

# The Relationship between the Risk of Liquidity and the Risk of Credit in Banks

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**Abstract:** This article considers the relationship among the two central sources of bank default risk: risk of credit and risk of liquidity. Where we discussed in this study the relationship among these two sources of risk in the field of banking institutions. Through previous studies and research that discussed this relationship. As well, we considered both kinds of risks in detail, right down to examine the relationship between them through two parts, the first part is the theoretical studies and then we discussed the second part which is the practical studies. This article has reached the epilogue that on the practical front of these studies, there is no substantial relationship between risk of liquidity and risk of credits. This signifies that the practical studies rejected the hypothesis which assumes there is a statistically important relationship among risk of liquidity and risk of credit.

**Keywords:** liquidity, credit, classification of risks, risk of liquidity, risk of credit, liquidity management, the relationship among risk of liquidity and risk of credit.

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## 1. INTRODUCTION

Banking institutions and banking activities have developed significantly through time. With the insertion of money, financial services like deposit-taking, adding money, currency substitution, and money transfers became important. Because of the fundamental office of money, banks had and still have an important part in the economic system. Banks act as a mediator between supply and demand of securities, and they convert short-term deposits into long and medium-term credits. Specialized information on financial products is gathered from banks to improve investment decisions and to manage the risk.

Like any other firms, banks are exposed to classical operational risks like infrastructure breakdown, supply problems, environmental risks, etc. More typical and important for a bank is the financial risks it takes by its transformation and brokerage function. The banks increase funds by captivating deposits, borrowing in the market of interbank or issuing debt instruments on the fiscal market. Essentially, the bank's main activity is to purchase and sell financial products with different profit and risk characteristics. This alteration from supply to demand side is not without hazard. Banks are endangered to credit, market, operational, interest rate and risk of liquidity. The fit management of these risks is a key point to reduce the earnings risk of the bank, and to reduce the risk that the bank becomes insolvent and that depositors cannot be refunded (Gestel & Baesens, 2009).

Also, in this discussion, we give a wide overview of banking and risk management is given. A brief summary of liquidity risk, risk of credit, and the relationship among them.

## 2. LIQUIDITY RISK

Liquidity is commonly specified as the capability of a financial corporation to meet its debt obligations without incurring unacceptably large losses. An instance is a company preferring to return its outstanding one-month commercial paper obligations by issuing new commercial paper instead of by selling assets. Thus, "funding liquidity risk" is the risk which a company will not be qualified to meet its existing and future cash flow and guarantees requirements, both expected and unexpected, without materially influencing its everyday operations or overall financial condition. Fiscal companies are particularly sensitive to the funding of liquidity risk since debt maturity conversion (for instance, funding longer-term loans or asset purchases with debt obligations or shorter-term deposits) is important key work fields for them.

In response to this well-known hazard, financial firms organize and maintain liquidity management systems to estimate their prospective funding wants and ensure the funds are obtainable at proper times. A key component of these systems is observing and evaluating the firm's current and future debt obligations and planning for any unexpected funding wants, notwithstanding of whether they appear from company-specific components, like a decline in the company's collateral value, or from systemic (economy-wide) components. To achieve equilibrium, its funding demand, both expected and unexpected, with available supply, a company must also include its costs and profitability targets.

Financial companies can handle their liquidity wants through various sources ranging from existing assets to quit and debt obligations. The most easily available are operating cash flows emerging from interest and major payments from existing assets, service fees, and the receipt of funds from several transactions. For instance, effective management of the timing and maturity of companies' liability cash flows and the asset can promote liquidity. Furthermore, companies may sell assets which are near-term cash equivalents, like government bonds. This is consistently done on a contingency basis to achieved unexpected cash wants, and such liquidity reserves must be actively managed since the assets must be unencumbered (that is, not underwritten as collateral for any other transaction) and convenient to liquidate under potentially adverse market conditions.

A substantial alternative to a clear asset sale is an entry into a buy agreement with a ready counterparty. In such a "repo" deal, the holder of an asset sells it to the purchaser but further enters into a separate covenant to buy the asset back at a particularized time for a set price. From a funding perspective, the repo grants the seller with a short-term loan that is collateralized handling the asset in question. The Federal Reserve's deducting window is a place for such repos based on particular asset types as a guarantee. To access the deducting window has classically been limited to depository institutions. Nonetheless, as challenges persist liquidity in the financial markets, the Fed has originated a variety of additional collateralized lending facilities, such as the Essential Dealer Credit Facility and the Term Auction Facility, which enlarge its capacity to render liquidity to a wider set of financial institutions based on an extra whole set of collateral sorts for a more larger diversity of the maturities (Lopez, 2008).

### 3. RISK OF CREDIT

What is risk of credit? Well, Brown & Moles (2008) pointed to the most leisurely way to take risk of credit is to think of your own position. Consider the instance where an acquaintance, someone you may have known at school or in a social situation, turns to you and demands you to loan them some money, not a minor amount to compensate for their bus ticket to home, but enough amount so that, if they do not repay you as promised, you are left significantly out of the pouch. What do you do? Do you lend the individual the money? They may not repay you. Thus, it is more beneficial to refuse. And so once more, you may miss out on a potential profit possibility.

The core of the decision is whether the individual respect the promise to repay or defaults. The desirable outcome is that the loan is paid back (with interest). The unacceptable outcome that you hope to dodge is that the individual fails to repay the loan or, in the parlance of credit, defaults.

Notice how the example puts up all kinds of topics. If you experienced the individual better, you might be more willing to work with the lending decision (that is, if you knew the person's circumstances and their power to pay back). The past experience of others who have lent money to the individual might be useful to know. You may additionally desire to compare the individual to others who have borrowed money in a similar situation. As a consequence, you may be capable to get a statistical estimate of the likelihood that the individual will repay you (or, equivalently, will default on the loan).

Your views as to whether you would be wise to lend the money to this acquaintance might change if the individual produced a guarantee to support the loan, or some collateral (that is, something you could call upon if the individual were unable or unwilling to meet the obligation).

Whatever your thoughts, the decision requires you to take a judgment on the uncertain future outcome. This might take the form of a gut feeling (or what professionals would term expert judgement), or you might be able to rely on a formal assessment model.

In commerce, every time an individual or a firm borrows and hence makes a promise to pay, a financial asset is created. This promise can be informal and take the form of a verbal agreement or can be based on a formal written contract. The promise can involve the purchase of an asset, a product or a service from the provider. The promise can include the

buying of an asset, a product or a service from the provider. The promise can also be as in the example above, to reimburse a loan. Regardless of the purpose of the transaction, the worth of the promise will depend on the ability and willingness of the person or firm to make good on the promise.

According to Gregoriou and Hoppe (2008), a bank loan is a debt, which requires the redistribution of the financial assets between the borrower (debtor) and the lender (creditor). The bank loan is generally indicated to the borrower who got a money amount from the lender and needs to pay back, known as the principal. In addition, the banks usually charge the fees on borrower, which is the interest on the debt. The risk associated with loans is a risk of credit. One of the major duties of financial institutions is to provide loans, this is typically the source of income for banks, bank loans and credit also constitute one of the ways of increasing money supply in the economy (Waymond, 2007).

#### **4. THE RELATIONSHIP AMONG RISK OF LIQUIDITY AND RISK OF CREDIT**

The debate can be split into two parts, the first ones are the theoretical studies and the second one is the practical studies.

##### **4.1 The Theoretical Research:**

Over the past 60 years, an immense quantity of literature has dealt with banks' risk of liquidity and risk of credits. Explanations for the approach banks job and their essential peril and return sources are provided by two principal research strands concerning the microeconomics of banking: the theory of classic financial intermediation, most conspicuously designated by the Dybvig and Diamond (1983) and Bryant (1980) models and their enlargement (like Diamond, 1997, or Qi, 1994), and likewise by the industrial companies way to banking, which emphasizes most particularly in the model of Monti-Klein of banking organizations and subsequent associated research. The financial intermediation view model's banks as liquidity pools, which provide both borrowers and depositors with the cash ready availability, that way promoting economic welfare and absorb the economic risks of liquidity. The approach of industrial regulation of banks to maximize prices in the corporate monopolies and credit markets, face rising demand for deposits and lower demand for loans in connection with higher interest rates. On the asset side, banks generate returns through loan interest rates; on the liabilities side, banks face costs through deposit interest rates (Imbierowicz & Rauchii, 2013).

The models of both shores of the literature indicate which, there is a connection at least in the notion, among risk of credit and risk of liquidity. However, research is ambiguous about the question of at any rate this relationship is positive or negative. The Monti-Klein framework and its subsequent take borrower defaults and swift fund retreats into account, both expected to be dropping a bank's earnings. Since ownership equity, marketable securities, and other funding of debt are recognized as disclosed, banks maximize their earnings by maximizing the difference between loan rates and deposit, presented a developing from the external factors major refinancing rate, in addition, to randomly borrower defaults and funding revoke. As the risk of liquidity is seen as profits, lowering costs, a loan default raises this risk of liquidity in order to the lowered cash inflow and reduction it triggers (e.g. Prisman, Sushka and Slovin, 1986). somewhat, in theory, the risk of liquidity, and risk of credit must consequently be positively correlated. This assumption is endorsing the theoretical literature of financial intermediation, elaboration of these models shows those risky bank assets with each other with uncertainty about the economy's liquidity wants spark bank to run based on utter panic (Samartín, 2003; Iyer and Puri, 2012). Depend on these models, liquidity and risk of credit have to be positively related and contribution concurrently to bank instability.

According to (Imbierowicz & Rauchii, 2013) The idea of a positive relationship between liquidity and risk of credit is also supported by a very new body of literature which furthermore concentrates in 2007 & 2008 during the financial crisis, like, Acharya and Viswanathan (2011), Diamond and Rajan (2005), He and Xiong (2012) and Metrick and Gorton (2011). Rajan and Diamond's paper (2005) rest on the model established by Rajan and Diamond (2001). Their paradigm is established on the premise which banks get money from inexperienced depositors, that is used for lending. Problems appear whether many economic projects financed with loan yield inadequate funds (or even default) and the bank cannot satisfy the depositors' demand. As a consequence of this deterioration of asset, more and more clients (depositors) will demand back their money. Therefore, the bank will, call in all loans and that way diminish aggregate liquidity in the market.

The principal outcome is hence that higher risk of credit joined higher risk of liquidity through depositor demand. Acharya and Viswanathan's (2011) model demonstrate reason the fortify of leverage in good economic circumstances

drives to rigorous asset shocks and a drying up of liquidity in bad economic circumstances. The underlying assumption is that financial companies increase debt which has to be rolled over constantly and which is used to finance assets. Turns out that more religion in the banking system fruit higher “bank run” hazard: in crisis times when asset prices deteriorate, banks find it more difficult to get around the debt, i.e. they face a liquidity problem. He also focuses on debt rollover risk. They assert that the debt maturities of lenders (e.g. Investment banks) on short-period debt are spread over time and rolled through to keep away from bank-run risk if concurrently all debt contracts terminate. The authors terminate to an equilibrium in which each lender will not roll over the debt contract if the fundamental asset value falls below a definite beginning. The outcome is a “rat race” in that lenders are more presumably to pace if the asset values decline. A different view on the relationship among liquidity and risk of credit is given by Metrick and Gorton (2011). This paper impressively shows how perceived risk of credit (as opposed to genuine risk of credit) can lead to risk of liquidity in banks.

**4.2 The Practical Research:**

According to the first study of Khezeli1 & Almasi (2015) Banks and financial institutions due to the nature of its activities from the very beginning are faced with many risks, but because of the breadth and diversity of banking activities, Researchers disagree on the risks of banking operations, so some risk of credit, the rate of interest and risks of liquidity, including major banking on the count. In terms of risks that can affect the financial institution separated into three levels as follows:

The first level, the hazard that the financial institutions do not have control and influence they and only they are affected. The second level, the risk that financial institutions affect them, but this effect is small and more affected. The third level, the risk that the financial institutions by applying the methods and tools that could affect the financial institutions under its control and manage them. Among the risks that threaten bank financial institutions, Risk of credit due to the focus, the volume of operations and especially its sensitivity, the most important risk is, the third level is the only risks that financial institutions can overcome them, control them by methods of risk management tools. Therefore, the level number three is the focus discussed risks. Risks of financial institutions on the impact. Actions and reactions of the financial institution must also consider the risks on each other because it may have a negative correlation risk and other risks and the two will be together the cover. or on the contrary, the risk of the whole portfolio together financial institution or negative effects of their addition, so the role of integrated risk management of financial institutions revealed.

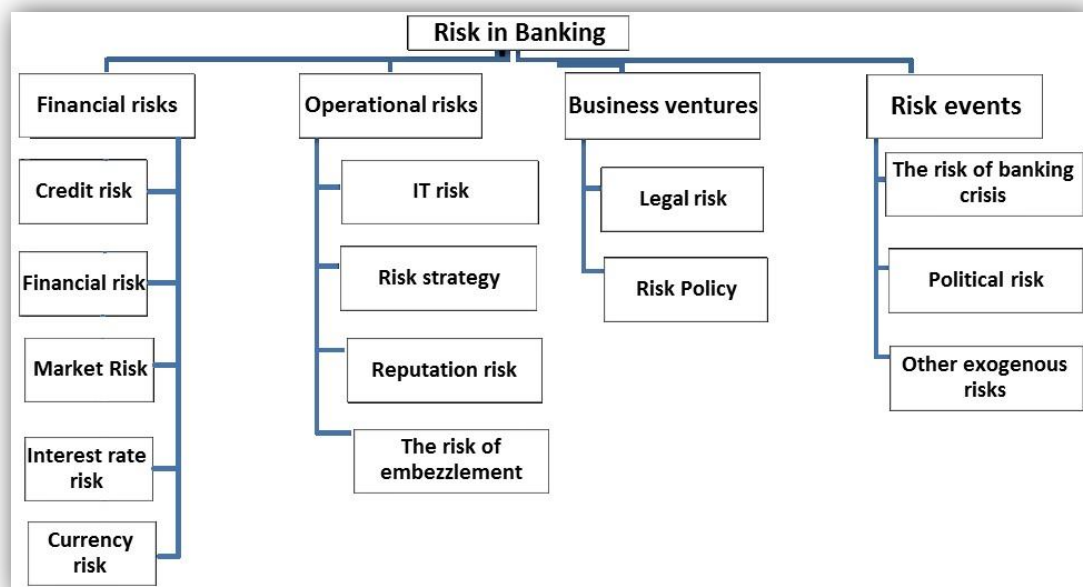


Fig 1: Classification of Risks in Banks

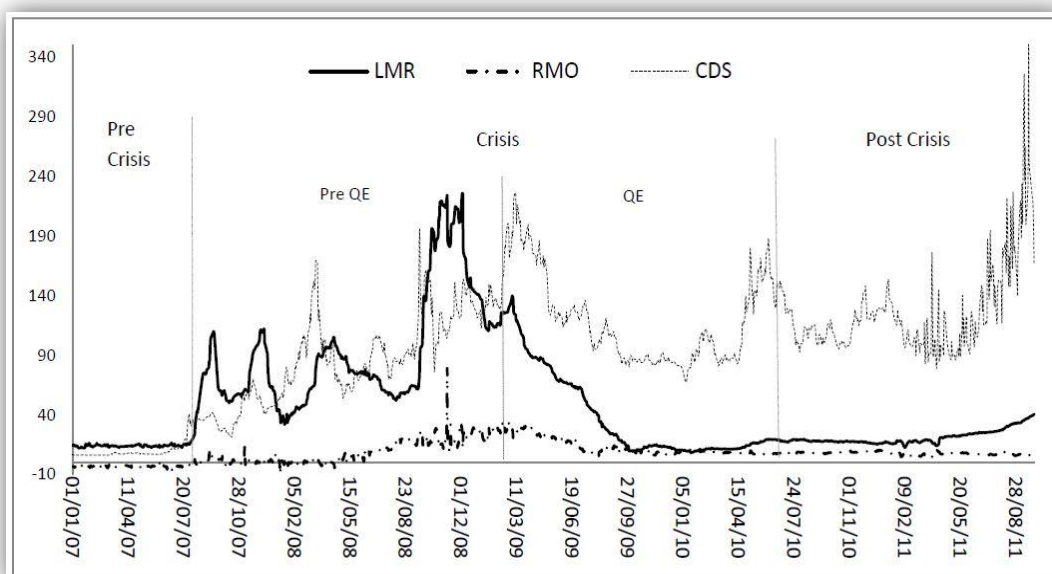
Source: Khezeli, B. & Almasi, A. (2015, p. 600)

In this study, Khezeli & Almasi (2015) also evaluate the performance and the ranking of the branches, Select the optimal model and then identify the relationship between risks of liquidity and credit on of the performance success of the Bank branches of Kermanshah the two approaches Parametric-based economy and Nonparametric based on mathematical optimization is utilized. In this context, the Mellat banks Kermanshah province, which has 20 branches as the population of the research, 90 to 92 years were studied. Research findings indicate differences in both of nonparametric and parametric in assessing the performance rating of the bank and Comparative advantage of (MEA nonparametric) compared to (SFA parametric) is. The findings also imply that there is no significant relationship among risk of credit and risk of liquidity, but both of them have an impact on the performance of the Mellat branches bank of Kermanshah and also a greater influence on the performance of the branches.

According to Wong, Mariscal, Yao, & Howells (2012, p. 12) which examines the behaviour of the LIBOR-OIS spread for three-month sterling over the course of the crisis. The spread is decomposed into credit and liquidity premia using three-month Repo-OIS and the Labour-Repo spreads, respectively. In contrast to the current literature, we replace the conventional central bank intervention dummy variables by the most informative ratio of accumulated money spent on buying gifts to banks' total assets. Moreover, a model of error correction accounts for the spreads' changed time series properties in the crisis compared to the period before crisis and allows for long-term inference.

The principal outcomes of the study are as follows. For the analysis of the mutual relations and determination of liquidity and credit spreads over the crisis, it is crucial to split the crisis period into central bank intervention and non-intervention periods. Our outcomes show that the relationship between credit and liquidity premia depends on QE. While the risk of credit is the driver of the liquidity spread in the period before QE, causation is reversed through QE. In this period, be intervention reduces the liquidity spread greatly whereas there is no direct influence of QE on the credit spread. However, the reduction of the liquidity spread (Granger) causes a fall in the credit spread.

In particular, earlier studies (for example, Bank of England, 2007) utilize credit default swap (CDS) as a measure of risk of credit. Our results show that CDS is interchangeable with LMR in the early period of the crisis. However, during QE, LMR and CDS do not share the same stochastic trend and CDS plays no role in the determination of the Libor-OIS spread. The insignificance of CDS during QE likely described by its longer term to maturity. As the results show, QE narrows the liquidity spread, which in turn reduces credit premia as measured by LMR. This effect cannot occur in the long-term maturity of the CDS (Taylor, 2012).



**Fig 2: Interbank and repo spreads and credit default swap (CDS)**

Source: Wong, Mariscal, Yao and Peter Howells (2012, p. 8)



Figure 1 depicts how the time series properties of the risk of credit (LMR) and risk of liquidity (RMO) components of Libor-OIS spread (LMO) as well as CDS have changed over time. This suggests a potential appearance of unit roots and structural change across different time periods, which is confirmed by the outcomes of unit root test over the various sample periods. In the before crisis period, a stochastic trend was rejected for all variables, except CDS. During the crisis period, all risk components adopt a random walk and this remains so for the before crisis period with the except the risk of liquidity variable. The change in its time series property may be the result of the massive liquidity provision by the BoE. As our estimation results later on show, the size of the QE effect is large in the RMO component.

Furthermore, Imbierowicz, B. & Rauchii, C. (2013) declare in their study about Risk of liquidity and risk of credit is the two most important factors for bank survival. This study was in the U.S. and it investigated the relationship among these factors in virtually all commercial banks over the period 1998 to 2010. We show that every risk category has a significant influence on bank default probability. They also documented that the interaction of both categories of risk significantly defines banks' probability of default, albeit in various forms. This requests for a common management of risk of credit and risk of liquidity in banks. Using multiple collections of subsets of the sample, fiduciary variables for risk of liquidity and risk of credit, microeconomic shocks, possible macroeconomic, and econometric techniques, they do not hit a reliable relationship between risk of liquidity and risk of credit in banks.

Their results have various interesting implications. The existing bodies of literature looking the influence of either risk of liquidity or risk of credit on the stability of bank are both so big; however, surprisingly few studies consider the relationship between both risks. They are the first to empirically throw few lights on the relationship among risk of liquidity and risk of credit in banks from different perspectives and angles. Their results provide several recommendations for the bank (risk) management and bank supervisors. The years 2007 & 2008 have explicated that mistrust between banks, to the most extent was forced by the large risk of credits in their portfolios, can lead to freezing the market liquidity.

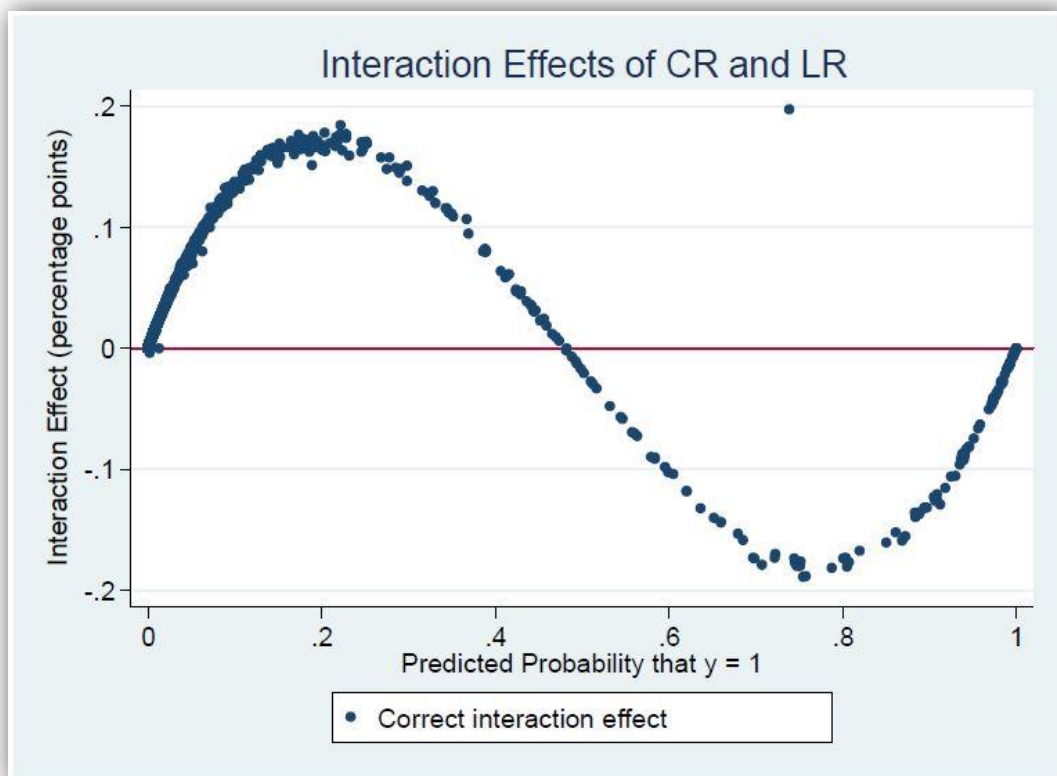


Fig 3: The Effect of the Interaction between Risk of liquidity and Risk of credit on Bank Default Probability

Source: Imbierowicz, B. & Rauchii, C. (2013, p. 286)

Regulators and central banks had to interpose to prevent the financial system from collapse. However, their outcomes indicate that a joint management of risk of liquidity and risk of credit in a bank could reduce uncertainties and substantially increased bank stability. Their results, therefore, support and underpin latest organizational exertions like the Basel 3 framework and the Act of Dodd-Frank, which puts a powerful emphasis on the importance of risk of liquidity management in conjunction with the asset quality and risk of credit of a bank.

Also, Gefang, Koop & Potter (2011) Concluded in their study by saying: "we have motivated and developed a statistical model which uses a panel of LIBOR-OIS spreads and CDS rates of the bank to untangle liquidity and risk of credit. The panel of the spreads involves variation across banks, currencies, and terms. The existing literature almost always ignores these panel dimensions and simply works with one average LIBOR-OIS spread. From a statistical perspective, our empirical outcomes show that there is an advantage from exploiting these panel dimensions in terms of increasing our understanding of liquidity and risk of credit. Our empirical outcomes suggest that liquidity and risk of credits, both of them played an essential role in the fiscal crisis. However, especially in the 1 month and 3-month terms, the role of risks of liquidity was much more important. Over a period of 12 months, credit and liquidity risks, both play an important role". The inherent risk of liquidity factors is much more changeable than the factors of credit risk and their variation is associated with familiar events in the financial crisis.

## 5. CONCLUSION

Risk of liquidity and risk of credit are the two extreme significant factors for bank existence. This article briefly reviewed the relationship among these factors in banks through a diversity of related studies. The researcher also observed that there are two primary facets to this issue. In theoretical side, there is a relationship between risk of credit and risk of liquidity. Merely on the practical side of the fields, there is no substantial relationship between risk of liquidity and risk of credits. This implies that the practical studies rejected the hypothesis which suggests there is a statistically important relationship between risk of liquidity and risk of credit.

Nevertheless, the studies suggest that a joint management of risk of liquidity and risk of credit in a bank could decrease uncertainties and substantially increase bank stability. Therefore, our results underpin recent organizational efforts such as the Basel 3 framework and the Act of Dodd-Frank, which lay a stronger emphasis on the significance of risk of liquidity management in synchronism with the asset quality and risk of credit of a depository financial institution.

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