments and the 2007 global financial crisis (Kadioglu & Ocal, 2017).

Asset quality serves as a performance measure for bank assets, especially loans, with main affecting factors including asset diversification degree, loan size and duration, portfolio growth, collateral quality, directed/political lending, and related party lending, while indicating asset risk levels and financial strength within the bank (Zagherd & Barghi, 2017).

3.3The Relationship Between Asset Quality and Interest Rate Sensitivity

The relationship between asset quality and interest rate sensitivity is closely linked in the context of bank soundness. Just as asset quality indicates the risks a bank faces from its loans, the greatest danger for banks is losses from delinquent loans, and poor asset quality is a primary cause of bank failure. In this context, interest rate sensitivity plays a pivotal role, as changes in interest rates can directly affect borrowers' ability to repay their debts, especially loans with variable interest rates. This financial pressure leads to a rise in non-performing loans, which in turn reduces asset quality and threatens the bank's profitability and soundness. Therefore, high-quality assets lead to higher return margins and thus increased returns. The relationship between interest rate sensitivity and asset quality is inverse; the more sensitive a bank is to interest rate fluctuations, the higher the probability of its assets deteriorating (Kosak et al., 2015).

Third Axis: Field Framework of the Study

This axis focuses on analyzing the financial aspects of the study variables, with the objective of understanding and determining the trajectories of the adopted financial indicators. The analysis is based on study data covering the time period from 2013 to 2023, where this data was collected from the financial statements and reports of banks and companies that constitute the study sample. The results will be presented as follows:

4.1 Financial Analysis of Interest Rate Sensitivity Variable

Previous studies have found numerous models through which interest rate risks and their impact on various banks and financial institutions were identified. In this regard, there are models built on measuring the gap between interest rate-sensitive assets and liabilities (Gap Analysis), others built on duration analysis, or models based on simulating different interest rate scenarios (Value at Risk - VaR), which leads to diversity in the results of these models in determining the extent of banks' exposure to interest rate risks and their impact on financial performance.

Within the current study, the methodology that focuses on measuring interest rate sensitivity as a model for evaluating the extent to which banks' asset quality is affected by interest rate fluctuations was adopted. The concept of interest rate sensitivity is considered one of the important measures that reflects the degree of responsiveness of bank performance and financial position to changes in prevailing market interest rates. This approach aligns with the model adopted in the current study to analyze the impact of this sensitivity on asset quality.

Table (2) shows the percentages of the interest rate sensitivity variable, where a ratio higher than 1 indicates that the bank holds more interest rate-sensitive assets than sensitive liabilities, meaning it will benefit from rising interest rates. A ratio less than 1 indicates that the bank holds more interest rate-sensitive liabilities than its sensitive assets, meaning it will benefit from declining interest rates.

The overall average interest rate sensitivity for all banks during the mentioned time period is 1.152, indicating that banks generally have more interest rate-sensitive assets than their sensitive liabilities. Banks such as ANB, BSF, and Aljazeera achieved ratios of 1.598, 1.521, and 1.558 respectively, which are sensitivity ratios higher than the general average, indicating that these banks expect future interest rate increases and will benefit from this rise, achieving greater profits.

Banks such as CBQ and QNB achieved ratios of 0.978 and 1.158 respectively, which are sensitivity ratios close to the general average. Banks such as Mashreq and CBD achieved ratios of 0.779 and 0.955, which are sensitivity ratios lower than the general average, indicating that these banks expect future interest rate declines and will benefit from this decrease, achieving profits.

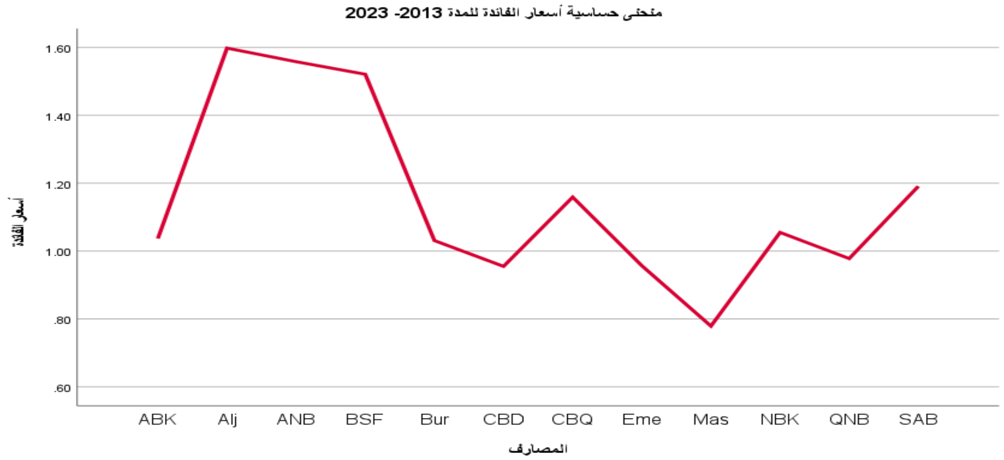
The table data also shows fluctuations in banks' interest rate sensitivity ratios over the years, indicating that banks adjust their strategies according to market changes. Based on the results of financial analysis of interest rate sensitivity for banks in the sample, the validity of the first main hypothesis is confirmed, which states: "Different levels of interest rate sensitivity exist in the study sample banks."

Table (2) Interest Rate Sensitivity Variable for Years 2013-2023 (Percentage Ratio)

Years / Banks	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Mean for Banks
NBK	1.021	1.058	1.124	1.080	1.052	1.077	1.039	1.023	1.079	1.041	1.015	1.055
ABK	1.124	1.250	1.221	1.045	1.046	0.972	0.969	0.894	0.866	0.914	1.111	1.037
Burgan	0.852	0.932	1.035	1.144	1.061	1.131	1.073	1.062	1.028	1.075	0.949	1.031
Mashreq	0.818	0.825	0.821	0.764	0.770	0.777	0.807	0.750	0.762	0.765	0.706	0.779
CBD	0.979	1.000	0.964	0.959	0.976	0.958	0.950	0.936	0.924	0.920	0.944	0.955
Emerits	1.055	1.039	1.010	0.953	0.969	0.956	0.998	1.028	0.925	0.828	0.761	0.957
CBQ	1.054	1.176	1.098	1.097	1.152	1.174	1.154	1.276	1.196	1.179	1.195	1.159
QNB	0.926	0.938	0.983	1.027	0.998	0.993	0.992	0.979	0.972	0.959	0.995	0.978
ANB	1.392	1.383	1.609	1.629	1.471	1.658	1.624	1.380	1.507	1.761	1.724	1.558
BSF	1.286	1.089	1.310	1.395	1.413	1.660	1.714	1.506	1.542	1.634	2.187	1.521
Aljazeera	1.695	1.503	1.611	1.503	1.524	1.466	1.531	1.367	1.511	1.718	2.151	1.598
SABB	0.790	1.205	1.294	1.326	1.214	1.213	1.084	1.115	1.072	1.266	1.517	1.191
Mean for Years	1.083	1.117	1.173	1.160	1.137	1.170	1.161	1.110	1.115	1.172	1.271	-
Total Mean												1.152

Source: Sample banks data for years 2013-2023

Figure (2) shows that banks' interest rate sensitivity changes noticeably during the specified time period, where some banks show significant fluctuations in interest rate sensitivity, while other banks show lesser fluctuations. The figure shows that banks' interest rate sensitivity is not



constant but changes over time, and the degree of fluctuations differs between banks, indicating differences in their strategies for managing interest rate risks.

Figure (2) interest rate sensitivity Curve

4.2 Financial Analysis of Asset Quality

Table (3) illustrates the quality of assets owned by banks, such as loans and investments, where an increase in the indicator suggests a decrease in asset quality, meaning the bank faces higher risks in debt collection or investment recovery. A decrease in the indicator suggests an increase in asset quality, meaning the bank possesses high-quality assets with low risks.

The averages for NBK (0.006), Emerits (0.004), QNB (0.003), and ANB (0.000) were much lower than the general average of (0.043), indicating that these banks enjoy very high asset quality compared to other banks, meaning their asset risks are low.

ABK achieved an average of (0.330), which is much higher than the general average, indicating that ABK faces significant problems in its asset quality, meaning its asset risks are very high.

Banks Mashreq, CBD, BSF, ALJAZEERA, and SABB achieved averages of (0.031), (0.022), (0.020), (0.015), and (0.019) respectively, which are averages lower than the general average but close to it, indicating acceptable asset quality but the bank may need to monitor its asset quality.

Based on the results of the financial analysis of asset quality for the banks in the sample, the validity of the second financial analysis hypothesis is confirmed, which states: "Different levels of asset quality exist in the study sample banks."

Table (3) Asset Quality for Years 2013-2023 (Ratio Index)

Years / Banks	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Mean for Banks
NBK	0.008	0.004	0.002	0.005	0.006	0.005	0.005	0.010	0.007	0.009	0.008	0.006
ABK	0.402	0.367	0.305	0.375	0.337	0.363	0.288	0.326	0.321	0.281	0.260	0.330
Burgan	0.014	0.009	0.003	0.009	0.016	0.013	0.006	0.009	0.034	0.004	0.006	0.011
Mashreq	0.055	0.035	0.018	0.016	0.006	0.026	0.056	0.094	0.000	0.019	0.015	0.031
CBD	0.060	0.056	0.029	0.014	0.009	0.023	0.005	0.022	0.003	0.013	0.011	0.022
Emerits	0.001	0.005	0.002	0.002	0.003	0.005	0.002	0.003	0.003	0.005	0.018	0.004
CBQ	0.037	0.039	0.043	0.052	0.059	0.058	0.051	0.045	0.049	0.051	0.062	0.050
QNB	0.002	0.002	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.001	0.012	0.003
ANB	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
BSF	0.014	0.010	0.009	0.013	0.028	0.030	0.027	0.029	0.026	0.026	0.010	0.020
Aljazeera	0.013	0.009	0.008	0.011	0.013	0.016	0.014	0.023	0.022	0.018	0.017	0.015
SABB	0.013	0.013	0.012	0.014	0.016	0.030	0.028	0.025	0.023	0.021	0.018	0.019

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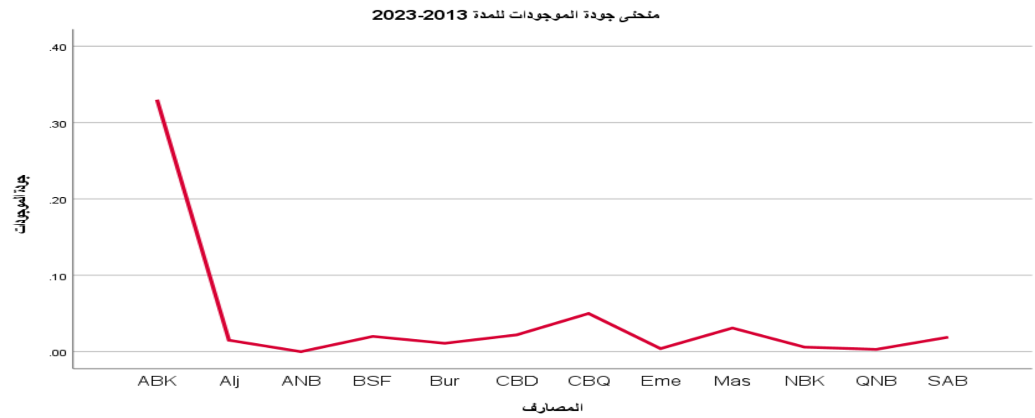
Mean for Years	0.052	0.046	0.036	0.043	0.041	0.048	0.040	0.049	0.041	0.037	0.036	-
Total Mean												0.043

Source: Sample banks data for years 2013-2023

Figure (3) shows the asset quality curve for the mentioned banks during the period from 2013 to 2023, indicating that ABK shows very sharp fluctuations, suggesting significant changes in its asset quality over the years,



while other banks show relatively slight fluctuations, indicating greater stability in their asset quality.

Figure (3) Asset quality curve

5. Econometric Analysis

5.1 Stationarity Testing Using Unit Root Test (Unit Root Methodology)

This methodology is based on determining what is known as the unit root or stationarity and is considered one of the most important econometric analysis methods aimed at identifying the extent of stability of research data before testing the econometric model. Data are stationary or stable (i.e., do not contain a unit root) when their levels change over time while their mean remains constant during the specified time period. Conversely, data are non-stationary if their mean changes over the time period, which may lead to spurious, inflated, and inaccurate estimates in impact tests, negatively affecting the results of statistical hypothesis tests.

It is worth noting that data stationarity may be achieved at the level or in first or second order differences. Additionally, stationarity may be achieved with the presence of an intercept only, or with the presence of a trend and intercept, or without trend and intercept (none). Furthermore, knowledge of data stationarity contributes to correcting short-term imbalances in the data, which helps in interpreting non-linear cointegration relationships that traditional linear tests may not be able to interpret.

The current research adopted the implementation of unit root tests in the E-views v.12 program through the application of the Augmented Dickey-Fuller criterion for the research variables as follows:

- **First: Interest Rate Sensitivity Data Series for Banks**

From the unit root test results for this series (interest rate sensitivity data series) in Table (17), it can be concluded that it showed stability at the level with the inclusion of an intercept only, meaning it is stationary and does not contain a unit root at first-order integration I(0). Accordingly, there is no need to apply differences to make the series stationary.

This conclusion was based on the estimated value of the Augmented Dickey-Fuller (ADF) test statistic, which reached (-3.779962), and its estimated value was greater than the critical values determined at significance levels of (1%), (5%), and (10%), which were (-3.480818), (-2.883579), and (-2.578601) respectively. Moreover, the probability value (p-value) associated with the test at this level (0.0040) was less than the assumed significance level for the study (0.05).

Additionally, the stability of the series can be inferred by comparing the estimated value of the ADF statistic with the estimated values of the critical values to facilitate the comparison and conclusion process. As a result of these findings, it is confirmed that the interest rate sensitivity series is characterized by short-term stability due to not containing a unit root. Therefore, the null hypothesis (H_0) for the unit root test is rejected and the alternative hypothesis (H_1) is accepted, which indicates that the interest rate sensitivity data series is stationary at the level with the presence of an intercept and free from unit root.

Table (4) Unit Root Test for Interest Rate Sensitivity Using the Augmented Dickey-Fuller Method

Variable	ADF Test Statistic Estimated Value	Critical Values at Significance Level			Series Stationary at	Probability Value
		%1	%5	%10		
Interest Rate Sensitivity Series	-3.779962	-3.480818	-2.883579	-2.578601	Level and Intercept	0.0040

Source: From E-Views V.12 program results

- **Second: Asset Quality Data Series**

From the unit root test results for this series (asset quality data series) in Table (20), it can be concluded that it showed stability at the level with the inclusion of an intercept only, meaning it is stationary and does not contain a unit root at first-order integration I(0). Accordingly, there is no need to apply differences to make the series stationary.

This conclusion was based on the estimated value of the Augmented Dickey-Fuller (ADF) test statistic, which reached (-3.567866), and its estimated value was greater than the critical values determined at significance levels of

(1%), (5%), and (10%), which were (-3.486064), (-2.885863), and (-2.579818) respectively. Moreover, the probability value (p-value) associated with the test at this level (0.0076) was less than the assumed significance level for the study (0.05).

As a result of these findings, it is confirmed that the asset quality series is characterized by short-term stability due to not containing a unit root. Therefore, the null hypothesis (H_0) for the unit root test is rejected and the alternative hypothesis (H_1) is accepted, which indicates that the asset quality data series is stationary at the level with the presence of an intercept and free from unit root.

Table (5) Unit Root Test for Asset Quality Using the Augmented Dickey-Fuller Method

Variable	ADF Test Statistic Estimated Value	Critical Values at Significance Level			Series Stationary at	Probability Value
		%1	%5	%10		
Asset Quality Series	-3.567866	-3.486064	-2.885863	-2.579818	Level and Intercept	0.0076

Source: From E-Views V.12 program results

5.2 Normal Distribution Test

The normal distribution test aims to determine the distribution shape of research data, which is one of the basic conditions for regression analysis according to the econometric model, where data must follow normal distribution. The multiple tests used for this purpose include the skewness test, the kurtosis test, and the Jarque-Bera test which combines the two previous tests, in addition to other tests. This test was applied to the research variables data, and the following are the results of normal distribution analysis for time series of independent and dependent variable indicators:

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- **Interest Rate Risk Sensitivity Data Series**

From the normal distribution parameter results in Figure (24) and its accompanying table, it is clear that the estimated value of the significance level (Probability) for the Jarque-Bera test for this series data reached (0.624600). Comparing it with the default significance level (0.05), we find it is greater, and therefore the data of this series takes the shape of normal distribution.

To confirm this conclusion, we can refer to the estimated Jarque-Bera value which reached (0.941287), which is less than the critical chi-square value of (3.841) with one degree of freedom at a 95% confidence level. To reinforce these results, we find that the estimated skewness value reached (-0.033330), which is close to zero and falls within the acceptable range for normal distribution (usually considered between ± 1). Similarly, the estimated kurtosis value reached (2.591711), which is less than the critical value (±3). Therefore, the interest rate sensitivity data series met the normal distribution criterion.

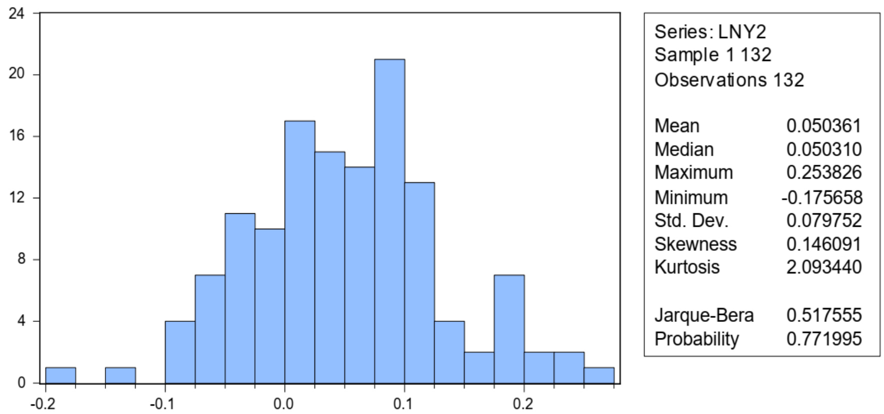

Figure (4) Normal Distribution of Interest Rate Risk Sensitivity Data

- **Asset Quality Data Series**

From the normal distribution parameter results in Figure (28) and its accompanying table, it is clear that the estimated value of the significance level (Probability) for the Jarque-Bera test for this series data reached (0.771995). Comparing it with the default significance level (0.05), we find it is greater, indicating that the data of this series follows normal distribution. To reinforce this conclusion, we can look at the estimated Jarque-Bera value which reached (0.517555), which is less than the critical value for chi-square distribution with one degree of freedom at a 95% confidence level of (3.841). To reinforce these results, we note that the estimated skewness coefficient value reached (0.146091), which is close to zero and falls within the recognized range for normal distribution (usually between ± 1). Similarly, the estimated kurtosis coefficient value reached (2.093440), which is less than the critical value (±3). Therefore, it can be said that the asset quality data series meets the conditions for normal distribution.

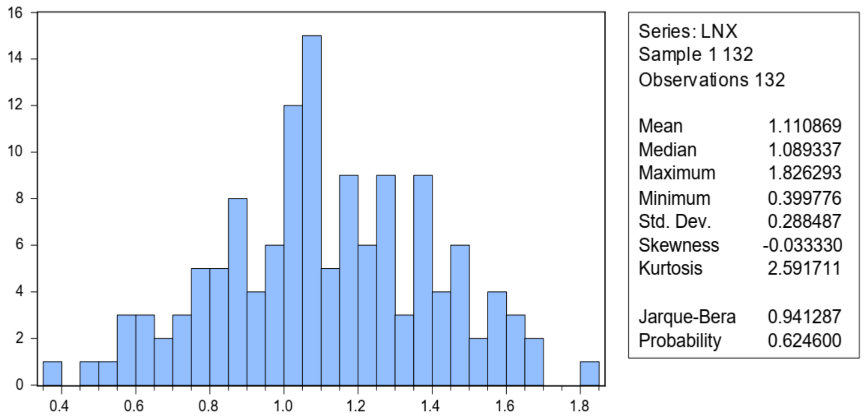

Figure (5) Normal Distribution of Asset Quality Data

6. Statistical Analysis

6.1 Correlation Analysis

The main correlation hypothesis states: "There is a statistically significant correlation between interest rate sensitivity and asset quality of the studied banks." From observing the correlation results between interest rate sensitivity and asset quality shown in Table (4), we find the following:

Relationship between Interest Rate Sensitivity and Asset Quality: The correlation results between the interest rate sensitivity variable and the asset quality variable showed a significant negative correlation between them, based on the correlation coefficient value of (-0.708), which is statistically significant at the 1% level indicated by (**). Therefore, we conclude the existence of an inverse and statistically significant relationship between interest rate sensitivity and asset quality, meaning that as interest rate sensitivity levels increase, asset quality levels decrease in banks, and vice versa. Thus, the correlation hypothesis is accepted, indicating "the existence of a statistically significant correlation between interest rate sensitivity and asset quality of banks in the sample."

Table (6) Correlation Results between Interest Rate Sensitivity and Asset Quality

Variables	Asset Quality
Interest Rate Sensitivity	- 0.708 **
** Significant at 1% level, * Significant at 5% level	

Source: SPSS V.27 program results

6.2 Impact Analysis

Direct Impact of Interest Rate Sensitivity on Asset Quality: The main impact hypothesis states: "There is a statistically significant direct impact of interest rate sensitivity on asset quality." The results in Table (5) regarding the direct impact of interest rate sensitivity on asset quality indicate the following:

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Impact on Asset Quality: The estimated t-value of (3.404) indicates a statistically significant direct impact of interest rate sensitivity on asset quality, as this value was greater than its critical value of (1.657) with degrees of freedom (130). The significance of the impact is confirmed by the P-value of (0.007), which is less than the assumed study level (0.05). The explanatory value of the coefficient of determination (R^2) of (0.501) shows that the interest rate sensitivity variable explains 50.1% of the variation occurring in asset quality. Based on these results, the impact hypothesis is accepted, indicating "the existence of a significant impact of interest rate sensitivity on asset quality."

Table (7) Direct Impact of Interest Rate Sensitivity on Asset Quality

Model	Independent Variable (Interest Rate Sensitivity)					
	B_0	B_1	R^2	t Estimated	T Tabular *	Estimated Significance (P)
Asset Quality	0.211	0.708 -	0.501	3.404 -	1.657	0.007
*Tabulated T value with degrees of freedom (130)		P ≤ 0.05			N = 132	

Source: SPSS V.27 program results

7. Conclusions and Recommendations

Conclusions:

1. Financial analysis results showed variance in interest rate sensitivity levels among banks included in the study. This indicates that banks adopt different strategies for managing interest rate risks, where some are more sensitive to interest rate changes than others.
2. Financial analysis data shows fluctuations in banks' interest rate sensitivity ratios over the years, reflecting the impact of interest rate fluctuations on banks' strategies and financial decisions.

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3. Financial analysis of asset quality revealed significant differences among banks in their asset quality. Some banks enjoy high asset quality, indicating low risks, while other banks face challenges in their asset quality, reflecting higher risks.
4. Correlation analysis showed a significant negative correlation between interest rate sensitivity and asset quality. This means that as interest rate sensitivity levels in banks increase, their asset quality levels decrease, and vice versa.
5. Impact analysis showed a statistically significant direct impact of interest rate sensitivity on asset quality, meaning that the interest rate sensitivity variable explains a certain percentage of the variation occurring in asset quality.
6. Research results indicate an inverse relationship between interest rate risks and asset quality, meaning that increased bank exposure to interest rate risks may lead to deterioration in their asset quality, and vice versa. This result highlights the importance of integrated risk management in banks.

RECOMMENDATIONS:

1. Develop advanced, comprehensive measurement models capable of simulating various interest rate scenarios and estimating their financial impact, while integrating hedging instruments like financial derivatives to reduce interest rate exposure.
2. Apply strict credit standards in loan processes, including accurate borrower creditworthiness assessment and ensuring adequate collateral sufficiency.
3. Adopt comprehensive risk management that considers interactions between interest rate risks, asset quality, and other risks, while developing

integrated strategies combining both interest rate and asset quality management tools.

4. Enhance regulatory bodies' oversight of banks' interest rate risk and asset quality management, ensure compliance with regulatory standards, and develop clearer regulatory standards addressing the relationship between interest rate risks and asset quality.

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