THE IMPACT OF MACROECONOMIC VARIABLES AND FINANCIAL SOUNDNESS INDICATORS ON NET INTEREST MARGIN: A CASE STUDY OF BANK STRATEGY

Amjad Salem Younes Qwader [*], Khalid Ali Alduneibat [**], Ehsan Ali Alqararah [***], Sulieman D. Al-Oshaibat [*]

[*] Department of Business Economics, College of Business, Tafila Technical University, Tafila, Jordan
[**] Department of Accounting, College of Business, Tafila Technical University, Tafila, Jordan
[***] *Corresponding author*, Department of Business Economics, College of Business, Tafila Technical University, Tafila, Jordan
Contact details: Department of Business Economics, College of Business, Tafila Technical University, 66110/179 Tafila, Jordan

Abstract

This study aimed to analyse the impact of macroeconomic variables, such as inflation, economic growth and financial soundness indicators, on net interest margin (NIM) in Jordanian commercial banks. The autoregressive distributed lag (ARDL) model was used to achieve the study's objectives and test its hypothesis. The study found a long-term equilibrium relationship between these variables. Moreover, the results showed a significant long-term and short-term relationship between financial soundness indicators and NIM in Jordanian banks. While the deposit utilisation ratio, capital adequacy ratio and non-performing loan (NPL) ratio exhibited a positive relationship with NIM, the analysis revealed a negative relationship between the statutory liquidity ratio (SLR) and NIM. However, the analysis did not show any significant impact of inflation and economic growth on the margin in both the long and short term. This study recommends that Jordanian banks adopt transparency policies in disclosing information related to financial soundness, develop advanced credit risk assessment systems and establish a specialised unit to study, analyse and manage bank liquidity, credit policy and NPLs.

Keywords: Net Interest Margin (NIM), Jordanian Commercial Banks, Macroeconomic Variables, Financial Soundness Indicators, Capital Adequacy Ratio, Non-Performing Loans (NPLs), ARDL Model

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1. INTRODUCTION

Net interest margin (NIM) is a crucial indicator of the efficiency and effectiveness of banks in managing their resources and meeting the needs of the economy (Salina et al., 2021). NIM refers to the difference between the interest rates charged on loans (IROL) and advances granted by banks and the interest rates paid on term deposits (IROD). An elevated margin might signal inefficiencies within the banking sector and higher borrowing costs, negatively impacting economic growth and investment (Brock & Suarez, 2000). Conversely, a low margin indicates effective intermediation by banks, stimulating economic activity (Mohammed et al., 2022).

Despite the remarkable achievements of the Jordanian banking sector in its key financial indicators, including asset size, deposits, credit facilities and capital adequacy, the sector has faced several criticisms. One major concern is the high interest margin, which is perceived as reinforcing the dominance of the banking sector over borrowers and the wider community. This dominance negatively affects the economy by contributing to a decline in economic growth and a slowdown in investment. NIM is affected by various factors, including macroeconomic and internal banking variables. Accordingly, the research problem revolves around answering the following question:

RQ: To what extent do inflation, economic growth and financial soundness indicators affect the interest rate margin in Jordanian banks?

This study is significant because it addresses the crucial issue of NIM, which plays a pivotal role in the banking process. Interest margin, as the primary variable linking surplus and deficit units within an economy, has profound implications for domestic development, including project establishment, economic growth and job creation. The importance of this study is further underscored by the period under consideration, which is characterised by Jordan's transition towards privatisation. This transition led to a significant increase in investments by the local private sector across various domains. Additionally, numerous investment-related laws, such as the Jordanian Banking Law of 2000 and the Investment Development Law of 2001, as well as subsequent complementary laws, were enacted during this period. These legislative changes facilitated the establishment of new institutions, streamlined their management and fostered an investment environment conducive to increased financial, productive, commercial and service activities.

This study aims to investigate the factors influencing NIM in Jordanian banks from 2001 to 2023. It analyses the role of key economic and financial variables, such as inflation, economic growth and financial soundness indicators, in explaining changes in NIM. The study also seeks to develop an econometric model to identify the significance of these factors and quantify their impact.

This study contributes to the Arabic literature by linking the relevant variables (macroeconomic variables, financial soundness indicators, and NIM) and providing a foundation for future research. It offers valuable practical information about the NIM in Jordanian commercial banks and highlights the potential to reduce this margin, which may help in fostering a favourable investment environment to enhance financial, productive, commercial and service activities.

The remainder of this paper is structured as follows. Section 2 reviews the related literature and theoretical framework, while Section 3 outlines the study methodology and data collection methods. Section 4 describes the statistical and normative analyses and the techniques used in the analyses. Section 5 presents and discusses the results. Finally, Section 6 concludes the research.

2. LITERATURE REVIEW

2.1. Empirical literature

Net interest margin refers to the difference between IROL and IROD. The introduction of the study discusses the development of this variable.

Academic research has shown an increasing interest in the factors influencing NIM, as this margin is a critical indicator of the efficiency and effectiveness of banks in managing their resources. The study by Ho and Saunders (1981) was among the first to highlight the factors affecting interest margins in the banking sector. It concluded that factors such as managerial risk, average transaction size and structure of the banking market can significantly impact interest margins in the U.S. banking sector.

Since then, numerous theoretical and empirical studies have been conducted to identify the factors affecting interest margins, particularly those related to the internal environment of banks and the macroeconomic environment. These studies have covered various countries and time periods. For instance, Naceur and Goaied (2008) examined the impact of macroeconomic factors and internal bank factors on the interest margins of Tunisian banks. Their findings indicated a strong influence of internal bank factors on the interest margins and profitability of these banks. The study also showed a positive relationship between the inflation rate and interest margins, while the growth rate did not affect the interest margins.

Additionally, Khrawish et al. (2010) investigated the determinants of NIM for commercial banks in the Jordanian banking industry. The study revealed that the interest margin is related to banks' ability to reduce their debt and extend more loans to customers. It also showed that bank size has a statistical significance on interest margins, whereas macroeconomic factors had a minimal impact on them. According to Ben-Hichem et al. (2013), a positive relationship exists between the operating cost index and the size of interest margins. The study also indicated a negative relationship between the stock index and interest margins, noting that macroeconomic factors did not affect interest margins.

The study by Tarus et al. (2012) also found a positive relationship between operating expenses, credit risk and NIM in the Kenyan banking sector. It suggested that inflation positively affects the margin, while economic growth and market concentration negatively impact it. In their study,

Al-Ali (2012) concluded that internal bank characteristics, represented by operating expenses and the loan index, have a positive effect on the interest margins of some Syrian commercial banks, while equity has a negative effect on interest margins. Additionally, the exchange rate was observed to have a positive impact on interest margins, whereas growth and inflation rates had a weak negative effect on interest margins.

Umraugh (2015) concluded that operating costs and the participation of foreign banks were among the main reasons for the increase in interest margins for banks in Jamaica. Liquidity, credit and financing risks, as well as changes in the size of financial institutions, negatively affected interest margins. Regarding macroeconomic variables, interest margins were negatively associated with exchange rate fluctuations. The study by An and Loan (2016), conducted in Vietnam, found lending, credit risk and capital to have a positive impact on NIM. Conversely, the study showed a negative impact of managerial efficiency on NIM. The study likewise indicated that bank size and the loan-to-deposit ratio did not have statistical significance for NIM. Moreover, Nassar et al. (2014) indicated a negative relationship between the cash-to-assets ratio and interest margins for banks in Honduras, while the loan-to-assets ratio had a positive effect on interest margins. Their results also indicated a significant positive relationship between the microfinance ratio, the loan-to-deposit ratio and interest margins.

Kirimi et al. (2022) demonstrated that the relationship between financial soundness and financial performance in Kenyan banks is moderated by bank size, where size acts as a reinforcing factor. Larger banks showed greater capacity to convert financial soundness indicators (such as capital adequacy and asset quality) into better financial performance compared to smaller banks. The study also found that internal factors like operational efficiency had a more significant impact on larger banks. These findings emphasize the importance of considering bank size when designing financial supervision policies to enhance banking stability.

Wulandari's (2023) study revealed that bank soundness indicators (capital adequacy, asset quality) and branch network expansion significantly drive deposit growth. The research showed that banks with stronger financial indicators attract more customers, particularly when branches are located in strategic areas. The results confirm the importance of strengthening financial health and implementing well-planned geographic expansion to increase deposits.

Emonena's (2025) theoretical review examined the relationship between financial soundness and bank performance, confirming that indicators like capital adequacy, asset quality, and liquidity directly impact profitability and financial stability. The analysis demonstrated that banks maintaining higher financial soundness standards achieve better long-term performance. The study concluded by stressing the need for a comprehensive regulatory framework to enhance financial soundness and support banking sector efficiency.

Previous studies have generally shown that a variety of economic and financial factors influence NIM, including internal bank-specific and external macroeconomic factors. This study aims to contribute to the academic literature by combining financial soundness indicators, which represent the internal environment of the bank, with inflation and economic growth, which represent the macroeconomic environment. Prior research has not examined the combined impact of these variables on NIM. The present study seeks to address this gap, potentially offering a more comprehensive understanding of the factors affecting NIM. It also focuses specifically on the Jordanian context, providing results that contribute to a deeper understanding of the factors affecting NIM in Jordanian banks and enabling researchers and policymakers to develop more effective financial policies regarding interest margins.

Based on the theoretical frameworks and relevant studies, and to achieve the objectives of this study, the following hypotheses are formulated:

H1: A statistically significant positive relationship exists between inflation and the net interest margin.

H2: A statistically significant positive relationship exists between economic growth and the net interest margin.

H3: A statistically significant positive relationship exists between the loan-to-deposit ratio and the net interest margin.

H4: A statistically significant positive relationship exists between the capital adequacy ratio and the net interest margin.

H5: A statistically significant positive relationship exists between the non-performing loan (NPL) ratio and the net interest margin.

H6: A statistically significant positive relationship exists between the legal liquidity ratio and the net interest margin.

2.2. Development of study variables in Jordan

2.2.1. The reality of net interest margin in Jordan

The preliminary analysis of NIM data for Jordanian commercial banks (see Figure 1) reveals significant fluctuations between 2001 and 2023. The margin experienced a notable increase at the beginning of the study period, peaking in 2003 at 6.2%, followed by a decline to its lowest level during the study period at 3.3% in 2007. Subsequently, it stabilised at an average level of approximately 4.8% between 2008 and 2018, before gradually declining again to reach 3.4% by the end of the study period in 2023. These fluctuations could be attributed to a combination of factors, including developments in macroeconomic variables and changes in financial soundness indicators, which will be discussed in this study.

**Figure 1.** Evolution of the interest rate margin in Jordan (2001–2023)
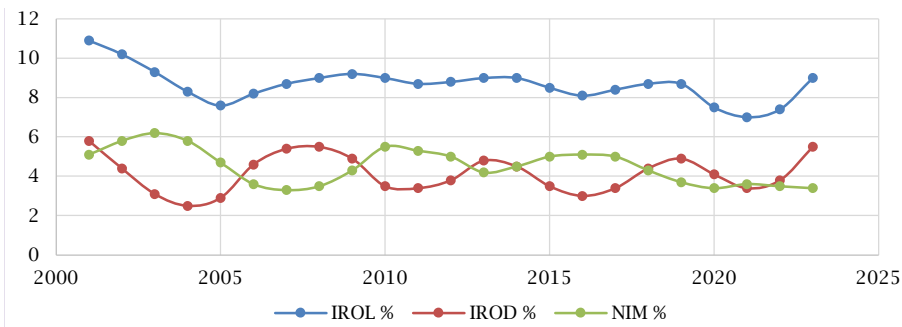
Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).

2.2.2. Reality of macroeconomic and financial variables in the Jordanian economy

The study is limited to these variables due to their potential direct impact on the *NIM*.

Jordan's economic growth (gross domestic product — *GDP*) fluctuated during the study period (see Figure 2). It reached its peak in 2004 and fell rapidly after 2010, mainly because of the Arab Spring revolutions in Egypt, Syria and Iraq. The worst year was 2020, when the economy shrank by 1.1% due to the COVID-19 pandemic.

Figure 2. Evolution of economic growth in Jordan (2001–2023)
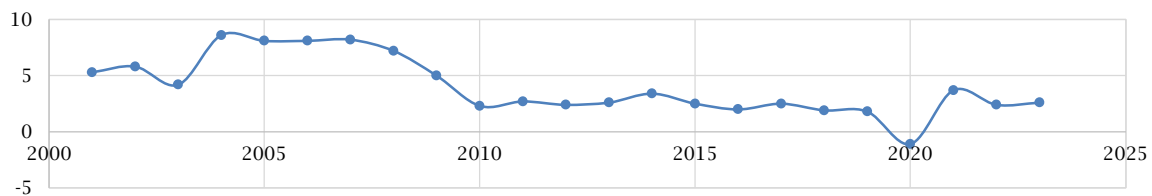
Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).

Jordan's inflation rate exhibited significant fluctuations throughout the study period (see Figure 3). It peaked at 14% in 2008, primarily due to the surge in global oil prices that affected the domestic market and an acute cold spell that adversely impacted agricultural output. Conversely, 2009, 2015 and 2016 recorded negative inflation rates, indicating deflationary pressures. These fluctuations in the inflation rate can be attributed to several factors, including monetary policies, external shocks, weather conditions and changes in commodity prices, particularly imported goods.

Figure 3. Evolution of the inflation rate in Jordan (2001–2023)
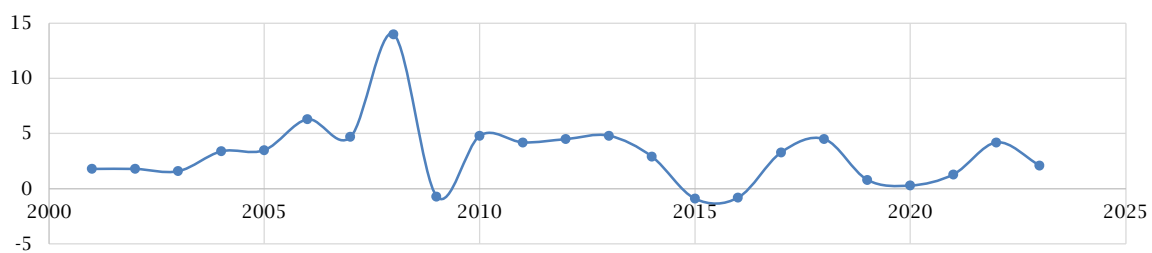
Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).

Deposit utilisation ratio (*DUR*) reflects the ability of banks to convert deposits into loans. It is considered an indicator of the extent to which the bank uses bank deposits to meet the credit needs of customers (Abu Hamad, 2002). *DUR* can be measured according to Eq. (1).

$$DUR = \frac{Net\ credit\ facilities}{Total\ bank\ deposit} \qquad (1)$$

This ratio showed a steady increase during the study period (see Figure 4), indicating a growth in bank lending. This increase could be attributed to the growing demand for financing from businesses and individuals and the incentive policies adopted by banks to encourage lending.

Figure 4. Evolution of the deposit utilisation ratio (2001–2023)
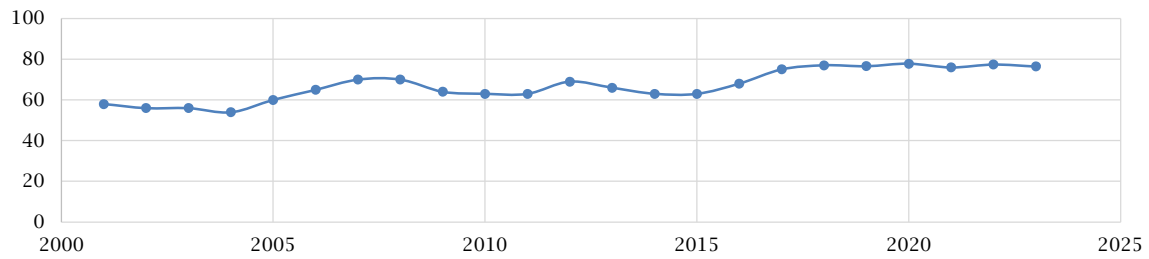
Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).

Capital adequacy ratio (*CAR*) is an important performance measure of a bank's solvency and ability to face the risks of future losses.

It can be measured according to the following equation:

$$CAR = \frac{Total\ equity}{Total\ risky\ assets} \qquad (2)$$

Khrioush et al. (2004) define risky assets as all assets except liquid assets (cash and balances with the central bank and financial institutions).

The Jordanian banking sector is characterised by a strong capital base, with the *CAR* consistently exceeding the minimum requirement of 10.5% set by Basel III. On average, the *CAR* for the study period (2001–2023) stood at approximately 17.6%. The lowest level during this period was recorded in 2003 at 15.9%, while the highest was in 2006 at 21.4% (see Figure 5). These values indicate the banks' capacity to absorb potential losses and maintain the stability of the Jordanian banking system.

Figure 5. Evolution of the capital adequacy ratio in Jordanian banks (2001–2023)
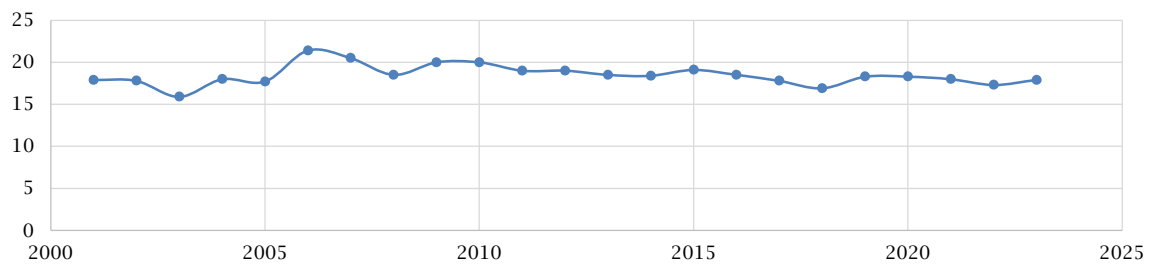
Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).

NPL ratio is loans that no longer earn bank interest or loans that a bank may find itself obliged to schedule based on the current conditions of borrowers. According to the current banking legislation in Jordan, a loan is considered non-performing if the maturity of any of its payments exceeds more than 90 days (Qwader, 2019). The variable of *NPL*s in the present study is measured by the ratio of bad credit to the total credit.

Jordanian banks have successfully maintained a low *NPL* ratio. As illustrated in Figure 6, the average *NPL* ratio during the study period was 7.1%, indicating a high-quality loan portfolio and low credit risk.

Figure 6. Evolution of the non-performing loan ratio to total debt (2001–2023).
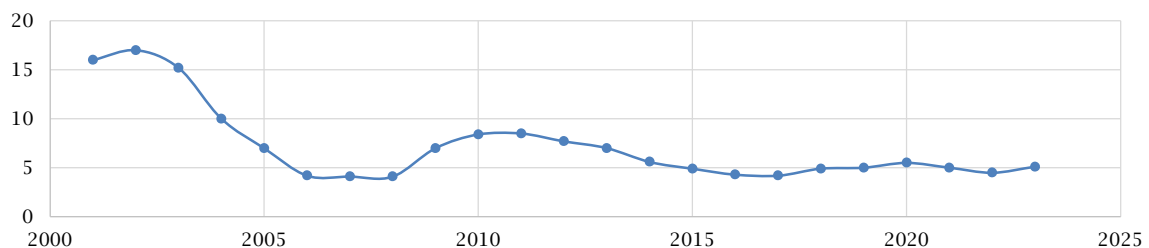
Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).

Statutory liquidity ratio (*SLR*) is a legal ratio monitored by the central bank, often monthly. It represents the proportion of a bank's total deposits that must be held as liquid assets to meet its financial obligations promptly under all circumstances and cases. This includes both primary and secondary reserves. *SLR* is calculated based on the following formula:

$$SLR = \frac{Primary\ reserve + Secondary\ reserve}{Deposits\ and\ deposit\ liabilities} \qquad (3)$$

Figure 7 illustrates a notable increase in the liquidity ratio throughout the study period. Since 2003, the *SLR* has consistently exceeded the 100% minimum requirement set by the Central Bank of Jordan, with an average of 142%

during the study period. This increase can be attributed to the positive correlation between the capital adequacy and liquidity ratios, indicating the bank's ability to meet cash withdrawal demands and fulfil its obligations to depositors.

Figure 7. Evolution of the statutory liquidity ratio (2001–2023)

Source: Authors' elaboration based on the Central Bank of Jordan (n.d.).
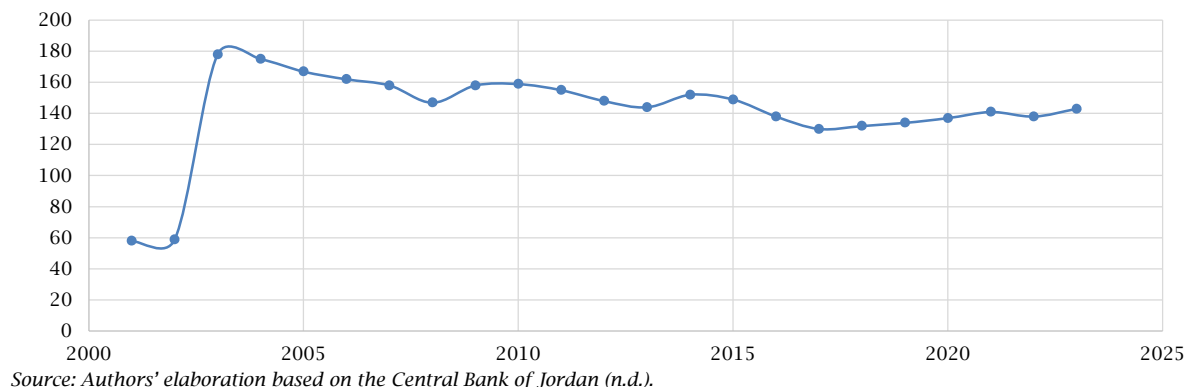
2.3. Theoretical relation between macroeconomic and financial variables and net interest margin

Net interest margin represents a fundamental indicator of the profitability level of financial institutions (Saksonova, 2014). Various interconnected economic and financial factors influence this ratio.

A prominent factor is inflation. When the inflation rate rises, the purchasing power of currency diminishes, driving individuals and institutions to demand more goods and services. This outcome, in turn, boosts the demand for loans, empowering financial institutions to raise interest rates and increase profit margins. The heightened demand for loans grants financial institutions greater bargaining power, allowing them to increase interest rates without losing significant customers (Zachary, 2013).

The literature presents conflicting views regarding the impact of inflation on NIM. While Naceur and Goaied (2008) and Tarus et al. (2012) found a positive relationship between inflation and margin, Al-Ali (2012) concluded a weak negative relationship.

Additionally, economic growth, as measured by GDP growth, is a crucial factor affecting interest rate spreads. In periods of economic expansion, higher demand for loans allows banks to lend more and charge higher interest rates. A robust economy generally leads to lower default rates as well, boosting bank profitability and, consequently, widening their interest rate spread (Khrawish et al., 2010).

Furthermore, the financial soundness indicators of banks play a significant role in influencing interest margins. The relationships can be summarised as follows:

Firstly, the potential relationship between DUR and NIM can be positive but not straightforward. As the ratio of loans to deposits increases, the profit margin of a bank tends to expand (Berríos, 2013). However, higher lending exposes banks to greater credit risk, prompting them to raise interest rates to compensate. Therefore, banks must strike a delicate balance between profitability and risk management.

Secondly, an inverse relationship exists between SLR and NIM. When banks are required to hold more liquid assets, they have fewer funds available for lending, which can lead to higher interest rates. Conversely, a decrease in funds available for lending may necessitate higher interest rates on deposits to attract funds, thereby compressing the margin (Shim, 2013).

Thirdly, the relationship between NPLs and NIM can be positive. A higher NPL ratio indicates increased expected losses for the bank. To compensate for these losses, banks tend to raise interest rates on new loans. Regulators may also impose higher capital requirements on banks with high NPL ratios, reducing their profitability and putting upward pressure on interest margins to offset these provisions (Nikolopoulos & Tsalas, 2017).

Upon reviewing the literature regarding the relationship between NPLs and interest margins, we observed contradictory results. On the one hand, several studies indicate a positive relationship between NPLs and interest margins (Flamini et al., 2009; Messai & Jouini, 2013; Ozurumba, 2016; Apergis, 2014). On the other hand, some literature supports a negative relationship between NPLs and interest margins (Manz, 2019; Kjosevski et al., 2019; Panta, 2018).

Lastly, economic theory indicates a positive relationship between capital adequacy and NIM. Banks with higher capital ratios have greater ability to absorb potential losses, allowing them to expand lending and increase interest rates (Bitar et al., 2018). In addition, banks that comply with capital adequacy requirements have more flexibility in setting interest rates, which contributes to higher NIM. However, this relationship can be affected by other factors, such as business cycles, competition and monetary policies. Several studies have agreed that capital adequacy has a positive impact on the interest margin and bank profits (Hannan & Berger, 1997; Angbazo, 1997; Meghyreh & Shammout, 2004; Pasiouras & Kosmidou, 2007).

In conclusion, financial soundness indicators and NIM of banks have a complex relationship. Understanding these relationships helps banks and financial institutions manage risks and improve financial performance, as well as enables regulators to assess the stability of the banking system.

3. RESEARCH METHODOLOGY

The study period spanned 2001 to 2018 and included all 13 Jordanian commercial banks listed on the Amman Stock Exchange. The quantitative approach was used to analyse the study variables during the study period, and these variables were examined to provide a theoretical description. To clarify the expected effects on the variables

$$NIM_t = \beta_0 + \beta_1 INF_t + \beta_2 GDP_t + \beta_3 DUR_t + \beta_4 CAR_t + \beta_5 NPL_t + \beta_6 SLR_t + \mu_t \qquad (4)$$

where,
- NIM_t — net interest margin of the banks at time t;
- INF_t — inflation rate (consumer price index) at time t;
- GDP_t — economic growth at time t;
- DUR_t — deposit utilisation ratio at time t;
- CAR_t — capital adequacy ratio at time t;
- NPL_t — ratio of non-performing loans to total loans at time t;
- SLR_t — statutory liquidity ratio at time t;
- β_0 — intercept of the regression;
- β_1–β_6 — coefficients of the variables;
- μ_t — error term;
- t — time period (2001–2023).

Annual data were used to analyse all study variables. Data on financial soundness indicators were obtained from the annual reports of Jordanian banks for the study period. Data on the inflation rate and economic growth were obtained from the annual reports of the Central Bank of Jordan for the study period. EViews9 software was used to analyse the annual time series data from 2001 to 2018. The study results were presented based on the analysis and processing of the study hypotheses.

Based on economic theory, β_1, β_2, β_3, β_4, β_5, and β_6 are expected to be positive, that is, greater than 0.

The vector autoregression (VAR) model and structural vector autoregression (SVAR) model offer two effective alternative approaches for estimating the model.

4. ESTIMATION RESULTS

Before estimating the regression model, a unit root test was conducted using the augmented Dickey-Fuller (ADF) test to ensure the stationarity of the time series variables. The test results (see Table 1) indicate that *NIM, DUR, SLR, GDP* and *NPL* were stationary at levels (i.e., not integrated), while the *CAR* and *INF* required first differencing to become stationary.

under study, a standard analytical method was used to calculate the statistical significance values, which illustrate the impact of macroeconomic variables and financial soundness indicators on *NIM* in Jordanian banks. This was achieved by estimating the standard economic models for these variables.

Building upon previous studies conducted by Umraugh (2015) and Nassar et al. (2014), we developed a statistical model to evaluate these variables:

Table 1. Results of the time series stability test (Unit root test)

Variable	Levels		First deference	
	ADF statistics	Result	ADF statistics	Result
NIM	-3.982*	Stationary	-	-
CAR	-1.931	Non	-2.531*	Stationary
DUR	-3.872**	Stationary	-	-
SLR	-8.170*	Stationary	-	-
NPL	-8.179*	Stationary	-	-
GDP	-2.389***	Stationary	-	-
INF	-2.614	Non	-3.859*	Stationary

*Note: *, **, and *** significant at the 1%, 5% and 10% levels.*
Source: Authors' elaboration.

Given that the variables in this study do not possess the same order of integration, other cointegration techniques, such as those that require variables to have the same integration order, cannot be employed. Therefore, the autoregressive distributed lag (ARDL) model (Pesaran et al., 2001) was utilised in this study. After model estimation, the results of the cointegration test among the variables were obtained.

The cointegration test was conducted using the ARDL bounds test. The null hypothesis (H_0) states that there is no cointegration (no long-run equilibrium relationship) among the variables:

$$H_0: b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = 0 \qquad (5)$$

$$H1: b_1 \neq b_2 \neq b_3 \neq b_4 \neq b_5 \neq b_6 \neq 0 \qquad (6)$$

where, b_1, b_2, b_3, b_4, b_5 and b_6 are the model's parameters.

As shown in Table 2, the results of the cointegration test indicate that the calculated F-statistic (8.462) is greater than both the upper and lower critical values at the 1% significance level. This result leads to the rejection of H_0 and the acceptance of the alternative hypothesis, suggesting a cointegration among the variables. In other words, a long-run equilibrium relationship exists between the variables.

Table 2. Cointegration test using the ARDL bounds test

| Panel A: ARDL bounds test results			
Equation	F-statistic	Result	Prop.
NIM (CAR, DUR, NPL, SLR, INF, GDP)	0.00456	8.462	Existence of common integration
	K = 6		
Panel B: Critical value bounds			
Significance	I(0) Bound		I(1) Bound
10%	2.36		3.12
5.0%	2.74		3.81
2.5%	2.98		4.23
1.0%	3.25		4.65

Source: Authors' elaboration.

To ensure the robustness of the proposed model over the long term, the cumulative sum (CUSUM) stability test was applied. This test involves comparing the CUSUM of the model's residuals with

pre-specified critical bounds. If these values exceed the critical bounds, it suggests the presence of structural breaks in the data. However, the test results in Figure 8 reveal that the CUSUM plot remains

within the critical bounds at the 5% significance level, indicating the stability of the estimated economic relationship and the absence of significant changes in the data.

Figure 8. CUSUM of the square stability test
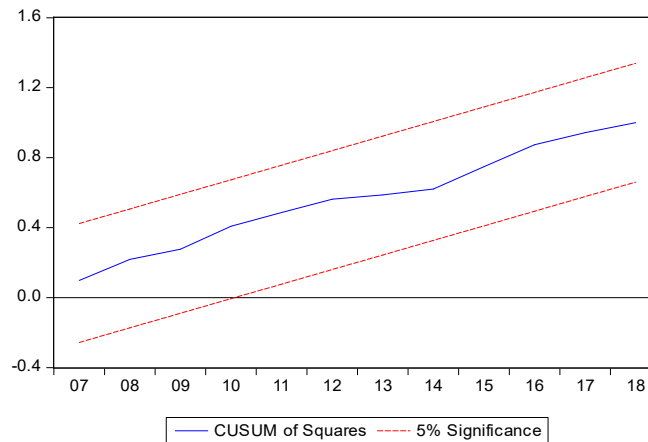
Source: Authors' elaboration.

Following the confirmation of cointegration among the variables, a long-run relationship was estimated using the ARDL model. The optimal lag structure was selected based on the Akaike information criterion (AIC). Table 3 presents the estimated long-run coefficients.

The long-run cointegration test results (Table 3) reveal a significant positive relationship between *DUR* and *NPL* with *NIM* at the 5% level, as well as a positive relationship between *CAR* and *NIM* at the 10% level. Conversely, a significant negative relationship is observed between *SLR* and *NIM* at the 5% level. The results confirm our hypotheses regarding the relationship between financial soundness indicators and interest rate margin, as detailed in the theoretical framework of this study. However, *GDP* and *INF* were found to have no significant impact on *NIM*. The dominance of a few large banks (e.g., Arab Bank and Housing Bank for Trade and Finance) in the Jordanian banking sector (Qwader, 2022) may be the reason why changes in inflation and economic growth have not significantly affected *NIM*. This high concentration gives these banks the power to set interest rates independently of broader economic trends.

The ARDL model demonstrates a high degree of explanatory power for the dependent variable (*NIM*), with an R-square of 93.8%. Furthermore, the Durbin-Watson statistic (DW) of 1.92, which is close to 2, suggests the absence of autocorrelation in the model. The F-test confirms the overall statistical significance of the model at the 1% level.

The results of the test showed that the coefficient of the speed of adjustment in the interest rate equation (see Table 4) was significant at the 1% level and had the expected negative sign. This confirms the existence of a long-run equilibrium relationship between the interest rate in Jordanian banks and the other variables used in the model. This coefficient indicates that approximately 92% of any disequilibrium is adjusted in the coming periods.

The short-run cointegration test results showed a positive relationship between *DUR* and *NPL* with *NIM* at the 5% significance level, and a positive relationship between *CAR* and *NIM* at the 10% significance level. The results also showed a negative relationship between *SLR* and *NIM* at the 5% significance level. On the other hand, *GDP* and *INF* did not have a significant impact on *NIM* in the short run.

Table 4. Results of estimating the model parameters in the short run

Variable	Coefficient	Std. error	T-statistic	Prob.
D(NIM(-1))	2.1232	0.7493	2.8336	0.2990
D(DUR)	0.1602	0.0677	2.3663	0.0223
D(CAR)	0.2981	0.1758	1.6956	0.0819
D(NPL)	0.2102	0.0921	2.2816	0.0337
D(SLR)	-0.0891	0.0395	-2.2557	0.0281
D(GDP)	0.0971	0.0495	1.9616	0.2276
D(INF)	0.0209	0.0187	1.1176	0.6130
CointEq(-1)	-0.6867	0.1764	-3.8929	0.0002

Source: Authors' elaboration.

5. DISCUSSION

The results of the unit root tests indicated that not all study variables were stationary at the same level. The overall analysis results likewise suggest the existence of a long-term equilibrium relationship between the NIM in Jordanian banks and the independent variables included in the model.

Cointegration tests revealed a significant relationship between financial soundness indicators and NIM in Jordanian banks, both in the short and long term. While the DUR, CAR and NPL ratios

Table 3. Long-run coefficients

Variable	Coefficient	Std. error	T-statistic	Prob.
DUR	1.2452	0.6128	2.032	0.0171
CAR	1.0969	0.3213	3.4131	0.0791
NPL	3.1125	0.7451	4.1778	0.0312
SLR	-3.2547	0.4984	-6.5303	0.0213
GDP	1.2989	0.3147	4.1274	0.2161
INF	0.4867	0.4015	1.2122	0.6121
C	0.09867	0.0321	3.0738	0.0073
R-squared = 93.8%		Adjusted R-squared = 87.9%		
F-statistic = 14.98		DW-statistic = 1.92		
Prob = 0.001				

Source: Authors' elaboration.

showed a positive relationship with NIM, the results indicated a negative relationship between the liquidity coverage ratio and NIM, which is consistent with the theoretical relationship between financial soundness indicators and the interest margin.

Conversely, the results did not show any significant impact of inflation and economic growth on the NIM, which is consistent with Khrawish et al. (2010) and Naceur and Goaied (2008) but contradicts Al-Ali (2012).

Conversely, the results did not show any significant impact of inflation and economic growth on the NIM. The dominance of a few large banks, such as Arab Bank and Housing Bank for Trade and Finance, in the Jordanian banking sector (Qwader, 2022) may be the reason why changes in inflation and economic growth have not significantly affected NIM. This high concentration gives these banks the power to set interest rates independently of broader economic trends.

6. CONCLUSION

This study aimed to analyse the determinants of the NIM in Jordanian banks from 2001 to 2023, focusing on the role of two main variable categories: macroeconomic variables — specifically, inflation rate and GDP —and financial soundness indicators, including the DUR, CAR, NPL, and SLR.

To achieve this aim, the study employed a standard econometric methodology utilising ordinary least squares (OLS) regression models to determine the nature, direction, and magnitude of the relationships between these variables and the NIM.

Concurrently, it is important to note that research analyzing fluctuations in the NIM within the Jordanian banking sector remains limited, despite the indicator's significant theoretical and practical importance for assessing bank performance and its contribution to financial sector stability. Consequently, this study seeks to address this research gap by investigating the causes of NIM volatility in Jordanian commercial banks. Preliminary analyses revealed significant fluctuations in this margin, indicating its sensitivity to various economic and financial factors. Accordingly, this research aims to identify the underlying drivers of these fluctuations, with particular emphasis on the role of macroeconomic variables and financial soundness indicators.

The results of the study's analysis indicate a significant relationship between financial soundness indicators and NIM in Jordanian banks, both in the short and long term. This result suggests that Jordanian banks can use financial soundness indicators as a primary tool for determining NIM, emphasising the importance of regulatory oversight of these indicators to ensure the stability of the Jordanian banking system. Conversely, the results did not show any significant impact of inflation and economic growth on the NIM.

Considering the study results, the researcher recommends that Jordanian bank management and regulators, particularly the Central Bank of Jordan, focus on a comprehensive set of measures. These include adopting transparency policies in disclosing financial soundness information, developing advanced credit risk assessment systems and establishing a specialised unit to study, analyse and manage bank liquidity, credit policy and NPLs. Furthermore, the study recommends that the Jordanian government implement policies and programs to mitigate the negative impact of the economic environment on banking activities.

For future research, this study suggests conducting an in-depth investigation to examine the relationship between NIM, financial soundness indicators and macroeconomic variables and developing accurate evaluation models to identify the factors affecting NIM. As this margin is a fundamental tool for improving bank performance, enhancing financial stability and creating an attractive investment environment, it contributes to achieving sustainable economic development.

It is essential to acknowledge that this study has several limitations. Firstly, the data used are limited to a specific period, which may limit the generalisability of the results to other periods. Secondly, there may be other factors affecting NIM that were not included in the model, such as changes in the risk preferences of depositors or investors. Finally, the data used are specific to Jordan, thereby limiting the generalisability of the results to other countries.

REFERENCES

Abu Hamad, R. S. (2002). *Ạ̄dạrị̈ ạ̄lmạṣārifa mad̲k̲hala taḥ̊lị̄lị̄ā kamị̄yā maˈāṣiri* [Management of banks: Analytical quantitative introduction]. Dar El Fikr for Printing & Publishing.

Al-Ali, A. (2012). Factors influencing the interest rate margin: An applied study on some Syrian commercial banks. *Damascus University Journal of Economic and Legal Sciences, 28*(2), 387–411. https://www.damascusuniversity.edu.sy/mag/law/images/stories/2-2012/a/387-411.pdf

An, P. H., & Loan, V. T. (2016). Factors affecting net interest margin of joint-stock commercial banks in Vietnam. *Journal of Economic Development, 24*(1), 92–103. https://www.researchgate.net/publication/338527420

Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking & Finance, 21*(1), 55–87. https://doi.org/10.1016/S0378-4266(96)00025-8

Apergis, N. (2014). The long-term role of non-traditional banking in profitability and risk profiles: Evidence from a panel of US banking institutions. *Journal of International Money and Finance, 45*, 61–73. https://doi.org/10.1016/j.jimonfin.2014.03.003

Ben-Hichem, K., Barbara, C., & Sheik-Rahim, F. (2013). *Profitability and interest rates differentials in Tunisia banking* https://www.doc88.com/p-703869449783.html

Berríos, M. R. (2013). The relationship between bank credit risk and profitability and liquidity. *The International Journal of Business and Finance Research, 7*(3), 105–118. https://ssrn.com/abstract=2149816

Bitar, M., Pukthuanthong, K., & Walker, T. (2018). The effect of capital ratios on the risk, efficiency and profitability of banks: Evidence from OECD countries. *Journal of International Financial Markets, Institutions and Money, 53*, 227–262. https://doi.org/10.1016/j.intfin.2017.12.002

Brock, P. L., & Suarez, L. R. (2000). Understanding the behavior of bank spreads in Latin America. *Journal of Development Economics, 63*(1), 113–134. https://doi.org/10.1016/S0304-3878(00)00102-4

Central Bank of Jordan. (n.d.). *Annual statistical bulletins.* https://www.cbj.gov.jo/En/List/Annual_Statistical_Bulletin

Emonena, O. L. (2025). Financial soundness and banks' performance: A theoretical review. *International Journal of Finance, Accounting and Management Studies, 1*(4), 104–121. https://www.ijfams.com/index.php/ijfams/article/view/54

Flamini, V., McDonald, C, & Schumacher, L. (2009). *The determinants of commercial bank profitability in Sub-Saharan Africa* (IMF Working Paper No. 09/15). International Monetary Fund (IMF). https://shorturl.at/M91pf

Hannan, T. H., & Berger, A. N. (1997). The rigidity of prices: Evidence from the banking industry. *Journal of Reprints in Antitrust Law & Economics, 27*, Article 245. https://heinonline.org/HOL/LandingPage?handle=hein.journals/jrepale27&div=15&id=&page=

Ho, T. S., & Saunders, A. (1981). The determinants of bank interest margins: Theory and empirical evidence. *Proceedings of 16th Annual Conference of the Western Finance Association, 16*(4), 581–600. https://doi.org/10.2307/2330377

Khrawish, H. A., Al-Abadi, M., & Hejazi, M. (2010). Determinants of commercial bank interest rate margins: Evidence from Jordan. *Jordan Journal of Business Administration, 4*(4). https://journals.ju.edu.jo/JJBA/article/view/696

Khrioush, H., Al-Zoubi, K., & Al-Abadi, M. (2004). Aleawamil almuathirat ealaa darajat al'aman almasrifii al'Urduniyi dirasat maydania [Factors affecting the level of banking hedging: Applied application]. *Journal of Economics and Administration, King Abdul-Aziz University, 18*(2), 59–77. https://ddl.mbrf.ae/book/3245136

Kirimi, P. N., Kariuki, S. N., & Ocharo, K. N. (2022). Moderating effect of bank size on the relationship between financial soundness and financial performance. *African Journal of Economic and Management Studies, 13*(1), 62–75. https://doi.org/10.1108/AJEMS-07-2021-0316

Kjosevski, J., Petkovski, M., & Naumovska, E. (2019). Bank-specific and macroeconomic determinants of non-performing loans in the Republic of Macedonia: Comparative analysis of enterprise and household NPLs. *Economic Research-Ekonomska Istraživanja, 32*(1), 1185–1203. https://doi.org/10.1080/1331677X.2019.1627894

Manz, F. (2019). Determinants of non-performing loans: What do we know? A systematic review and avenues for future research. *Management Review Quarterly, 69*(4), 351–389. https://doi.org/10.1007/s11301-019-00156-7

Meghyreh, A., & Shammout, M. (2004). Determinants of commercial bank performance in Jordan. *Arabic Economic Research, 32*, 3–34. https://journals.ekb.eg/article_290269_b97a2f4dc77b37c4d3fbbe2c1951fe5f.pdf

Messai, A. S., & Jouini, F. (2013). Micro and macro determinants of non-performing loans. *International Journal of Economics and Financial Issues, 3*(4), 852–860. https://dergipark.org.tr/en/download/article-file/362822

Mohammed, J. H., Ali, L. T., & Mhmood, L. A. (2022). Measuring financial strength using the profitability index and its impact on achieving financial soundness: An analytical study of several Iraqi private commercial banks. *Journal of Business and Management Studies, 4*(4), 61–73. https://doi.org/10.32996/jbms.2022.4.4.5

Naceur, S. B., & Goaied, M. (2008). The determinants of commercial bank interest margin and profitability: Evidence from Tunisia. *Frontiers in Finance and Economics, 5*(1), 106–130. https://ssrn.com/abstract=1538810

Nassar, K., Martinez, E., & Pineda, A. (2014). *Determinants of banks' net interest margins in Honduras* (IMF Working Paper No. 14/163). International Monetary Fund (IMF). https://www.imf.org/external/pubs/ft/wp/2014/wp14163.pdf

Nikolopoulos, K. I., & Tsalas, A. I. (2017). Non-performing loans: A review of the literature and the international experience. In P. Monokroussos & C. Gortsos (Eds.), *Non-performing loans and resolving private sector insolvency: Experiences from the EU periphery and the case of Greece* (pp. 47–68). Springer. https://doi.org/10.1007/978-3-319-50313-4_3

Ozurumba, B. A. (2016). Impact of non-performing loans on the performance of selected commercial banks in Nigeria. *Research Journal of Finance and Accounting, 7*(16), 95–109. http://www.iiste.org/Journals/index.php/RJFA/article/viewFile/32749/33640

Panta, B. (2018). Non-performing loans and bank profitability: Study of joint venture banks in Nepal. *International Journal of Sciences: Basic and Applied Research, 42*, 151–161. https://ssrn.com/abstract=3304961

Pasiouras, F., & Kosmidou, K. (2007). Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance, 21*(2), 222–237. https://doi.org/10.1016/j.ribaf.2006.03.007

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289–326. https://doi.org/10.1002/jae.616

Qwader, A. (2019). Relationship between macroeconomic variables and their impact on non-performing loans in Jordanian banks. *Asian Economic and Financial Review, 9*(2), 166–175. https://doi.org/10.18488/journal.aefr.2019.92.166.175

Qwader, A. (2022). Market concentration and market share's effects on the financial performance of Jordanian banks. *International Journal of Academic Research in Business and Social Sciences, 12*(11), 2317–2333. https://doi.org/10.6007/IJARBSS/v12-i11/15724

Saksonova, S. (2014). The role of net interest margin in improving banks' asset structure and assessing the stability and efficiency of their operations. *Procedia — Social and Behavioral Sciences, 150*, 132–141. https://doi.org/10.1016/j.sbspro.2014.09.017

Salina, A. P., Zhang, X., & Hassan, O. A. G. (2021). An assessment of the financial soundness of the Kazakh banks. *Asian Journal of Accounting Research, 6*(1), 23–37. https://doi.org/10.1108/AJAR-03-2019-0022

Shim, J. (2013). Bank capital buffer and portfolio risk: The influence of business cycle and revenue diversification. *Journal of Banking & Finance, 37*(3), 761–772. https://doi.org/10.1016/j.jbankfin.2012.10.002

Tarus, D. K., Chekol, Y. B., & Mutwol, M. (2012). Determinants of net interest margins of commercial banks in Kenya: A panel study. *Procedia Economics and Finance, 2*, 199–208. https://doi.org/10.1016/S2212-5671(12)00080-9

Umraugh, S. (2015). *An investigation of the determinants of banks' net interest margins in Jamaica* (Working paper). Division Bank of Jamaica. https://www.boj.org.jm/uploads/pdf/papers_pamphlets/papers_pamphlets_An_Investigation_of_the_Determinants_of_Banks_Net_Interest_Margins_in_Jamaica.pdf

Wulandari, I. (2023). The influence of bank soundness level indicators and branch office on bank deposit growth. *Jurnal Moneter, 11*(1), 54–61. https://shorturl.at/0Xifa

Zachary, L. N. (2013). *The effect of interest rates on demand for credit by small medium enterprises in Nairobi County* [Master's project, University of Nairobi]. https://doi.org/10.13140/RG.2.2.11730.27843