

ISLAMIC BANKS, LIQUIDITY MANAGEMENT AND RISK-SHARING

By

Lahsen OUBDI

Full Professor at the National School of Business & Management (ENCG-A), Entrepreneurship, Finance and Audit Laboratory (LAREFA), Ibn Zohr University, Agadir, Morocco.

l.oubdi@uiz.ac.ma

&

Abdessamad RAGHIBI

PhD Candidate - National School of Business & Management (ENCG), Entrepreneurship, Finance and Audit Laboratory (LAREFA), Ibn Zohr University, Agadir, Morocco.

Abdessamad.raghibi@edu.uiz.ac.ma

&

Anas ALAOUI MDAGHRI

PhD Candidate - National School of Business & Management (ENCG), Entrepreneurship, Finance and Audit Laboratory (LAREFA), Ibn Zohr University, Agadir, Morocco.

anas.alaouimdaghri@edu.uiz.ac.ma

Abstract

Bank liquidity stands as a key pillar in the survival of the financial system as it reflects its robustness and maturity. On the other hand, the recent introduction of Islamic banks in Morocco has provided a new ground to re-think the ongoing practices of liquidity

management. In fact, these practices have relied on questionable mechanism like Tawarruq that deviates from the basic principles of Islamic finance. Researchers agree that Risk-sharing stands in the center of the Islamic finance and therefore, is presented as an optimal model for an efficient banking model. However, operational constraints along with rigid regulatory framework have put this model on hold for years. (Bacha & Mirakhor, 2017) proposed a genuine model based on Risk-sharing that provides a complete banking structure that will enable Islamic banks to manage their liquidity along with optimizing their risk exposure. The proposed model is fully based on Risk-sharing and shari'ah-compliant instruments namely Sukuk. Hence, our paper aims to present the banking model along with the perspective of its application on the Moroccan case. We find that two main obstacles shall impede its application which is the operational and regulatory framework. Nevertheless, the first point could be easily being overcome with the maturity of the interbank market and the second point's solution relies solely on the governmental will to develop the Islamic finance industry.

Keywords: Risk-sharing, liquidity management, Tawarruq, Sukuk.

Résumé

La liquidité bancaire constitue un pilier essentiel de la survie du système financier, car elle reflète sa robustesse et sa maturité. D'autre part, l'introduction récente des banques islamiques au Maroc a fourni un nouveau terrain pour repenser les pratiques actuelles de gestion de la liquidité. En fait, ces pratiques reposent sur des mécanismes douteux, tel que Tawarruq, qui s'écarte des principes de base de la finance islamique. Les chercheurs conviennent que le partage des risques est au centre de la finance islamique et est donc présenté comme un modèle de base pour un système bancaire efficace. Cependant, des contraintes opérationnelles et un cadre réglementaire rigide ont mis ce modèle en arrêt pendant des années. (Bacha & Mirakhor, 2017) ont proposé un véritable modèle fondé sur le partage des risques, qui fournit une structure bancaire complète qui permettra aux banques islamiques de gérer leurs liquidités tout en optimisant leur exposition au risque. Le modèle proposé repose entièrement sur des instruments de partage du risque et conformes à la charia, à savoir le Sukuk. Notre papier vise donc à présenter le modèle bancaire ainsi que la perspective de son application sur le cas marocain. Nous constatons que deux obstacles principaux entraveront son application, à savoir le cadre opérationnel et réglementaire. Néanmoins, le premier point pourrait facilement être surmonté avec la maturité du marché interbancaire et la solution du second point repose uniquement sur la volonté du gouvernement de développer l'industrie de la finance islamique.

Mots clés : Partage du risque, Gestion de liquidité, Tawarruq, Sukuk.

I. Introduction

In practice, a surplus of liquidity is often correlated with a lack of competitiveness. While a liquidity deficit is considered a sharp weapon against the banks. Various cases of banks' failures and distress related mainly to mismanagement of the liquidity that characterize the conventional and Islamic banking environment. Therefore, banks have a primary task to put in place efficient mechanisms and instruments for liquidity risk management.

Islamic finance has grown strongly over the last 30 years. In fact, the number Islamic banks at the end of 2015 was 480 with total assets of USD2 trillion (Reuter, 2017). Hence, the need to put in place an Islamic risk management system becomes crucial. However, conventional tools do not fulfill the three conditions on which the Islamic Finance model is based on: The prohibition of Ribah, Maysir and Gharar.

Furthermore, the cornerstone of Islamic Economics model is based on risk sharing that lags behind dazzling application. Risk sharing contracts have created a new type of financial intermediation proper to Islamic banks. This Islamic financial intermediation connects agents with financing capacity and those needing financing on the basis of characteristics reflecting the specificity of the Islamic approach in terms of the financial intermediation (Mustapha & Kenza, 2017). As a result, Islamic banks should not experience the same liquidity pressures as their conventional counterparts through the flexibility offered by risk-sharing contracts.

Nevertheless, the examples of Islamic banks in distress contradict this hypothesis. Liquidity risk in Islamic banks comes mainly from the nature of their balance sheet. In fact, liquidity usually comes from the ability of banks to collect savings. In contrast, conventional banking intermediation is based on the fact that liquidity is the result of processing and recourse operations where necessary. However, the lack of a standardized Islamic interbank market magnifies liquidity risks for banks Islamic. Furthermore, management of liquidity has traditionally been a problem area for Islamic financial institutions. Conventional banks use a variety of methods to manage liquidity. Like any enterprise, banks use asset and liability management techniques to manage cash flows on both sides of the balance sheet, revolving around the repricing and duration of assets and liabilities. However, it is inevitable that imbalances will arise, and banks make extensive use of two markets in these circumstances. One is the secondary market for debt instruments where bills and bond can be readily bought and sold. The other is the interbank market where banks lend and borrow at interest on an overnight or longer-term basis. For many years Islamic banks were hampered in liquidity management by the absence of an equivalent infrastructure. Islamic law has restrictions on the sale of debt that inhibits a acceptable secondary markets, while the institutional framework for a money market was undeveloped.

In addition to that, the 2008 financial crisis demonstrated that excessive optimism about the valuation of market liquidity has led the latter to serious liquidity problems. Indeed, central banks as lenders of last resort, were obliged to intervene and support the markets through monetary policy by injecting liquidity. The refore, setting up an adequate liquidity management system is more urgent in the context of Islamic finance under the pressure of contractual requirement to put their balance sheets to the rules of shari'ah.

The purpose of this article is to highlight the state of liquidity management in Islamic financial institutions around the world as well as presenting applied solution for liquidity management. Finally, we will try to explore the perspective of applying (Bacha & Mirakhor, 2017)model on the Moroccan context.

II. Literature Review

Liquidity is a multidimensional concept that can be apprehended in different forms. In the economic literature, liquidity is the ability of an agent to exchange wealth for goods and services or other assets (Nikolaou, 2009). In the financial literature, researchers distinguish between two dimensions: financing liquidity and market liquidity. The first is the ability of a financial institution to meet its obligations according to their maturities while financing the increase in assets (BCBS, 2008; Drehmann & Nikolaou, 2013; Strahan, 2008). The second is the ability to trade short-term assets with minimal costs (Benson, Faff, & Smith, 2015; Dowd, 2005).

As for the liquidity risk for financial institutions, it includes both the risk of not being able to finance its portfolio of assets with appropriate maturities and rates and the risk of not being able to liquidate a position in the future. time and at reasonable prices. In some theoretical works, it is defined by the mismatch between the maturity of assets and liabilities, while in other work, it is defined as the gap between the receipts and payments.

Liquidity risk is naturally inherent in the banking business. It emanates from the exogenous macroeconomic factors at the bank as well as financing and operational policies internal to the bank. In the case of Islamic banks, the nature of shari'ah-compliant contracts is an additional source of liquidity risk.

Conventional financial institutions like Islamic Financial Institutions (IFI) face sources of liquidity risk that are more or less similar, but there are other sources that are special to Islamic financial institutions generated by the shari'ah-compliance constraints.(Habib, 2018) define liquidity risk for Islamic Financial Institutions as the risk that is associated with temporary shortages of cash to meet short- term obligations and is a major issue for Islamic financial institutions due to the lack of Shariah compliant short-term securities available in the market and the inability to utilize interest-based conventional products. Conventional investors use the overnight money market for very short-dated liquidity, yet there is no Shariah-compliant alternative for this.

(Ali, 2013) cites the different sources of liquidity risk for financial institutions and indicates that liquidity risk stems mainly from thematurity gap between assets and liabilities and the inability to convert an asset into cash on the financial side. assets, and the inability to meet depositors' demands on the liability side. The author adds other sources specific to Islamic financial institutions such as "contractual form", the shari'ah restriction of the sale of debt (Bay' Al-dayn) and the lack of an appropriate Islamic financial infrastructure for liquidity management.

Indeed, Islamic financial institutions run the risk of non-compliance of contracts with the Islamic Law, which is a source of additional liquidity risk. In the event of this risk, depositors may be forced to withdraw their deposits (Khoutem & Mouldi, 2013). As a result, the bank in

question is obliged to respond to depositors' requests, which causes a liquidity pressure on the Islamic bank. The second source of liquidity for an Islamic financial institution lies in the fact that they can face a risk that arises from the management of investment accounts called the misplaced business risk.

According to The AAOIFI (Accounting and Auditing Organization for Islamic Financial Institutions), the misplaced business risk arises from the volatility of returns on assets generated from an investment accounts. Eventually, the bank in question offers a less advantageous return than other competing banks, depositors will withdraw their deposits to seek the most profitable bank. This creates a source of liquidity risk for the bank.

The third source of liquidity risk for an Islamic institution is its exposure to mark-up risk. Indeed, they are confronted with changes in the benchmark indices that are used to determine mark-ups (van Greuning & Iqbal, 2007).

III. Shari'ah-compliant Liquidity Management Instruments

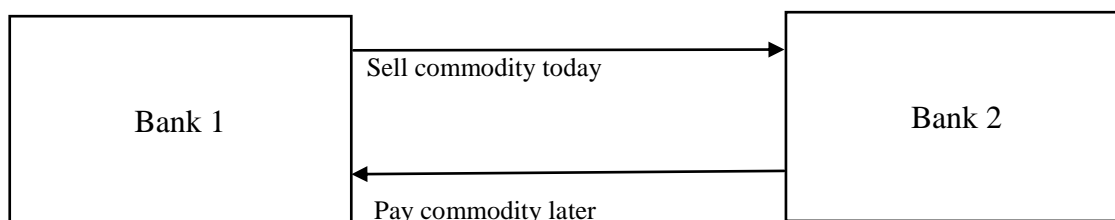
As we have shown in the first chapter that Islamic financial institutions are exposed liquidity risk just like their conventional counterparts. Unlike banks conventional instruments for which liquidity management instruments are abundant, *shari'ah-compliant* liquidity management instruments for Islamic financial institutions are very limited and the use of conventional interest-based instruments is strictly prohibited. Moreover, the Islamic interbank market is not as developed to allow Islamic banks to properly manage liquidity. We add to this the illiquidity of most short-term instruments traded in the secondary market.

According to a survey conducted by the Islamic Financial Services Board (IFSB, 2010), *murabahah*, the interbank investment funds under various profit-sharing arrangement and Islamic mutual funds are the main liquidity management tools available to Islamic financial institutions. *Commodity murabahah* is the most used instrument by Islamic banks in Bahrain, Saudi Arabia, Qatar, Kuwait, Malaysia and the United Arab Emirates. The *commodity murabahah* is the instrument most commonly used by Islamic financial institutions to provide short-term interbank liquidity.

Commodity murabaha is defined as a deferred sale or a sale on credit in which a commodity is used as the underlying asset for the transaction. Raw material is chosen as underlying assets must be non-perishable and freely available. Most *commodity murabahah* transactions use metals traded on the London Stock Exchange as an asset because they meet all the criteria. The purpose of *commodity murabahah* is to replicate the conventional interbank deposit transactions. This instrument can therefore serve both as a deposit facility and as an instrument to increase the liquidity (Sobol, 2014).

In its most basic form, this transaction involves two banks, one as the buyer of a commodity and one as the seller as can be seen in figure 1.

Tawarruq like *commodity murabahah*, is a commodity-based transaction for interbank liquidity purposes. The *tawarruq* has, however, some Shari'ah issues associated with it. The main Shari'ah issue with *tawarruq* transactions is related to the fact that the intention behind the purchase of the commodity is not to own and use the commodity.

Figure 1: Simple commodity Murabahah structure

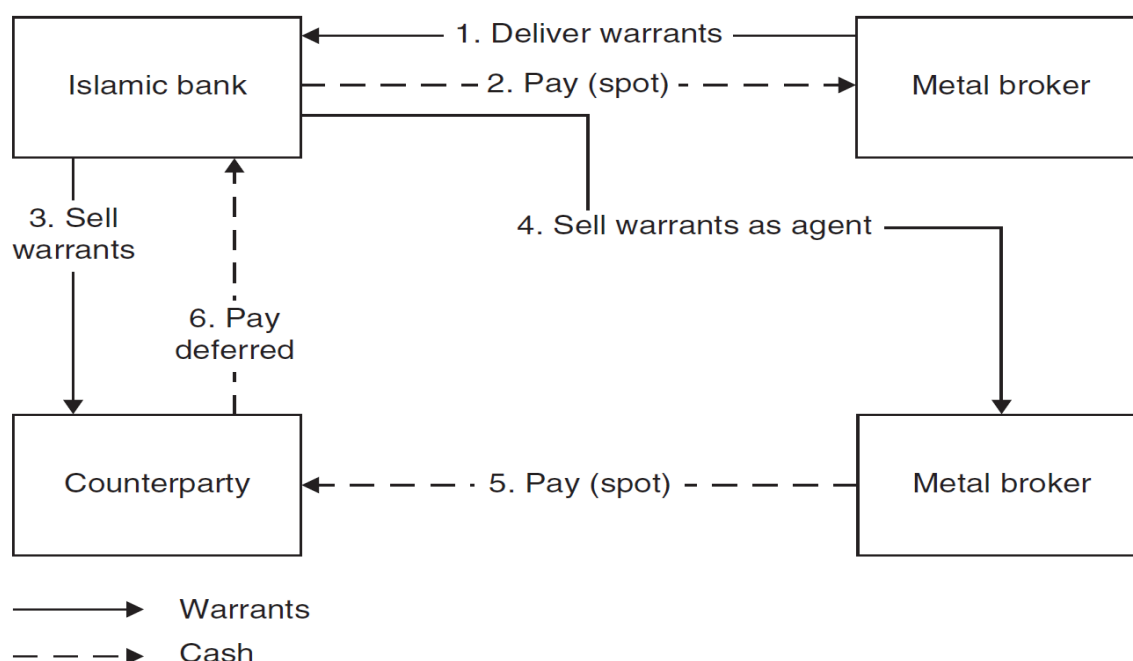
Source: (Schoon, 2016).

Instead, the commodity is sold instantaneously in order to obtain the required funds. Historically, although the minority of the schools of thought in Islamic jurisprudence have rejected the tawarruq for that reason, the majority have approved it subject to certain conditions such as an auditable ownership transfer of the commodity and separation of the purchase and sale arrangements. The tawarruq is depicted graphically in figure 2.

Short-term Sukuk Ijarah is another liquidity management instrument available to Islamic financial institutions. These Sukuk are a *shari'ah-compliant* alternative to conventional bonds. The difference between the two lies in the fact that conventional obligations are based on the interest rate, while the sukuk are based on a real underlying asset. If the Islamic bank wants to manage its liquidity through the Ijarah sukuk, it buys sovereign sukuk at face value at the time of primary issuance and receives rent. If the bank suffers from a shortage of liquidity, it can sell the sukuk on the secondary market to another bank to obtain liquidity. If the problem of the bank is excessive liquidity, it can buy sukuk on the market. These transactions look like repo operations of conventional banks. In case the market is not liquid (which is often the case), the Islamic bank can sell the sukuk to the central bank for cash.

Regarding the issue of regulatory institution for Islamic liquidity management, the Liquidity Management Center LMC was established in 2002 in Bahrain and its main shareholders are the Bahrain Islamic Bank, Dubai Islamic Bank, Islamic Development Bank and Kuwait Finance House.

Figure 2: Tawarruq Structure



Source:(Schoon, 2016)

The IILM is based in Kuala Lumpur and its current shareholders are the central banks and monetary authorities of Malaysia, Indonesia, Kuwait, Luxembourg, Mauritius, Nigeria, Qatar, Turkey and the UAE. The main purpose of both organizations is to create an interbank money market (primary and secondary market) and issue short and medium term Shariah-compliant instruments to invest short-term liquidity surpluses of IFIs and facilitate liquidity management of the IFIs. In addition, they provide Islamic advisory services, including but not limited to the areas of structured finance, project finance and corporate finance.

IV. Risk Sharing in Islamic Finance

The structuring of contracts in Islamic finance is based mainly on the principle of risk-sharing which is considered to be the cornerstone of the Islamic Moral Economy (IME). In fact, the famous Shari'ah rule¹ stipulates that the compensation/profit of an agent must absolutely be linked to an equivalent risk-taking. The original model designed by Dr. Ahmed El-Naggar on which the Islamic bank operates as an investment intermediary between depositors-investors with fund seekers on the market failed to find its way to reality.

The need to change the basic model of liquidity management for Islamic banks comes first from the specificity of the latter as detailed in the first chapter. Nevertheless, the recommended change also comes from a desire to break with the conventional model based mainly on debt and the mechanism of financial leverage. In fact, debt and leverage are considered the main source of financial instability in the current system (Askari, 2012).

Before presenting the mechanism of Risk-sharing application in liquidity management, first define the concept in question. Risk-sharing is a risk management method in which the costs

¹ الغنم بالغرم

generated by a risk are distributed over several stakeholders such as a union². In other words, the principle of risk sharing is a contractual or social commitment in which the results of a random event are carried collectively by a group of individuals, the entity engaged in that contract or the individuals or entities in a community (Askari, Hossein, Iqbal, Zamir, Krichene, Nouredine & Mirakhor, 2012).

Therefore, the model proposed by Islamic finance is based on a banking balance sheet with no debts giving rise to an interest payment. In fact, these financial institutions will no longer use financial leverage. Potential losses will be directly charged to investors' capital without any adverse effects on the system.

In addition, Islamic economic preference tends to favor risk-sharing contracts. We can cite the work of the Islamic Council of Ideology (1981), (Siddiqi, 2006) and (Khan, 2000). Their work goes further by considering the sharing contracts (Profit & Loss Sharing) as a synonym for Islamic finance (Khan, 1996).

The basic risk-sharing model, if appropriately applied, mandates the commercial bank to limit itself to two very specific and distinct functions: A function of deposit protection against a commission and a function of investing with customer deposits in investment funds. This model requires the bank to keep a reserve coverage rate of 100% and charge a fee for this service (Askari, 2012).

Based on this proposal, the bank will incur no risk in its balance sheet when the deposits are covered at 100% and all potential losses of investment deposits will be allocated directly to the accounts of customers. In addition, if the bank decides to invest with its own funds, the loss will only affect a fraction of its capital without committing the deposits of its customers.

V. Risk Sharing & Liquidity Management

The liquidity management arsenal currently offered by the market and the central banks goes against the shari'ah principles (International Financial Services Board (IFSB), 2008). The main reason behind this finding comes from the non-shari'ah-compliance of the underlying contracts of the instruments used. In fact, the majority of available liquidity management instruments are structured on the basis of *Tawarruq* or *Bay 'Al-'inah* contracts on which the majority of Islamic jurists (*Al-jumhour*) agree on their impermissibility.³ Indeed, Islamic banks must put in place tailor-made tools to manage their liquidity.

Morocco recently introduced Islamic finance into its financial system is starting to think seriously about developing liquidity management tools under growing pressure from banks.⁴ In addition to that, banks cannot, under any circumstances, use conventional instruments due to the specificity of their financing which is backed by tangible assets.

²<http://www.businessdictionary.com/definition/risk-sharing.html>.

³*I'lam Al-muwaqqi'in* – Ibn al-qayyem (3/182).

⁴<https://www.boursenews.ma/article/decryptage/banques-participatives-attention-a-ne-pas-tuer-le-projet-dans-l-oeuf>

Hence, this structure makes their conversion into liquidity very difficult. (Majid, 2003) concludes that their liquidity management is "unique".

Morocco has just published an official Act as well as the implementing decrees of the law on securitization (Emission Sukuk). Meanwhile, Islamic banks have expressed⁵ a real need for liquidity management instruments which prompted them to propose instruments pending a Sukuk sovereign issue. Indeed, banks have begun to think of solutions to remedy their need for liquidity. We can mention Assafa Bank's intention to use *Walakah Bil Istithmar* type contracts by approaching its own shareholders as sources of funds. Thus, the bank will act as *Wakile* by investing the funds raised in standard financing contracts (*Murabahah, Ijarah etc.*) and will remunerate the holders of these certificates according to the rate of profit. The bank will be compensated either by a fixed remuneration or will claim a profit beyond the agreed rate.

However, this solution has not yet been approved by the Higher Council of Ulema (CSO), the supervisory body, to put this instrument into practice. In fact, the use of *Wakalah-type contracts* is relatively permissible as a means of liquidity management. This is evident as it is used in different Muslim countries like Bahrain⁶ and England⁷. Never the less, the main disadvantage of this instruments relies on the fact that it put the risk on the party invested (*Muwakkil*), except misuse of funds by the *Wakile*, which may limit the massive adoption of this tool.

Table.1. Review of an Islamic Bank's Balance Sheet Under the Proposed Model

Active	Passive
Cash	Wadi'ah accounts
Cash	Current accounts
Financing of trading	Murabahah Certificates
leasing	Sukuk Ijarah
Real Estate (Diminishing Musharakah)	Diminishing Musharakah Sukuk
Project financing (Mudarabah / Musharakah)	Mudarabah / Musharakah Sukuk
Venture Capital (Mudarabah / Musharakah)	Mudarabah / Musharakah Sukuk

Adapted from (Bacha & Mirakhor, 2017)

As detailed in the third part of this paper, the Risk-sharing principle is the perfect solution for a sound and efficient banking model. Thus, (Bacha & Mirakhor, 2017) proposed a banking model based entirely on the risk-sharing principle and which will optimize the liquidity management of the Islamic bank. Their model of the proposed bank balance can be presented in table 1.

⁵<https://financenews.press.ma/article/alaune/banques-participatives-deja-en-manque-de-ressources>

⁶<http://www.cbb.gov.bh/page-p>

[the central bank of bahrain launches a new liquidity management instrument \(wakalah\) for the islamic retail banks.htm](http://www.cbb.gov.bh/page-p)

⁷<https://www.nst.com.my/opinion/columnist/2017/04/228938/boes-syariah-compliant-deposit-facility-fund>

In fact, by using this balance sheet structure, the majority of the bank's assets will be securitized by issuing Sukuk with the same underlying contract as these assets and the same duration of the financing granted. As a result, when the size of the asset is deemed important, a unique issue to it must take place. In the opposite case, the assets will be structured in pools of the same maturity and then securitized.

In practice, banks must have the means to issue Sukuk instantly (monthly or quarterly) which means providing them with preferential access to the market outside the formal circuit, which can take longer. Eventually, the issuing process take the following form: the bank will first determine the funds required and the documentation required on the asset side and thus initiate the securitization process. Then, the bank structured its offer according to maturities and risk profiles to offer investors a wide range of diversified products according to their requirements.

The proposed model will be able to play an efficient role in optimizing bank liquidity management through its mechanism that counteracts the match between the assets and liabilities of the bank. In addition, this model immunizes banks, investors and the financial market from the contingency effect under which the current system is held hostage.

Conclusion

Liquidity management is critical to bank stability and the sustainability of the financial system. This role is growing in the case of Islamic banks which must on average keep 40% of liquidity more conventional banks. Thus, this article has tried to address the issue of liquidity management in Islamic finance by focusing on the basic model of risk-sharing. Risk-sharing is supposed to be the underlying mechanism of any model of an Islamic bank. Indeed, its efficiency takes all its form when it comes to liquidity management.

Thus, our paper presented an innovative approach to liquidity management proposed by (Bacha & Mirakhor, 2017) that could be adapted to the Moroccan context. In fact, the amendment on securitization Act which paved the way to adopt Sukuk in Morocco would greatly encourage the application of this model. Moreover, the Moroccan experience in Islamic finance so far showed an interesting trend towards developing an authentic framework for the industry away from oriental experiences. Thus, we believe that the debate should now be redirected towards innovative approaches in liquidity management and the model presented in this paper would be a good starting point.

References

- Ali, S. S. (2013). State of Liquidity Management in Islamic Financial Institutions. *Islamic Economic Studies*, 21(1), 63–98. <https://doi.org/10.12816/0000240>
- Askari, Hossein, Iqbal, Zamir, Krichene, Noureddine & Mirakhor, A. (2012). *Risk Sharing in Finance Risk : The Islamic Finance Alternative*.
- Askari, H. (2012). Islamic Finance, Risik-Sharing, and International Financial Stability. *Yale Journal of International Affaires*, 7(1), 1–8.
- Bacha, O. I., & Mirakhor, A. (2017). A Risk Sharing Banking Model. In *The World Bank & IDB*.
- BCBS. (2008). *Principes de saine gestion et de surveillance du risque de liquidité, Septembre 2008*. Retrieved from http://www.bis.org/publ/bcbs144_fr.pdf
- Benson, K., Faff, R., & Smith, T. (2015). Injecting liquidity into liquidity research. *Pacific Basin Finance Journal*, 35, 533–540. <https://doi.org/10.1016/j.pacfin.2015.10.001>
- Dowd, K. (2005). *Measuring market risk*. <https://doi.org/10.1002/9781118673485>
- Drehmann, M., & Nikolaou, K. (2013). Funding liquidity risk: Definition and measurement. *Journal of Banking and Finance*, 37(7), 2173–2182. <https://doi.org/10.1016/j.jbankfin.2012.01.002>
- Habib, S. F. (2018). *Fundamentals of Islamic Finance and Banking*.
- IFSB. (2010). *Commodity Murabahah Transactions in Connection With Risk Management and Capital Adequacy Standards*.
- International Financial Services Board (IFSB). (2008). *Technical Note On Issues In Strengthening Liquidity Management Of Institutions Offering Islamic Financial Services: The Development Of Islamic Money Markets*.
- Khan, T. (1996). *An analysis of risk sharing in Islamic finance with reference to Pakistan*.
- Khan, T. (2000). Islamic Quasi Equity (Debt) Instruments and the Challenges of Balance Sheet Hedging: an Exploratory Analysis. *Islamic Economic Studies*, 7(1&2), 1–31.
- Khoutem, B. J., & Mouldi, J. (2013). Le Risque De Liquidite Pour Une Banque Islamique : Enjeux Et Gestion. *Etudes En Economie Islamique*, 7(1), 71–96. Retrieved from <http://www.irti.org/English/Research/Documents/IES/French/fr003.pdf>
- Majid, A. R. A. (2003). Development of Liquidity Management Instruments: Challenges and Opportunities. In *International Conference on Islamic Banking: Risk Management, Regulation and Supervision*. Retrieved from http://www.sbp.org.pk/departments/ibd/Lecture_6_LIQUIDITY_MANAGEMENT.pdf
- Mustapha, A., & Kenza, C. (2017). Problème de refinancement et de gestion des risques de la finance islamique : le cas du Maroc. *Revue Africaine De Management*, 2(2), 19–33.
- Nikolaou, K. (2009). Liquidity (Risk) Concepts. Definitions and Interactions. *ECB Working*

Paper Series, 1008(1–72), 1–71.

Reuter, T. (2017). *Innovation in Islamic Liquidity Management 2017*. Retrieved from <http://nasionalbonds.ae>

Schoon, N. (2016). *Modern Islamic Banking*.

Siddiqi, M. N. (2006). Islamic banking and Finance in Theory and Practice: A Survey of the State of the Art. *Islamic Economic Studies*, 13(2), 48. Retrieved from http://79.132.221.61/files/takmili/islamic_econ./islamic_banking/vol_13_2..m_n_siddiqi..isl_banking_and_finance...pdf

Sobol, I. (2014). *Liquidity Management Practices in Islamic Banking*.

Strahan, P. (2008). Liquidity Production in 21st Century Banking. *Working Paper of National Bureau Economic Research*, (13798), 43. <https://doi.org/10.3386/w13798>

van Greuning, H., & Iqbal, Z. (2007). *Risk Analysis for Islamic Banks*. <https://doi.org/10.1596/978-0-8213-7141-1>.