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RESEARCH ARTICLE

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ABSTRACT

Trading volumes are one of the most important indicators of liquidity in financial markets. Although the Iraqi banking system has experienced liquidity turmoil since 2003, this has led to a significant decline in the stock market. This study aims to investigate the impact of trading volumes on bank credit in the Iraq Stock Exchange. Based on a sample of 60 companies listed on the Iraq Stock Exchange and 18 banks, the study spanned a 15-year period, from 2008 to 2023. Using the least squares method, we demonstrated the relationship between the liquidity of stocks traded in Iraqi financial markets and bank credit ratios. We found that low stock liquidity has a positive impact on bank liquidity. Furthermore, using an autoregressive error correction approach, we concluded that low stock liquidity is less sensitive to low bank liquidity than the inverse relationship.

Keywords: Stock market, Liquidity, Traded stocks, Bank credit

1. Introduction

There are several definitions of cash, including the one provided by the Basel Committee in 2008, which defines cash available as “the ability of banks to meet all obligations and settle outstanding accounts.” Similarly, the International Monetary Fund defines cash available as “the ability of an institution to provide funds to make agreed-upon payments on time” (Al-Omari & Qasim, 2022).

The economic lessons provided by the global financial crisis (2007–2008) have revealed that the availability of cash is essential for economic progress. The lack of cash, in turn, leads to a limited distribution of credit across economic sectors, which in turn reduces investment and consumption opportunities, both of which are essential for economic growth (Hadi & Hamid, 2020).

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It is worth noting that a cash shortage in a particular bank can affect the cash ratios of other banks, spilling over to the stock market and, through reciprocal influence, spreading to the entire banking system. The risks of bank credit availability may spill over to the stock market, and banks may turn to stock markets to bridge their cash deficit. Thus, a cash flow crisis could turn into a financial and economic crisis (Imad & Manaf, 2017).

It is worth noting that the Iraqi banking system has witnessed numerous financial disruptions in terms of the provision of bank credit cash. Among these, we note that in 2020, during the global pandemic crisis and unfavorable economic conditions, Iraqi banks recorded an average solvency ratio of 19.6%, compared to 18.7% in 2019. In addition, banks' financing cash expanded in 2020, recording a cash deficit of 75.8 billion dinars. (Central Bank of Iraq, 2020).

It can also be said that the Iraq Stock Exchange (ISX) – which joined the Eurasian Federation of Exchanges, which includes thirty European, Asian and Arab stock exchanges in 2005, and in 2008 was selected as a member of the Federation's Business Committee for a one-year term, working to complete the requirements for joining the World Federation of Exchanges. Most importantly, it was included in the database issued by the Arab Monetary Fund on Arab financial markets at the end of 2010 – suffered from a lack of liquidity (Hadi & Hamid, 2020).

It is worth noting that during the study period, traded shares suffered from a liquidity decline of approximately 72% (Iraq Stock Exchange (ISX) Annual Reports).

Theoretical and empirical studies (Nikolaou, 2009; Brunnermeier & Pedersen, 2009; Chen et al., 2018) highlight an interactive relationship between bank cash and credit. While the impact of financing on cash equity has been widely documented (Nikolaou, 2009; Chen et al., 2018), the inverse relationship is underestimated, especially in emerging countries, such as Iraq (Jassim, 2017).

The study aimed to identify and diagnose the impact of stocks traded in financial markets on the volume of bank credit, as well as to identify the specific impact of bank credit ratios on the ratios of traded stocks. The study relied on a sample consisting of 60 companies listed on the ISX and 18 banks for the period from January 2008 to December 2023 (Zuhair & Rami, 2018).

After controlling for other factors, the regression of bank liquidity indicators on traded stock measures was used using the least squares method with robust standard errors. However, the automatic regression error correction criterion was used to reveal the degree of sensitivity of stocks to bank credit represented by liquidity (Al-Omari & Qasim, 2022).

The rest of the study is organized as follows. The second section consists of previous studies and the formulation of hypotheses. The third section includes the research methodology. The fourth section includes conclusions, discussion, and recommendations.

2. Literature review and hypothesis formulation

Based on identifying two types of liquidity, the researcher was able to identify two types of compatible risks: the ratio of publicly traded shares and the ratio of bank credit.

2.1. Current equity ratios

Schumpeter (1946) highlighted the concept of market cash. According to Keynes, an asset is more liquid if it can be realized immediately without loss. However, there are two aspects to stock cash: cash level and risk ratios. While cash ratios express the liquidity of a stock at a given point in time, cash risk is the probability that a stock will become illiquid within a given period.

Also, according to Chordia and Subrahmanyam (2004), a stock is characterized by high liquidity "if investors are able to make large transactions without significantly affecting the price, without incurring large losses, and quickly, and if any price change caused by a random shock is quickly corrected." Liquidity ratios have thus become multidimensional (Hossam, 2014).

They consist of four dimensions: tightness (the amount of transaction costs), broadness (transaction capacity), the ability to execute transactions very quickly around equilibrium prices, elasticity (the market's ability to withstand unexpected shocks), and immediacy (the speed with which transactions can be executed at the prevailing price).

It is worth noting that by improving the standard capital asset pricing model (CAPM), Acharya and Pedersen (2005) distinguish between three risks to equity cash ratios. The first risk, known as co-liquidity, measures the sensitivity of a firm's illiquidity to market illiquidity. The second risk relates to the sensitivity of a firm's performance to market illiquidity. The third risk relates to the sensitivity of a firm's illiquidity to market returns (Hadi & Hamid, 2020).

2.2. Bank credit ratios

According to the prevailing belief in financial intermediation theory (Bryant, 1980; Lemmen, 1994), banks provide liquidity to the economy by financing illiquid long-term assets (such as corporate loans or mortgages) with liquid short-term liabilities (such as customer deposits). Therefore, when long-term assets are not aligned with short-term liabilities, a bank is unable to settle its obligations and is unable to provide the necessary cash ratios.

Likewise, in 2008, the Basel Committee on Banking Supervision defined funding liquidity as "the ability of banks to meet their obligations and liquidate or settle their positions as they fall due." Similarly, in 2012, the International Monetary Fund defined funding liquidity as "the ability of solvent institutions to make agreed payments on time" (Imad & Manaf, 2017).

It is essential to highlight the important differences between cash ratios and cash risk. Cash ratios indicate that a bank is unable to meet its obligations at any given time. Cash risk, on the other hand, indicates the possibility of a bank being unable to meet its obligations in the future. While funding liquidity is immediate, funding liquidity risk, on the other hand, is always prospective and is measured over a specific time horizon. Cash risk consists of two components that assess the "quantity" and "price" effects: the random quantity of money or cash flows (exchange) and the random cost of obtaining funding liquidity from various sources (market liquidity, central bank liquidity, demand deposits) (Al-Omari & Qasim, 2022).

2.3. The interrelationship between liquidity ratios and bank credit ratios

Nicolaou (2009) highlights the interactions between bank credit liquidity, interbank liquidity, and stock market liquidity. A bank's funding liquidity risk can spill over into the interbank market. As a result of the reciprocal effect, the funding liquidity of other banks declines.

Due to uncertainty, depositors may withdraw their deposits, increasing the risk of a shortage of cash allocated to credit. This poses a systemic liquidity risk that threatens financial stability.

The funding risk may spill over into the stock market, as banks may turn to the stock market to fill their cash shortage by selling shares at "discounted prices." Panic selling of shares can lead to lower prices and make the market less liquid (Zuhair & Rami, 2018).

The spread of risk from banks' cash-to-credit ratios to equity-to-cash ratios does not occur in a one-way street. In fact, when asset prices fall below their fundamental values, the value of banks' balance sheets declines. As a result, banks are forced to implement urgent balance sheet restructurings and are constrained to sell more assets at lower prices to meet regulatory requirements. They find themselves facing a downward spiral of cash flow risk.

Empirically, Drehmann and Nikolaou (2013) conclude, based on 135 major refinancing operations conducted by the European Central Bank between June 2005 and December 2007, that higher funding ratio risk is associated with higher market cash ratio risk, particularly in times of crisis. Both authors measure funding ratio risk using a proxy that takes into account both the price of liquidity (the marginal cost of obtaining cash) and the volume of cash, all discounted to the total volume of liquidity provided by the ECB to neutralize changes in monetary policy and ensure consistency, recognizing that auctions or tender invitations may be of different sizes.

$$\text{Liquidity risk financing} = \frac{Size * Interest\ Buy\ Price}{Total\ Outstanding\ Amounts}$$

The study by Brunnermeier and Pedersen (2009) represents a step forward in exploring the relationship between two different types of cash. They explored the relationship between dealer financing cash and the liquidity of traded stocks. Their study found that the ratios of traded stocks depend on dealer financing cash, which in turn depends on the cash of traded stocks. Their paper suggests that under certain conditions, margins are disrupted and the combination of dealer financing cash and cash of traded stocks increases, leading to a liquidity spiral (Hossam, 2014).

Matana and Panetti (2014) find that a liquid stock market allows banks to reduce their cash reserves to cope with withdrawals from impatient depositors and shift their asset portfolios toward illiquid assets. In the theoretical study by Chen et al. (2010), increasing cash in the stock market improves banks' credit creation process. From the banks' perspective, a liquid stock market reduces their cost of equity; therefore, banks may find it optimal to raise more equity in the market to meet the higher capital requirements associated with a greater scope of lending to potential borrowers with creditworthiness, but which they have not previously provided. In other words, banks can extend additional loans to a larger number of borrowers while maintaining their solvency at a lower cost (Hadi & Hamid, 2020).

2.4. Study hypotheses

Previous studies have highlighted the reciprocal relationship between bank credit ratios and stock liquidity ratios. In contrast, the effect of bank cash ratios on stock liquidity is widely documented (Nikolaou, 2009; Chen et al., 2018). It is clear that this reciprocal relationship has a very small impact in emerging countries. We followed the theoretical approach of Nikolaou (2009) and Brunmermeier and Pedersen (2009), which states that a shortage of cash in the stock market leads to a shortage of cash allocated to banks for credit.

Our first hypothesis can be formulated as follows:

1. A decrease in the liquidity of traded stocks leads to a decrease in bank credit liquidity ratios.

Conversely, it is necessary to focus on the inverse relationship: a decrease in bank credit liquidity leads to a decrease in the liquidity of traded stocks. All previous theoretical

studies (Nikolaou, 2009; Brunnermeier & Pedersen, 2009) confirm the presence of cash volatility during crises. According to the American Financial Markets Association (2017), banks cease to play the role of market financiers by providing the necessary cash ratios, as they are no longer required to comply with Basel III prudential rules and hold less risky and more profitable assets. We therefore investigate the impact of this new situation on the transmission of bank illiquidity to the stock market (Zuhair & Rami, 2018).

Our second hypothesis can be formulated as follows:

2. There is a statistically significant effect of the decline in bank credit liquidity ratios on the liquidity ratios of stocks traded in financial markets.

3. Research methodology

3.1. Sample selection

The study sample consists of 18 commercial banks and all stocks listed on the stock exchange, comprising 60 listed companies, for the period 2008–2023. Data was collected from the Department of Statistics and Planning, as well as from the budgets of the banks under study.

3.2. Indicators used

3.2.1. Dependent variables

Since we seek to demonstrate the impact of liquidity ratios on credit ratios and the risk of cash ratios allocated to credit, the dependent variables are proxies for funding liquidity shortages and funding liquidity risk. We believe that commercial banks face a funding liquidity problem when they resort to borrowing from the central bank and other banking institutions in the short term. Therefore, we measured cash ratios through the reported liabilities to the central bank and other depository institutions to total assets.

Banking regulators use the Liquidity Coverage Ratio (LCR) and Net Credit Ratio (NCR) to assess the risk of bank credit ratios. These indicators were introduced by the Financial Stability Board (FSB) and the Committee for Central Bank Regulation after the outbreak of the financial crisis in 2007 and 2008. The Cash Coverage Ratio is calculated as the ratio of an institution's total assets of high-quality liquid assets to its total expected net cash flows over a 30-day horizon. The minimum required LCR level is 100% (Zuhair & Rami, 2018).

The Net Credit Ratio (NCR) is calculated as the ratio of available net financing to required total financing. On the liabilities side, the NCR discourages banks from borrowing too much in the short term and encourages greater reliance on fixed deposits, bond issuance, and equity capital. On the assets side, the NCR standard requires banks to invest in short-term loans and highly rated securities, reducing the share of long-term investments. However, given the difficulties in accessing detailed information for calculating the Cash Credit Ratio (CCR), it is necessary to estimate the risks of the Cash Credit Ratio (CCR).

3.2.2. Explanatory variables

One of the main objectives of the study is to assess the impact of stock liquidity ratios on bank credit liquidity ratios. Therefore, it is important to maintain multidimensional measures. Width is measured by the relative range offered. Depth and elasticity are estimated by the temporary price effect ratio (the important pricing role of the temporary price effect remains strong. Our results indicate that, in addition to the turnover ratio, the temporary deviation from the effective price is a component of the price effect, which also drives illiquidity or low liquidity ratios). Elasticity is estimated by the market efficiency coefficient (Hadi & Hamid, 2020).

It is worth noting that the range offered increased sharply between 2007 and 2010 and between 2017 and 2020. The price impact ratio increased from 2012, with a slight decline in 2017, before sharply increasing in 2019 and especially in 2020. After volatility, the market efficiency coefficient increased mainly in 2020. Central bank cash has seen a sharp decline, especially since 2007. The central bank was severely affected by the pandemic crisis in 2020.

3.2.3. Control variables

To isolate the influence of other factors that determine the bank credit liquidity ratio, we introduce control variables such as bank size, credit risk, economic conditions, stock performance, and regulatory requirements.

3.3. Descriptive statistics

Table 1. Presents the descriptive statistics for the various variables.

R	C	BS	EC	MER	IIiq	SP	NCR	CW	
0.0059	0.0949	0.0064	0.0089	0.9938	0.6662	0.0115	1.7653	0.0755	Mean
0.0030	0.0767	0.0050	0.0118	0.9430	0.4411	0.0105	1.7059	0.0788	Median
–0.2085	0.0473	–0.0173	–0.1433	0.4166	0.0000	0.0032	1.4501	0.0336	Minimum
0.2013	0.2090	0.0419	0.1092	3.1447	4.6438	0.0292	2.2358	0.1369	Maximum
0.0442	0.0493	0.0113	0.0277	0.3185	0.7433	0.0053	0.2095	0.0245	Standard Deviation
4.3125	–0.3587	0.0411	12.3677	9.3115	7.5498	0.7252	–0.7308	–0.8133	Kurtosis
–0.0841	1.0890	0.4939	–1.7192	2.0456	2.4974	0.8188	0.6566	0.1440	Asymmetry

Statistical program outputs.

Table 2. Pearson correlations between variables.

R	C	BS	EC	MER	IIiq	SP	NCR	CW	
								1.0000	CW
							1.0000	–0.8374	NCR
						1.0000	–0.2540	0.1477	SP
					1.0000	0.3108	–0.2319	0.2947	IIiq
				1.0000	0.0351	0.2926	–0.0100	–0.0315	MER
			1.0000	–0.1535	–0.0761	–0.0276	0.0231	–0.0289	EC
		1.0000	0.0688	0.0107	–0.1852	0.1878	0.0712	–0.0922	BS
	1.0000	0.0310	0.0440	0.0078	–0.2040	–0.4827	0.9192	–0.7946	C
1.0000	0.1445	–0.0526	0.0514	–0.2371	–0.1175	–0.0179	0.1969	–0.1753	R

Statistical program outputs.

Table 2 shows that weak bank liquidity (CW) is strongly and negatively correlated with the net credit ratio (NCR) and credit risk. Low bank liquidity (CW) is positively correlated with low cash flows (SP and Illiq). NCR is negatively correlated with low liquidity ratios (SP and Illiq). The explanatory variables (SP; Illiq; MER) are positively correlated with each other; hence, the risk of multicollinearity among the explanatory variables. On the other hand, we do not observe strong correlations between the control variables and the explanatory variables (Hossam, 2014).

4. Experimental results and discussions

The research focused on demonstrating the impact of liquidity ratios of stocks traded in the stock market on bank credit liquidity ratios through a variable ratio analysis whereby we regress bank cash on stock cash. We then investigated whether the cash ratios of stocks

traded have a greater impact on bank credit ratios or vice versa. Our results are subject to a set of robustness tests.

4.1. The impact of stock market liquidity on bank credit ratios

4.1.1. Main test

To test the effect of stocks on credit, we formulated the model using Equation 2.

$$LB_t = a_0 + a_1 LM_t + a_2 C_t + \epsilon_t$$

The index i refers to the period from 2008 to 2023; a0 is a constant; $\alpha 1$ and $\alpha 2$ are the parameters to be estimated; ϵi is the error term. The LBt coefficient is a matrix summing all measures of bank cash ratios (CW); the LMt coefficient is a matrix summing all measures of liquidity ratios; and the Ct operator is a matrix of control variables, including bank size (BS), economic conditions (EC), credit risk (C), index return (R), and regulatory requirements (RR). All variables are expressed in natural logarithms except Reg, which is an indicator variable. To avoid multicollinearity among the liquidity ratio variables, we tailor a model for each of them.

We used the ordinary least squares (OLS) method with a correction for heteroscedasticity. However, to avoid any potential problem of multicollinearity, we introduced each measure of equity cash ratios into a separate regression (Al-Omari & Qasim, 2022).

The credit cash shortage is positively affected by bank size and credit risk. Estimates indicate that the coefficients of size (volume) and credit risk (credit) are significantly positive at the 5% confidence level. Consequently, the credit cash shortage depends on transaction costs and the depth of the stock market. Listed banks use the stock market to raise capital and provide themselves with stable financial resources. However, when the stock market is illiquid, banks temporarily postpone this process until the market improves. Therefore, banks may temporarily experience a liquidity shortage; the situation becomes worse if banks face a funding shortage. Listed banks use the stock market to raise capital and provide themselves with stable financial resources. However, when the stock market is illiquid, banks temporarily postpone this process until the market improves. Therefore, banks may temporarily experience a liquidity shortage; the situation becomes worse if banks face a funding shortage (Zuhair & Rami, 2018).

Banks also turn to the stock market as both a source and a demander of liquidity. They invest their surplus funds in the stock market by purchasing shares (providing liquidity to the stock market), and when bank liquidity improves, they sell shares to demand liquidity. However, in the event of a cash shortage in the market and a collapse in stock prices (the financial crisis of 2007–2008 and the pandemic crisis in 2020), banks find themselves faced with two options. The first is to agree to sell shares at “discounted” prices. With the uncertainty in the stock market, everyone seeks to exit with minimal losses. This “massive” selling makes the market increasingly less liquid. This solution is never acceptable to most banks. The preferred solution for banks is to maintain their investment portfolio. Since shares are recorded at “fair value,” the value of banks’ assets decreases, forcing them to rebalance their balance sheet structure. To do this, they resort to interbank lending in the short term (Al-Omari & Qasim, 2022).

Initially, the 2020 pandemic crisis was characterized by a shortage of cash in the stock market and tighter cash ratios in banks. This tightness in bank liquidity was primarily due to the ongoing trend of credit money circulation, exacerbated by the panic caused by the COVID-19 pandemic. As a result, banks resorted to interbank lending to secure bank credit ratios. The Central Bank pursued an unconventional monetary policy by injecting liquidity

and reducing the reserve ratio from 2% to 0% in June 2020. Consequently, tight equity liquidity ratios are not a determining factor in tight bank credit liquidity ratios, but rather a dampening factor during bank liquidity crises (Jassim, 2017).

4.1.2. Testing the strength of association

We test the sensitivity of the underlying relationship between stocks and bank credit by controlling for multicollinearity and inverse correlation.

4.1.2.1. Checking for multicollinearity. The Amendola et al. (2010) diagnostic test was used to check for multicollinearity, which assesses the strength and sources of multicollinearity among variables in a multiple linear regression model. To assess linear association, we calculate the singular values of the matrix of measured variables, X, and then convert them to conditional indices. The conditional indices quantify the number and strength of all close dependencies between variables in the matrix. We then analyze the variance of the estimates using least squares (OLS regression coefficients) in terms of singular values to identify the variables involved in each underlying dependency and the extent to which the dependencies deteriorate in the regression. The results of the multicollinearity diagnostic test are presented in Table 3.

Table 3. Multicollinearity test results.

RR	R	C	BS	MER	IIiq	SP	EC	Status Identifier	The Value
0.0010	0.0134	0.0111	0.0153	0.0044	0.0135	0.0076	0.0075	1.0000	19.672
0.1281	0.1033	0.0048	0.0685	0.0000	0.0599	0.0019	0.1668	1.8182	10.819
0.6625	0.0266	0.0002	0.1103	0.0004	0.0078	0.0012	0.0044	1.9330	0.9920
0.0362	0.0170	0.0032	0.0905	0.0013	0.0170	0.0049	0.7883	2.1609	0.9104
0.0398	0.1431	0.0478	0.6365	0.0132	0.0068	0.0144	0.0071	2.6245	0.7496
0,0017	0.1301	0.2580	0.0462	0.0034	0.1872	0.1951	0.0075	3.6295	0.5420
0.0387	0.5651	0.2018	0.0092	0.0001	0.6269	0.0311	0.0002	3.9917	0.4928
0.0920	0.0014	0.4731	0.0234	0.9771	0.0808	0.7438	0.0182	8.9733	0.2192

Source prepared by the researcher.

From Table 3, we see that all rows have a condition index lower than the usual ratios, leading to the absence of multicollinearity between the exogenous variables.

4.1.2.2. Verifying the Reverse Relationship. The main hypothesis of the research focused on the correlation analysis, which states that the direction of causality is from stocks to credit. It can be argued that if reverse causality underlies the true relationship between bank liquidity and stock liquidity, then the direction of causality is in the opposite order. To ensure that the results are not subject to the problem of reverse causality, we regressed credit liquidity on the level of lagged stock liquidity ratios by one period. Incorporating lagged predictors of liquidity is essential to ensure that the expected results are not affected by potential synchronization issues between credit liquidity and stock liquidity. The results of this regression are presented in Table 4. From the final table, we note that bank liquidity ratios (CW and NCR) are affected by the relative range offered (SP) and the price impact ratio (Illiq). Thus, there is a correlation between bank credit and stock risk. Therefore, the liquidity of banks also affects the liquidity of stocks (Zuhair & Rami, 2018).

4.2. Interactions between bank credit ratios and stock liquidity ratios and discovering the strongest relationship

We demonstrated that stock liquidity has a positive effect on bank credit in Section 4.1.1. However, by examining the inverse relationship (subsection 4.1.2.2), we concluded that

bank liquidity ratios also affect stock liquidity ratios. The responses were used to discover the strongest relationship. Therefore, we constructed an autoregressive regression (VAR) model formulated by Eq. (3).

$$\begin{aligned} \mathrm{LB_t} &= \mathrm{a_0} + \sum_{i=1}^{k} aiLM\mathrm{t} - i + \epsilon t \\ \mathrm{LM_t} &= \mathrm{a_0} + \sum_{i=1}^{k} aiLM\mathrm{t} - i + \epsilon t \end{aligned} \tag{3}$$

The LBt coefficient is a matrix that aggregates all measures of bank credit ratios (CW); the LMt coefficient is a matrix that aggregates all measures of liquidity ratios. The market efficiency ratio (MER) was excluded because it does not show a concurrent relationship with bank liquidity. The subscript i denotes the number of lags. $\Delta 1$ and $\Delta 2$ are the parameters to be estimated. Δk is the error term. The concurrent coefficients were estimated using a VAR model for the period under study. However, before doing so, it is necessary to determine the number of lags and check for possible cointegration between the variables. The Akaike (AIC), Schwartz (BIC), and Hannan-Quinn (HQC) criteria were used to select the number of lags. We can see from Table 5 that the BIC and HQC criteria are weak at lags of 2.

Table 5. Selecting the Number of Lags.

HQC	BIC	AIC	Number of delays
–18.484	–18.303	–18.607	1
–18.691	–18.364	–18.912	2
–18.644	–18.171	–18.963	3
–18.645	–18.028	–19.063	4

Source Prepared by the researcher.

We use the Johansen test to check for integration between variables. Johansen proposes five specifications for series (Hossam, 2014).

The choice of specifications depends on the nature of the record. Therefore, we conducted the Augmented Dickey-Fuller (ADF) test, the results of which are presented in Table 6.

Table 6. Results of the Augmented Dickey-Fuller test.

Correct Operation	P-Value	Testing Operations	Variables
Autoregressive without deviation	0.9399	One-way autoregressive model	NSFR
	0.6872	Autoregressive stability model	
	0.3636	Autoregressive model without regression	
stationary autoregression	0.9972	One-way autoregressive model	LF
	0.6678	Autoregressive stability model	
	0.3522	Autoregressive model without regression	
Autoregressive model with deviance	0.3184	One-way autoregressive model	Qs
	0.1112	Autoregressive stability model	
	0.4003	Autoregressive model without regression	
Autoregressive model with direction	0.3635	One-way autoregressive model	Illip
	0.6871	Autoregressive stability model	
	0.5588	Autoregressive model without regression	

Prepared by the researcher and outputs of the statistical program.

To check for possible cointegration between the variables in our VAR model, we perform a Johansson test with a linear trend in the series and cointegration relationships, since at least one series (Illiq) is an autoregressive model with a trend. The results of this test are shown in Table 7 (Zuhair & Rami, 2018).

Table 7. Johansen test results.

Criticality P	Upper Limit Test L	Criticality P	Trace Test	Eigenvalue	Level
0.0000	51.752	0.0000	86.873	0.20466	0
0.0284	22.267	0.0103	35.121	0.095273	1
0.1949	10.325	0.1355	12.494	0.044660	2
0.1409	21.685	0.1409	21.685	0.0095493	3

outputs of the statistical program.

Looking at Table 7, we see only one cointegrating relationship. To identify the strong relationship between bank credit and stock market liquidity, we use impulse responses and variance analysis from the estimated autoregressive vector with error correction.

From the above, we find that the cash ratios for bank credit (CW and NCR) react more strongly to fluctuations in stock market liquidity ratios (SP and Illiq) than the stock ratios react to bank credit ratios. Similarly, we note that variations in bank credit ratios can be explained to a greater extent by variations in stock market liquidity ratios, while variations in stock liquidity ratios caused by fluctuations in bank liquidity ratios are less significant. This implies that bank credit is more affected by shocks caused by a lack of stock market liquidity ratios than by the inverse relationship. We can analyze this situation by knowing that a lack of stock liquidity ratios affects a lack of bank credit ratios. When stock liquidity is low, banks are unable to provide liquidity to the stock market. A lack of stock liquidity exacerbates the liquidity shortage in banks.

On the other hand, a shortage of bank credit ratios has a lesser impact on the cash ratios of traded stocks. A shortage of bank liquidity affects the illiquidity of stocks on both the supply and demand sides. In terms of money supply, under regulatory and profitability constraints, banks invest less and less in the stock market, providing less liquidity. Thus, banks invest less in stock portfolios. In terms of liquidity demand, in the case of a shortage of bank credit ratios, instead of seeking cash in the stock market, banks turn to borrowing from other banks and investing more in treasury bonds and other debt securities. These securities are less volatile and of good quality. This allows banks to deposit them as collateral during repo transactions without paying additional fees, as well as complying with the requirements of the Basel III agreements, particularly the Net Credit Ratio (NCR) (Jassim, 2017).

4.3. Conclusion

Through various economic experiences in all societies, it has become clear that bank credit plays a prominent role in financing various sectors. The global financial crisis (2007–2008) demonstrated that bank liquidity plays a very important economic and financial role. A shortage of bank cash ratios slows the distribution of credit across the economy, leading to a decline in investment and consumption, which are the engines of economic growth. A bank liquidity crisis can spill over into the banking and stock markets, leading to a general cash crisis. This threatens the financial stability of the economy. Despite its ability to withstand numerous shocks, the Iraqi banking system is experiencing liquidity disruptions. It is worth noting that the Iraq Stock Exchange (ISX) has been characterized by a significant decline in stock liquidity.

Previous studies have highlighted the interaction between bank cash and cash-to-stock ratios. Our study focused on demonstrating the impact of stocks on bank credit for a sample of ISX-listed companies and Iraqi banks over the period from 2008 to 2023. After controlling for several factors, we demonstrated that bank credit ratios depend on the depth and flexibility of the stock market.

5. Result

1. There is an impact of the liquidity ratios of stocks traded in the Iraq Stock Exchange on bank credit ratios.
2. There is an inverse relationship between the impact of bank credit ratios on the liquidity ratios of stocks traded in the Iraq Stock Exchange.
3. Bank credit is the primary supporter of various economic sectors through the provision of capital.
4. The study showed that the impact of bank credit on stocks is also significant. It is based on one-way autoregressive error correction.
5. Based on the analysis of impulse responses and the decomposition of variances of variables, we conclude that bank credit has a smaller impact on stocks than vice versa.
6. The proportion of funds available for borrowing increases with the increase in stock liquidity resulting from economic growth and trade openness.

6. Recommendations

1. Study the relationship between liquidity ratios for traded stocks and borrowing ratios, which would support economic growth.
2. Intensify research into the relationship between various liquidity ratios, given their significant role in supporting the provision of capital necessary for economic growth.
3. Focus on the culture of financial trading in the Iraq Stock Exchange, given its importance in raising liquidity ratios, which in turn supports bank lending.
4. Diversify the variables used to measure liquidity ratios and bank credit ratios to enrich theoretical and practical aspects and provide a database.

Ethics statement

Not Applicable.

Conflict of interest

The author declare no conflict of interest.

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Author contribution

All authors participated in reviewing and editing the final version of the manuscript.

Data availability

The author confirm that the data supporting the finding of this study are available within the article and its supplementary materials.

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