



Basel III Liquidity Regulations and Financial Intermediation in Pakistan

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Abstract. Basel III liquidity standards were issued to augment the sustainability of the banking system. Nevertheless, it is imperative to comprehend the implications of these standards on other significant facets of the banking industry. Hence, this research aimed at identifying the impact of these regulations on the financial intermediation cost of the banking industry of Pakistan. In this research data from seventeen banks have been used for the period 2007 to 2021. A robust fixed effect model has been applied in the study and the robustness of the result is tested by the Driscoll Kraay covariance estimator and two-step difference generalized method of moments (GMM). Results show a significant negative impact of the liquidity coverage ratio and an insignificant impact of the net stable funding ratio on the banking cost of financial intermediation in Pakistan. These results highlight the potential unintended consequences of liquidity regulations on bank costs. Increased demand for high-quality liquid assets may lead to higher asset prices, which could further impact banks' cost of intermediation. Thus, policymakers should carefully monitor this trend to ensure that it does not result in market distortions or negative consequences for banking costs.

Keywords: Cost of financial intermediation · Basel III regulations · Liquidity coverage ratio · net stable funding ratio · net interest margin

1 Introduction

In any economy, banks perform a crucial function as financial arbitrators. They provide funds to the deficit units that are received from the surplus units. Research has shown that the level of banking intermediation in an economy is strongly linked to its economic growth (Demirgüç-Kunt & Huizinga, 1999). The importance of intermediation is even greater in bank-based economies (Talbi & Bougateg, 2018), where the banking industry constitutes a major portion of the country's financial industry and therefore, the private sector heavily relies on bank loans. A noteworthy impact of expenses associated with financial intermediation has been found on the scope and reach of the banking system. The ratio of interest spread is a widely used metric to assess the effectiveness of financial intermediation. It is calculated as a ratio between the differential between lending and deposit rates to the net assets of the bank. This ratio is known as net interest margin (NIM) (Das Gupta et al., 2021). Factors affecting NIM are identified by Ho and Saunders, (1981)

in their groundbreaking research “the dealership approach”, and over the years, these factors have been expanded.

The identification and mitigation of operational risk are part of the risk-based approach to financial intermediation. As part of this strategy, the risks associated with various operations of financial intermediation are identified, and the necessary risk management strategies are put into place to mitigate those risks. For instance, financial intermediaries manage credit risk by calculating lending rates based on the level of risk and the creditworthiness of borrowers. Credit derivatives are additionally utilized to manage the risk. Financial intermediaries utilize derivatives to reduce exposure to market volatility, diversify their investment portfolios to guard against interest rate risk and manage liquidity risk. They also manage asset-liability mismatches and maintain enough liquidity buffers to manage liquidity risk. To manage operational risk, these intermediaries establish robust internal controls, systems and procedures to prevent operational failures, fraud and errors. As a result, it can be claimed that a risk-based approach to financial intermediation encourages safe and sound financial intermediation and helps to keep the financial system stable and make it more resilient.

The Global Credit Crunch of 2008 increased the awareness of the vulnerability of the banking industry towards mitigation of liquidity risk management. The Basel Committee for Banking Supervision (BCBS) responded to this problem by releasing the Basel III framework, which sought to strengthen the banking system’s resilience by addressing the drawbacks of preceding frameworks concerning financing instability and illiquidity (BIS, 2010). Liquidity risk management is one of the major concerns of Basel III regulations. Basel III liquidity regulations provide a risk-based framework for financial intermediaries to monitor and control liquidity risk. The BCBS released the liquidity framework for banking institutions to control the spread of systemic risks and ensure that financial intermediaries have enough liquidity to withstand liquidity stress situations. By keeping an acceptable amount of stable funding sources and high-quality liquid assets (HQLA), banks must comply with Basel III liquidity standards that mandate the maintenance of two liquidity measures, namely the liquidity coverage ratio (LCR) and net stable funding ratio (NSFR). Moreover, it emphasizes the establishment of a robust framework for liquidity risk management, that includes the development of effective and efficient monitoring and reporting mechanisms, articulation of a clear policy, and conduct of frequent stress tests to gauge liquidity resilience.

The recommendations given by Basel III on liquidity also stress the importance of a risk-based approach for liquidity risk management, that requires tailored liquidity risk management practices to the unique risks that each financial intermediary faces. When employing this strategy, financial intermediaries must evaluate the liquidity risk profile. This profile must include information about financing arrangements, market reach, and cash flow forecasts. These are required to ascertain the capacity of liquidity risk tolerance and to create the most effective risk management plans. It can be said that Basel III liquidity regulations provide banks with a framework for liquidity risk management in a risk-based way, by ensuring the availability of sufficient liquidity to withstand liquidity stress events and to prevent systemic risk.

Based on the above discussion it can be argued that even though the focus of Basel III liquidity guidelines is to improve banking stability, implementation of these guidelines

may have an impact on other key areas of the banking institutions such as financial intermediation. Therefore, this research aimed at understanding the manner in which financial intermediation cost is affected by these regulations in a bank-based economy i.e., Pakistan. For this purpose, data from seventeen commercial banks is used for a period from 2007 to 2021. The robustness of findings is evaluated by using the two-step difference generalized methods of moments (GMM) approach.

The research is structured as follows: The literature review on Basel III and financial intermediation is presented in the next section. The methodology adopted and the characteristics of data and variables are presented in Sect. 3. Section 4 presents the explanation of empirical findings in Sect. 4. Lastly, in Sect. 5 conclusion of the study is presented.

2 Literature Review

2.1 Theory of Financial Intermediation

In a world where market imperfection and frictions exist, investors cannot find borrowers on their own and they cannot perform efficient allocation of their funds. Therefore, there is a need for an intermediary to mediate between investors and borrowers of financial capital. Financial intermediaries could be banking or non-banking financial institutions. Gurley and Shaw, (1960) are regarded as the pioneers of the theory of financial intermediation. Furthermore, this theory draws inspiration from both agency theory and informational asymmetry theory. According to Gurley and Shaw, (1960), the primary activity of these financial intermediaries is to transmute financial instruments issued by the firms i.e., shares and bonds, into those securities that are demanded by investors or depositors. Financial intermediaries are needed in the economy because they help investors and borrowers in risk division and transformation, which is not possible on their own because of the high transaction cost. Benston and Smith, (1976) suggested that transactional costs are the central point of this financial intermediation theory. However, Leland and Pyle, (1977) disagreed with the reason and implied that financial intermediaries exist because of informational asymmetries.

Santos, (2001), presented the two most notable justifications for the presence of financial intermediaries. The first is the liquidity provision and the second is the monitoring services provision. Banks serve a key role as liquidity providers because they provide liquidity insurance to depositors Bryant, (1980) and also provide monitoring services to investors by acting as delegated monitors and hence avoiding any duplication of monitoring costs. The currently prevailing financial intermediation theory implied that banks are merely financial intermediaries that receive deposits and disburse the same, much like other non-bank financial companies. Some authors claim that banks use the credit received from depositors in the form of demand deposits that by nature considered to be a current liability and advance it to borrowers who need them for a longer time (Dewatripont et al., 2010). As a result, banks generate liquidity through both long-term advances and short-term borrowing.

2.2 Cost of Financial Intermediation

There has been a surge in interest of researchers in NIM after the global financial crisis. This is evidenced by studies conducted by Afrin et al., (2022). As previously mentioned

NIM can be employed as an estimate of efficiency and the financial intermediation cost, both of which are crucial for promoting economic growth, because higher NIM could hinder growth by increasing lending rates which could deter investment and reduce deposit rates that can lead to a decline in savings (Harb et al., 2022; Levine, 2005). Such effects can directly impact the liquidity of banks. NIM has therefore been employed in this study as a proxy for the effectiveness of financial intermediation for banks. It is suggested that higher liquidity might raise banks' net interest margins (NIM) by lowering their funding costs (Dang, 2021). However, Pak, (2020), disagrees with this argument and states that this will result in a negative impact on NIM due to maturity mismatch and declined spread on loans.

2.3 Liquidity Risk Management and Liquidity Regulations

Liquidity risk management deals with balancing the need and availability of liquidity. It can be described as the likelihood of not being able to meet the depositors' needs or being unable to grow funds without undue expenses or losses (Ismal, 2010). Inefficient liquidity risk management leads to bank failures (Chen et al., 2021). The regulatory criteria NSFR is primarily intended to mitigate funding risk, which arises from the discrepancy between banks' assets and liabilities, whereas the LCR focuses on reducing liquidity risk by requiring banks to hold more HQLA. Although not its primary focus, the NSFR may indirectly affect banks' ability to create liquidity and impact market liquidity (BIS, 2013, 2014). Basel III's liquidity requirements are not aimed at market liquidity, but their implementation may have an impact on it. This could happen through an increase in intermediation costs and a shift in the demand for assets with certain attributes, such as high credit quality and longer maturities. Additionally, studies have demonstrated how Basel III liquidity requirements affect the creation of liquidity (Alaoui Mdaghri & Oubdi, 2022; Eshwari & Baby, 2023).

Banks are now required to adjust their asset composition towards HQLA to comply with regulations (Banerjee & Mio, 2018). This results in higher competition for funding categories that are preferred under the rules (Hartlage, 2012). This competition drives up the prices of HQLAs, increasing the financing costs for banks. Fuhrer et al., (2017) have shown that even before the implementation of Basel III LCR, a difference was already present among yields of level 1,2 and non-HQLA. With the introduction of the HQLA premium, this gap has widened. As a result, the marginal cost of purchasing additional units of liquid assets exceeds the relative proceeds, making it less desirable for banks to hold these assets.

3 Data and Research Methodology

The purpose of this research is to examine the effect of liquidity regulations on the commercial banks in Pakistan from 2007 to 2021, with a sample of seventeen out of twenty-five commercial banks operating in Pakistan. Five full-fledged Islamic banks were excluded as their model differs from that of conventional banks and could affect the results (Dolgun et al., 2019). Moreover, one bank that started its operations in 2014 and two banks that have not reported their financials for the last two years were also

excluded. The primary focus of this research is to examine the effect of NSFR and LCR on the intermediation cost of Pakistan's conventional banking industry.

3.1 Variables of the Study

The outcome variable for this study is NIM. It is the ratio of net interest earned to total assets, used as a proxy of the cost of financial intermediation (Das Gupta et al., 2021). The independent variables used in the study are liquidity coverage ratio (LCR) and Net stable funding ratio (NSFR). Due to the lack of sufficient detail in the balance sheet data required for LCR and NSFR computation, LCR and NSFR are calculated using the approaches suggested in the literature. LCR is calculated as a ratio of liquid assets to the sum of deposits and short-term funding as proposed by Chiaramonte and Casu, (2017). It is expected that increased liquidity regulations will lead to higher interest expenses. Thus, it is anticipated that LCR and NIM have a negative relationship. NSFR is calculated by following the factors given by Vazquez and Federico, (2015). The adoption of NSFR is likely to result in a decline in interest income that will subsequently lead to a decrease in NIM. Thus, a negative relationship between NSFR and NIM is anticipated.

The control variables used in this study are Capitalization (CA) is a ratio of equity to total assets, Asset Quality (AQ) is calculated by taking a ratio of non-performing loans to total loans, Inflation (Inf) and Concentration (Conc) that is calculated as a ratio of the sum of the assets of five large banks to the total assets of the banking industry.

Econometric model for the study is as below:

$$NIM_{it} = \beta_0 + \beta_1 NSFR_{it} + \beta_2 LCR_{it} + \beta_3 CA_{it} + \beta_4 AQ_{it} + \beta_5 Inf_{it} + \beta_6 Conc_{it} + \varepsilon_i \quad (1)$$

4 Findings

In this research the data was free from multicollinearity issues and was found stationary. However, it was found that there is a presence of autocorrelation, heteroscedasticity, cross-sectional dependence and endogeneity in the data.

The Breusch Pagan LM test shows that pooled OLS was not a feasible choice for this research. By using Hausman test it was found that fixed effect model (FEM) is the appropriate model for the study. Two variations of the FEM were used to focus on issues of heteroscedasticity and autocorrelation in the data: clustered FEM and FEM with Driscoll Kraay standard errors. Both of these models are known to be robust in the presence of cross-sectional dependence as well. Additionally, to ensure the reliability of the results, a Two-step Difference Generalized Method of Moments (GMM) was applied.

Factors influencing the NIM of banks in Pakistan are presented in Table 1. According to the findings of this research, NSFR does not significantly affect the NIM. But LCR is found to have a significant negative impact on the NIM of banks in Pakistan. Therefore, it can be said that NIM decreases with the increase in the percentage of LCR in Pakistan. These results are also endorsed by Sidhu, et.al, (2022). A negative impact of LCR on NIM implies that the net interest earned by banks in Pakistan decreases with the increase in

HQLA's holdings or if other things are held constant, the expense of holding the HQLA's increases more than the interest earned that can lead towards a decrease in NIM.

The results also highlighted the effect of bank-specific and country-specific variables on the NIM of conventional banks in Pakistan. It is evident from the results that there is a significant impact of all bank-specific variables on NIM. CA has a significant positive impact while AQ has a negative impact on NIM at a 1% significance level. The positive association of CA is as expected. A higher CA indicates that a bank has a stronger financial position and is better equipped to absorb potential losses. In the context of financial intermediation, a higher CA can lead to a positive impact on NIM. This is because banks with higher CA can reduce their funding risks, which in turn reduces their cost of financial intermediation (Adesina, 2021). AQ is found to have a negative impact on NIM. A lower ratio represents better asset quality that subsequently decreases funding cost thus, increasing NIM. Also, a rise in non-performing loans prevents banks from earning the anticipated net interest income, which causes a drop in NIM (Kirimi et al., 2021).

Lastly, the impact of Inf and Conc were evaluated as macroeconomic variables. Results show that Inf has no impact on the NIM of banks in Pakistan. Afrin et al., (2022), also found the same result of inflation on NIM in Bangladesh. Conc, on the other hand, is found to have a significant negative impact on NIM. The negative impact of Conc on NIM is in line with past research (Boamah et al., 2022). This shows that with the increase in Conc, NIM decreases. In a market with greater competition, banks are compelled to compete with each other to retain and acquire customers, which may result in reduced profit margins and a decline in the NIM. This is because, to remain competitive, banks may need to lower their interest rates on loans to tempt borrowers or raise their interest rates on deposits to entice depositors.

Table 1. Estimation results

	Robust FEM	DK	GMM
NSFR	-0.0025 (0.0059)	-0.0025 (0.0039)	0.0012 (0.0025)
LCR	-0.0218*** (0.0055)	-0.0218*** (0.0020)	-0.0119*** (0.0028)
CA	0.0930*** (0.0131)	0.0930*** (0.0270)	0.1737*** (0.0345)
AQ	-0.0210** (0.0094)	-0.0210*** (0.0030)	-0.0036*** (0.0082)
Inf	0.0172 (0.0106)	0.0172 (0.0139)	-0.0110 (0.0094)
Conc	-0.0169**	-0.0169	-0.0356***

(continued)

Table 1. (continued)

	Robust FEM	DK	GMM
	(0.0068)	(0.0149)	(0.0080)
No. of Observations	255	255	204
No. of Banks	17	17	17
R ²	0.4685	0.4685	
F-Stat	11.99***	70.85***	
Chi Sq			137.03***
No. of Instruments			10
Hansen test (p-value)			0.209
AR (2) test (p-value)			0.251

Notes: “This table presents two-step difference generalized methods of moments (GMM) and Dricoll-Kraay (DK) Covariance estimator with NIM, which is a proxy for NIM (dependent variable). NIM is a ratio of the difference between interest income and interest expense with total assets. CA is a ratio of total equity to total assets; AQ is a ratio of non-performing loans to gross loans; Inf is the annual inflation rate (CPI); Conc is a ratio of assets of 5 large banks to total industry assets. The sample is comprised of 255 fir-year observations across 17 banks for the period 2007–2021. ***, ** and * represent significance at the 1%, 5% and 10% levels, respectively.”

5 Conclusion

The findings of the study show that while LCR has a significant negative impact on NIM, NSFR has no discernible effect on NIM. According to the results, short-term liquidity is a determining factor of NIM in comparison to funding liquidity. The negative influence of LCR on NIM can be translated as an increment in LCR will lead to a decrease in NIM. This suggests that holding too much amount in high-quality liquid assets can decrease the interest margin of banks in Pakistan. Numerous reasons are possible for this relationship. First, increased investment in HQLAs leads towards a decline in the interest income of banks. Second, there has been a shift in the asset composition of banks in Pakistan. Banks are now investing more in liquid but lower-yielding assets than in more profitable assets. Third, with the increase in investment in HQLAs lending activities of banks may also be affected. To keep more HQLA banks must lend lesser than before, hence resulting in a decrease in NIM. Also, King, (2013), argued that an increase in holding HQLAs will increase interest expense that consequently has an impact on the NIM of banks. Therefore, policymakers must carefully consider this implication and do the needful changes to achieve an optimal balance.

The findings of this research draw attention to a possible unexpected consequence of the liquidity regulations issued by Basel III on the financial intermediation cost of banks. These rules aim to strengthen the banking sector’s stability and make banks more resilient and shock resistant. However, it is necessary to analyse how these regulations would affect other significant factors, such as the financial intermediation cost of banks. Study of control variables shows banks with robust financial positions as indicated by

capital to asset ratio and asset quality are much more likely to enhance NIM, therefore banking institutions should maintain strong capital reserves and devise strategies to manage assets with higher effectiveness to improve NIM.

It is worth mentioning that the results of this study might not essentially apply to other countries or banking systems. However, they can be used to guide policymaking in Pakistan as they offer insightful information about specific factors that influence the financial intermediation cost of banks there. For regulatory reforms to have a beneficial overall effect on the financial system, authorities must carefully weigh the possible costs and benefits. Also, this study does not incorporate other potential control variables that have an influence on the intermediation cost of banks. Lastly, a comparative study between Islamic and conventional banks can be performed to study the variation or similarity of the impact of Basel III liquidity standards on the intermediation costs. This can yield valuable insights for the regulatory authorities and banking industry.

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