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Examining the influence of credit risk indicators on the liquidity dynamics of Kurdistan International and Iraqi Islamic Bank for the period 2005-2022

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Abstract

The banking sector play a significant role in the economy and in the financial system of any country. The aim of this research is to investigate the influence of credit risk indicators on the liquidity of two Iraqi banks including Kurdistan international bank and Iraqi Islamic bank by using data covering 18 years from 2005 to 2022. This research used SPSS V.26 program which were using correlations and regressions for analyzing data. The main result of the research indicated that the null hypothesis will be rejected and stating that there is a significant effect of the credit risk indicators (explanatory variables) on the liquidity dynamics (dependent variable) at the 0.05 significance level. Research recommended that highlighting the total credit quality of a bank's assets and liabilities is crucial as the profitability and net worth of a bank pivot not only on default risks, but also on the quality of its assets and liabilities.

Key Words: Credit risk, Liquidity, Assets, Liabilities, Risks.

1. Introduction:

Banks play a vital role in the financial system and they have a great impact on the whole economy. Moreover, acting with a good manner may have an impact on obtain a huge amount of profit to banks, because when clients see banks respect them may continue to buy their services. Also, it is undeniable and not exaggeration to see a rise in bank clients and buyers when bank staffs provide services in a perfect way. Because if any single bank fails, this could lead to the failures of the whole economy of any country. It is clear to say that now adays credit risk and their indicators may have an impact on liquidity dynamics. As well as, the efficient allocation of banking resources becomes challenge, when there is no healthy banking system. Moreover, each bank may face different types of risks especially credit risks, and liquidity risks. Credit risks is associated with economic depressions and it consist of a big part of banking risks which is a key indicator of banking weakness. Furthermore, these risks may lead to instability of banks and could bully sustainability of operations in banking. While bank liquidity refers to a situation when bank is in a safe area and ensures its ability against any adverse conditions.

1.1. Research problem:

Bank credit is one of the most sensitive financial tools and it has adverse impact on bank stability and bank growth. Moreover, there are a direct link between bank credit risks and fluctuations of interest rates. Depending on this, this research goal is to discover how credit risks in banks impact the bank liquidity. This could be expressed through the following question:
Is there any significant relationship between credit risk indicators and liquidity indicators for banks?

1.2. Research hypothesis:

According to the research problem, the research hypotheses can be written as follow:

H0:- There is no substantial association between credit risk indicators and banking liquidity.

H1:- There is substantial association between credit risk indicators and banking liquidity.

1.3. Research Objectives:

The research objectives can be summarized as follows:

1. Determine credit risks and analyzing, measuring them to lower their influence, in order to avoid banking crises.
2. To know the nature and kind of association among credit risks and their impact on the banking liquidity indicator.

2. Theoretical background:

2.1. Previous research:

The study conducted by Abbas and Jawad (2023) explored the relationship between credit risk, liquidity, and profitability. Using data from the Commercial Bank of Iraq over a ten-year period. The research concluded that the bank should diversify its investments and expand foreign currency lending. Additionally, the study recommended financial restructuring, re-evaluating share prices, engaging in global market speculation, and investing in shares of reputable international companies to enhance financial inflows and strengthen its balance sheet.

Moreover, study by Ayinuola and Gumel (2023) investigated the impact of liquidity and credit risks on bank stability in Nigeria by using secondary data from 12 banks (2010–2021). Furthermore, the Generalized Method of Moments (GMM), estimated via the Arellano and Bond technique. The results revealed that both risks significantly and negatively affect bank stability, both individually and collectively. The findings provide insights to help bank managers balance liquidity, profit maximization, and risk minimization.

Likewise, study by Imbierowics and Rauch (2019) examined the link between liquidity and credit risks, the two main sources of bank default risk, using data from nearly all U.S. commercial banks (1998–2010). Their results indicate that while these risks do not exhibit a significant mutual relationship, they both contribute to banks' probability of default. Individually, each risk increases probability of default, but their combined effect varies depending on the overall risk level, either intensifying or mitigating default risk. In summary, these insights boost the understanding of bank risk and support regulatory efforts to improve the joint management of liquidity and credit risks.

2.2. Credit risk concept

It might not be exaggeration to say that knowing credit risk concept is more important and it helps to be in a safe position. The banking industry might face various risks and crisis which may lead to banking instability which is a crucial factor could effect on banking failure (Abbas and Jawad, 2023: 79). Moreover, there is a clear relationship between performance of banks decrease and rise in bank risks (Syafi'i and Rusliati, 2016: 78). Likewise, credit risk is a likelihood which a borrower could fail to meet their obligations within a specific time and as per the agreed upon terms (Ayinuola and Gumel, 2023: 17). In another words, Credit risk includes the chance that a borrower may not meet their obligations within the required timeframe and as per the agreed-upon terms. Similarly, according to Saputra et al., (2020) credit risk occurs when customers obtain a credit facility, but fails to pay back and to fulfill their payment obligations. Similarly, Riyanto and Surjandari (2018) stated that credit risk is the likelihood when borrower may default on a loan. Besides, they believe that another explanation of credit risk is the possible for financial loss rising from the incapability of a counterparty to meet its obligations.

2.3. Liquidity

The subject of bank liquidity has consistently captured the attention of researchers over a long period (Golubeva et al., 2019: 459). It is clear that liquidity concept in banking is really similar to liquidity concept in any institution, only it might be distinguished in the nature of banking activities (Abbas and Jawad, 2023: 79). Furthermore, the availability of liquidity is crucial for the whole operation of banking institutions, and its absence can disrupt banking activities (Ayinuola and Gumel, 2023: 17). Surprisingly, certain financial entities may choose to keep smaller cash reserves in their

accounts in order to enhance profits, and this possibly disregarding their liquidity standings in the process (Ibrahim, 2017: 114). In simpler terms, it measures the bank's ability to promptly settle saver fund withdrawals and satisfy incomplete credit requirements (Riyanto and Surjandari, 2018: 2). Liquidity risk is a metric used to assess a bank's capability to reach its direct financial requirements when they come due. Moreover, banks might experience liquidity risks over the time and it has been regular event in history. In banking sector liquidity is a situation when a bank could face difficulty in paying its obligations and meet financial commitments (Golubeva et al., 2019: 456). There might be various types of liquidity in any banks and financial institutions. Three dissimilar forms of liquidity and their related risks can be identified: central bank liquidity, market liquidity, and funding liquidity (Abderrazak and Lemqeddem, 2022: 320).

2.4. Credit risk and Liquidity:

Credit and liquidity risks are important because they have a direct impact on the solvency of financial institutions. According to Marozva and Mutezo (2020) a significant challenge for banks nowadays is credit and liquidity risks. This is why these risks are considered particularly high in the financial sector (Abbas and Ullah, 2023: 207). The interplay of credit risk, associated with potential default on loans, and liquidity risk, related to the ability to meet short-term obligations, emphasizes their critical role in influencing the overall stability and viability of financial institutions. More interestingly, Sadiq et al. (2022) found a notable correlation between credit risk and liquidity risk with leverage in their study. The traditional theories of microeconomics in banking suggest a close connection between liquidity and credit risk in banks. In essence, these theories propose that there is a sophisticated relationship between the two factors (Ghenimi, et al., 2017: 238). Furthermore, scholars such as Acharya, et al., (2016), Calomiriset al., (2015), Bandyopadhyay and Mayuri (2021), and Vazquez and Federico (2015) supported the idea that it is possible to regulate liquidity and credit risks simultaneously. In the same way Cai and Zhang (2017) reveal that the positive correlation between credit risk and liquidity risk is more evident in foreign banks and larger financial institutions. Importantly, their findings remain robust even when using alternative measures to assess various aspects of bank risks. Likewise, Abbas et al., (2019) and Ejoh et al., (2014) also found a significant positive correlation between credit and liquidity risks in their study.

However, there are those who strongly argue that there is no link between credit risk and liquidity risk in their studies. According to (Amara and Mabrouki, 2019: 97) findings, there is no significant and meaningful simultaneous or deferred connection between credit risk and liquidity risk. Nevertheless, each of these risks independently influences the stability of banks, and their combined impact contributes to the overall instability of the banking system. For instance, Setiawan et al., (2019) argue that, according to simultaneous equation models, credit risk and liquidity risk do not show mutual influence or an equal relationship. Moreover, Imbierowicz and Rauch (2014) discovered no significant reciprocal relationship between risk categories, both contemporaneously and over time. Nevertheless, these risk categories were found to impact banks' probability of default. Moreover, Lachaab (2023) found that both credit and liquidity risks, individually and collectively, influence bank stability. The study also emphasizes that elevated credit risk results in greater risk-taking during economic booms rather than recessions, while increased liquidity risk is associated with higher risk-taking in favorable economic conditions rather than unfavorable ones.

3. Research methodology:

The population of this research is the banking sector of Iraq, which is classified into four main groups: public banks, private banks, Islamic banks, and foreign banks. The sample for this research includes two private banks such as Kurdistan international bank and Iraqi Islamic bank for investment and finance nominated based on the availability of their annual reports, which were obtained from the Iraqi stock exchange site. The research relies on secondary data extracted from these annual

reports, covering a time distance of 18 years from 2005 to 2022. Data analysis was conducted using SPSS V.26 statistical software, retaining correlation and regression methods. The dependent variable chosen for analysis is the liquidity index, determined by the ratio of current assets to total assets. The explanatory variables consist of credit risk indicators, encompassing four variables. The research models and variables are structured as follows:

Dependent Variable:
Liquidity Index (calculated as current assets over total assets)
Explanatory Variables (Credit Risk Indicators):
[Total loans/ Total deposits]
[otal loans/ Total assets]
[Total loans/ Current assets]
[Loan Loss Reserve/ Total Loans]

Table 1 research standards

Variables	Metrics	Source
LD	Total loans/ Total deposits	(Setiawan et al., 1172: 85)
LA	Total loans/ Total assets	(Schuller, 2008: 29)
LCA	Total loans/ Current assets	(Schuller, 2008: 29)
LRL	Loan Loss Reserve/ Total Loans	(Abbas and Jawad, 2023: 85)
CAA	Current Assets/ Total Assets	(Setiawan et al., 1172: 85)

The source: Prepared by the researcher.

4. Results and Discission:

4.1. Analyzing Credit Risk Indicators on Bank Liquidity:

Table 2 Analyzing Credit Risk Indicators of Kurdistan International bank

Year	LD	LA	LCA	LRL	L
2005	0.135	0.020	0.002	0.021	0.943
2006	0.406	0.667	0.005	0.739	0.958
2007	0.039	0.175	0.466	0.189	0.921
2008	0.188	0.125	0.360	0.131	0.949
2009	0.403	0.126	0.041	0.246	0.946
2010	0.380	0.184	0.547	0.193	0.954
2011	0.129	0.075	0.708	0.078	0.957
2012	0.224	0.246	0.233	0.285	0.969
2013	0.319	0.675	0.017	0.174	0.965
2014	0.490	0.726	0.104	0.760	0.955
2015	0.961	0.168	0.469	0.017	0.945
2016	0.073	0.021	0.470	0.021	0.948
2017	0.009	0.003	0.719	0.002	0.955
2018	0.003	0.001	0.005	0.001	0.963
2019	0.004	0.002	0.004	0.001	0.965
2020	0.004	0.002	0.003	0.002	0.971
2021	0.004	0.002	0.289	0.002	0.970
2022	0.004	0.002	0.656	0.002	0.966

The source: Prepared by the researcher by using Excel.

From the table 2 the ratio of liquid assets to total assets in Kurdistan increased relatively during the research years, rising from 0.943 to 0.966 in 2022.The ratio of total loans to total deposits has been relatively low, reaching its highest ratio of 0.961 in 2005. This was due to the increase in loan volume and expense greater the growth in deposits. However, this ratio began to decline, especially

in the recent years of the research, due to the growth in the volume of primary deposits. The highest ratio of total loans to total assets was recorded during the year 2014, at 0.726, attributed to the increase in the ratio of loans granted and the rise in demand for loans. This indicates an increase in credit risks, as there is a possibility of an increase in exposure to the risks of loan default. The lowest ratio was recorded in 2018. As for the ratio of total loans to total assets, the highest ratio was recorded in 2011, at 0.708, indicating the development and prosperity of the bank's operations and an increase in both its loans and assets at the same time. The lowest ratio was recorded in 2005, at 0.002. Regarding the ratio of doubtful loans to total loans, the highest ratio was recorded in 2006, at 0.739. This indicates a significant increase in the ratio of non-performing loans compared to the allocated reserves for them. The lowest ratio was recorded during the years 2018 and 2019, at 0.001, suggesting a decrease in this indicator, meaning that the bank is prepared to face loan losses and a reduction in non-performing loans. This indicates a decrease in credit risks for the bank.

Table 3 Analyzing Credit Risk Indicators of Iraqi Islamic Bank

Year	LD	LA	LCA	LRL	L
2005	0.257	0.086	0.270	0.099	0.868
2006	0.218	0.083	0.258	0.096	0.873
2007	0.118	0.050	0.483	0.057	0.878
2008	0.337	0.171	0.214	0.208	0.822
2009	0.154	0.056	0.379	0.060	0.937
2010	0.622	0.197	0.118	0.213	0.924
2011	0.246	0.151	0.039	0.158	0.956
2012	0.518	0.241	0.020	0.251	0.954
2013	0.644	0.277	0.023	0.287	0.963
2014	0.699	0.276	0.050	0.282	0.960
2015	0.661	0.261	0.052	0.270	0.965
2016	0.974	0.307	0.047	0.323	0.952
2017	0.201	0.296	0.103	0.302	0.979
2018	0.856	0.275	0.137	0.307	0.896
2019	0.493	0.177	0.023	0.247	0.717
2020	0.750	0.228	0.023	0.278	0.819
2021	0.626	0.200	0.045	0.218	0.919
2022	0.689	0.259	0.024	0.290	0.894

The source: Prepared by the researcher by using Excel.

From Table 3, we observe the stability of the liquidity index, which was 0.868 in 2005 and continued to rise to 0.979 by 2017, before decreasing to 0.894 in the final year of the research, indicating the bank's policy of increasing liquidity levels. As for the ratio of total loans to total deposits, there is a noticeable increase during the research years, reaching 0.689 by 2022. We note a decrease in the ratio during 2007, followed by an increase. The total loans to total assets index show instability throughout the research years, with the highest ratio recorded in 2016 at 0.307. The decrease in this ratio indicates a decrease in credit risks. From Table 3, we notice a slight decrease in the total loans to liquid assets ratio, with the lowest level recorded in 2012 at 0.020, indicating the bank's ability to overcome crises. Regarding the ratio of doubtful loans to total loans, the highest ratio was recorded in 2018 at 0.307, attributed to the increase in non-performing loans, while the lowest ratio was 0.057 in 2007, indicating the bank's readiness to face loan losses and the improvement in the quality of loans granted, leading to a decrease in loan losses for the bank.

4.2. Statistical tests assessing the impact of credit risks on bank liquidity include:

1. **Correlation Test:** Measures the association strength between credit risks and liquidity.

Table 4 Correlation Test

		Liquidity	LD	LA	LCA	LRL
Liquidity	Pearson Correlation	1	-.218	.073	.089	-.044
	Sig. (2-tailed)		.202	.673	.605	.799
	N	36	36	36	36	36
LD	Pearson Correlation	-.218	1	.476**	-.383*	.494**
	Sig. (2-tailed)	.202		.003	.021	.002
	N	36	36	36	36	36
LA	Pearson Correlation	.073	.476**	1	-.398*	.864**
	Sig. (2-tailed)	.673	.003		.016	.000
	N	36	36	36	36	36
LCA	Pearson Correlation	.089	-.383*	-.398*	1	-.419*
	Sig. (2-tailed)	.605	.021	.016		.011
	N	36	36	36	36	36
LRL	Pearson Correlation	-.044	.494**	.864**	-.419*	1
	Sig. (2-tailed)	.799	.002	.000	.011	
	N	36	36	36	36	36
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

The source: Prepared by the researchers using SPSS data, Version 26.

From Table 4, we observe negative relationships between the liquidity index and both the ratio of total loans to total deposits and the ratio of doubtful loans to total loans, with coefficients of -0.218 and -0.44, respectively. On the other hand, there is a positive relationship between the liquidity index and both the ratio of total loans to total assets and the ratio of total loans to liquid assets, with coefficients of 0.073 and 0.089, respectively. The highest significant positive relationship was observed between the ratio of total loans to total assets and the ratio of doubtful loans to total loans, with a coefficient of 0.864**. Additionally, a significant negative relationship was recorded between X2 and ٣٠, with a coefficient of -0.0398.

2. **Regression Analysis:** Models the relationship between credit risk factors and liquidity.

Table 5 Model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.340[a]	.116	.002	.054344
a. Predictors: (Constant), LRL, LCA, LD, LA				

The source: Prepared by the researchers using SPSS data, Version 26.

Table 5 provides insights into the variance explained by the independent variable. The initial statistic, denoted as R, signifies the correlation coefficient between the independent and dependent variables. In this analysis, R holds a value of 0.340, suggesting a noteworthy correlation between the two variables. Following R, R Square (R2) is the squared value of R, commonly utilized to assess the

goodness-of-fit or the proportion of variance accounted for by a specific predictor variable. In this research, R2 stands at 0.116, indicating that 11.6% of the variability in the dependent variable can be attributed to the independent variables in this model. Moreover, adjusted R square is 0.002 percentage which is very low.

Table 6 Anova test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.012	4	.003	1.016	.414[b]
	Residual	.092	31	.003		
	Total	.104	35			
a. Dependent Variable: Liquidity						
b. Predictors: (Constant), LRL, LCA, LD, LA						

The source: Prepared by the researchers using SPSS data, Version 26.

Table 6 presents the outcomes of an ANOVA analysis, outlining the overall effect explained by the model. The computed significance value, noted as sig., was 0.414, surpassing the conventional threshold of 0.05. Additionally, the F-test yielded a value of 1.016, which falls below the critical F-value of 3.892 for degrees of freedom (1, 31). These findings suggest that based on the effect results within the research model, we fail to reject the null hypothesis and thus accept that there is no significant effect of the independent variable (X) on the dependent variable (Y) at the 0.05 significance level. This conclusion is supported by the low F value and the elevated significance level.

Table 7 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.936	.022		42.536	.000
	LD	-.052	.037	-.281	-1.404	.170
	LA	.149	.101	.500	1.477	.150
	LCA	.011	.046	.048	.249	.805
	LRL	-.097	.106	-.318	-.922	.364
a. Dependent Variable: Liquidity						

The source: Prepared by the researchers using SPSS data, Version 26.

Table 7 presents coefficients of variables in the model along with significance tests. Unstandardized coefficients indicate the change in the dependent variable for a one-unit increase in the independent variable. For instance, an unstandardized coefficient of -0.052 suggests that a one-unit increase in X predicts a decrease in Y by -0.052 units. Standardized coefficients, or Beta coefficients, are based on standardized data (z-scores) with a mean of zero and standard deviation of one, enabling comparisons across variables. For X, the Beta coefficient (-0.281) indicates its predictive role on Y, albeit at a moderate level. The significance level (Sig.) of 0.000 implies a significant effect of X on Y. This

conclusion is further supported by the calculated t-test value of -1.404, which is lower than the critical value of 1.653 for 33 degrees of freedom. Thus, the evidence suggests that X influences Y significantly.

4.3. Discussion:

The results from linear regression show that there is a link between credit risk indicators and liquidity dynamics and this is consistent with the results of the study of Cai and Zhang (2017), Abbas and Ullah (2023), Ejoh et al., (2014), and Sadiq et al., (2022). However, this result is not in the line with results of the study of Amara and Mabrouk (2019), Setiawan et al., (2019), and Imbierowicz and Rauch (2014).

5. Conclusions and suggestions:

5.1. Conclusions:

To conclude the findings from the research, suggest that based on the effect results within the research model, we fail to reject the null hypothesis and thus accept that there is no significant effect of the explanatory variables (credit risk indicators) on the dependent variable (liquidity dynamics) at the 0.05 significance level. Thus, the evidence suggests that X influences Y significantly. Moreover, we observe negative relationships between the liquidity index and both the ratio of total loans to total deposits and the ratio of doubtful loans to total loans. On the other hand, there is a positive relationship between the liquidity index and both the ratio of total loans to total assets and the ratio of total loans to liquid assets. The highest significant positive relationship was observed between the ratio of total loans to total assets and the ratio of doubtful loans to total loans, with a coefficient of 0.864**.

5.2. Suggestions:

After knowing research results its is necessary to suggest some points as follows:

1. Credit indicators are vital tools in assessing and analyzing bank liquidity and identifying potential banking crises. They provide a comprehensive view of the strength and confidence of banks and their ability to meet financial obligations in a timely manner. Additionally, credit indicators help identify potential risks of default and estimate the extent to which banks are exposed to credit risk.
2. The necessity of using credit indicators, which are among the most important indicators, helps in determining the banking liquidity index and taking preventive measures to avoid banking crises.
3. The importance of focusing on the overall credit quality of a bank's assets and liabilities is paramount because the profitability and net worth of a bank depend not only on default risks, but also on the quality of its assets and liabilities.

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