

SYSTEMIC LIQUIDITY RISK MANAGEMENT THROUGH MACRO-PRUDENTIAL INSTRUMENTS

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Abstract

This article focuses on problems regarding the effective management of bank liquidity risk in terms of systemic vulnerability of the banking sector. The necessity for an efficient management of systemic liquidity risk is conditioned on problems that faced to banks in providing sufficient liquidity to its business. In such circumstances it is necessary to identify not only macro-prudential instruments that would mitigate systemic liquidity risk, but also their role in an effective managing.

The article includes the assessment of macro-prudential instruments for the management of systemic liquidity risk in correlation with warning methods for this risk occurrence.

Key words: systemic liquidity risk, commercial bank, macro-prudential tools, bank management

JEL Classification: G21, G24; G28.

1. Introduction

The financial stability of the banking system requires a systematic approach to all components of the banking system that interact under the influence of external and internal factors. Stability of the banking system represent a complete description of the state of the banking system, in which its essence and purpose is achieved in the country's economic system, being adequately and efficiently fulfilled its functions, and also offers the ability to maintain balance and restore the economic situation after the external shocks caused by crises.

The issue of determining systemic liquidity risk in the stability of the financial system of the banking system has not been sufficiently studied so far. Among scientists there is no uniform opinion on the interpretation of the notion of "systemic risk". An analysis of the existing approaches to the interpretation of this concept makes it possible to distinguish three main approaches, which are complementary and underline the essential characteristics (Figure 1).

Figure 1. Addressing the concept of "systemic risk"

Addressing the concept of "systemic risk"		
The macroeconomic approach - focuses on the implications of systemic risk	Microeconomic approach - chain reaction, or "domino effect"	The combined approach - takes into account the horizontal and vertical relationships between the participants in financial and monetary relations.

Source: Elaborated by the author according to Samsonov N.I.:2013:272–275.

Systemic risk and its realization - a systemic crisis - is a phenomenon composed of several levels. These are based on the microeconomic risks of individual financial sector participants, which cannot pose a threat to the financial sector, as there are specific instruments to ensure risk for many of them. Risk have a systemic character, when structural causes, sector characteristics, desperate actions of individual participants are aggregated into the crisis potential. Thus, systemic risk, with a microeconomic base, is based on the structural features of the financial sector, making it possible to spread the vulnerability between the parties.

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2. Problem description

The international experience suggests that the systemic risk of the banking sector is influenced by market and credit risk. In order to characterize the methodological aspect of assessing the influence of operations with FDI on the systemic risk of the banking sector, we will stop in more detail on each particular risk. The risk issue occurs when all "shark" participants have identical positions in the financial market. The general description of the different approaches to the notion of "systemic risk" is reflected in Table 1.

According to the Global Financial Stability Report published annually, systemic liquidity risk represents the underestimated state of banking liquidity risk in the stable period (when liquidity is at a sufficient level), with confidence in the central bank, that it does not will allow banking panic, and thus will limit the impact of the liquidity shortage in the real economy.

Table 1. The conceptual aspect of systemic risk addressed in the literature

Author	Content
Bartholomew, Philip, and Gary Whalen. 1995. Fundamentals of Systemic Risk. In <i>Research in Financial Services: Banking, Financial Markets, and Systemic Risk</i> , vol. 7, edited by George G. Kaufman: Greenwich, Conn.: JAI. 1995, p. 3–17. , p. 4	Systemic risk "refers to an event having effects on the entire economic, banking, financial system, or rather only one or several institutions"
Mishkin, Frederic. Comment on Systemic Risk. In <i>Research in Financial Services: Banking, Financial Markets, and Systemic Risk</i> , vol. 7, edited by George Kaufman.: Greenwich, Conn.: JAI. 1995, p. 31–45., p. 32	The likelihood of an unexpected event that disrupts information on financial markets, which makes it impossible for them to efficiently channel funds for these parties with more productive investment opportunities
Kaufman, George G. Comment on Systemic Risk. In <i>Research in Financial Services: Banking, Financial Markets, and Systemic Risk</i> , vol. 7, edited by George G. Kaufman: Greenwich, Conn.: JAI. 1995, p. 47–52., p. 47	Systemic risk is "the likelihood that cumulative losses accumulate from an event that sets in motion a series of successive losses along a chain of institutions or markets that comprise a system. Systemic risk is the risk of a domino chain reaction that interconnects "
Federal Reserve Board. 2000. Fedwire Statistics: Annual Volume and Value. Available at: http://www.Federalreserve.gov/PaymentSystems/FedWire	In the payment system, systemic risk may arise if an institution participating in a private international payment network has been unable or unwilling to settle its net debt position. In the event that such a failure in the settlement has taken place, the creditors of the networking institution may also be unable to resolve their commitments
Bank for International Settlements (BIS). 1994. <i>64th Annual Report</i> . Basel, Switzerland: BIS, p. 177	"The risk of a participant's failure to meet its contractual obligations, which in turn will cause harm to other participants, causing a chain reaction that leads to wider financial difficulties"
Darby, Michael. Over-the-counter derivatives and systemic risk to the global financial system. NBER Working Paper Series, 1994, nr. 4801.	Has argued that recent financial innovations (credit derivatives) and increased activity of non-banking financial intermediaries (reinsurance companies) can reduce the risk of systemic shocks that are transmitted across the entire banking system.

Source: developed by the author according to the analysis of the studies shown in the table.

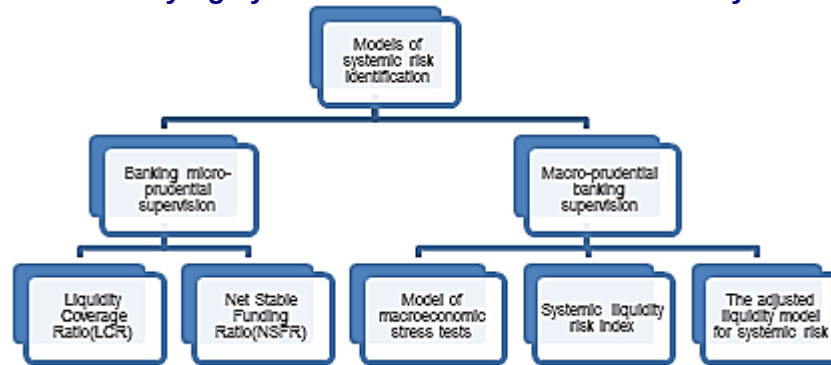
Based on the approaches discussed in various scientific papers, it is possible to provide a generalized definition of systemic liquidity risk. Systemic liquidity risk - the failure of several banks in the system (or systemic banks) to meet their obligations, characterized by the imbalance in cash flows (asset and liability maturities and value), a decrease in banks' capital, a decrease in confidence in the banking system, which could lead to a banking panic.

Throughout the research we will lead the macro-economic approach to define the essence of the concept of "systemic risk". Thus, systemic risk is the risk of a collapse of the banking system as a result of massive and simultaneous withdrawal of deposits (banking panic), which can have very serious consequences in the long run. Systemic risk is associated with a high degree of risk and panic of the population [2].

Thus, the systemic liquidity risk in this study will be approached as the potential danger of situations in which the reaction of economic agents to individual liquidity risk increases the lack of total reliability. Systemic liquidity risk always has serious consequences for the financial system as a whole, as it generates financial crises that affect financial stability, violates the allocation of resources, and ultimately affects the real economy.

In order to ensure the stability of the banking system and to prevent the emergence of systemic liquidity risk, it is necessary to investigate the methods of how to reduce systemic risk. The systemic risk management system should contain instruments that would mitigate the negative impact of both internal and external instability sources. After determining the sources of risk, institutional mechanisms will be identified that would enhance the security of the banking sector. These mechanisms should combine minimum restrictions on the rules that take into account the systemic risk that the bank has assumed in its activities.

Figure 2. Models for identifying systemic risks to ensure the stability of the banking system



Source: <http://www.imf.org/external/pubs/ft/gfsr/2011/01/pdf/text.pdf>;

International financial practices to ensure the stability of the banking system have developed two models of systemic risk identification, the purpose of which is to avoid systemic crises. The traditional model is implemented in the framework of micro-prudential banking supervision to ensure the transparency of the activities of financial institutions. A relatively new model includes macro-prudential supervision, where the estimated risk refers to the entire system and cannot be reduced to the sum of the individual risks. Creating this model on the basis of modern economic and mathematical science is a priority in managing systemic risks in the development of a methodological platform for a new global financial market regulation system (Figure 2).

New liquidity standards come to eliminate those shortfalls of financial resources that a bank has or can have in order to cover all its debts to the bank. Applying these standards is seen as an acknowledgment that the poor management of operational risks could reduce liquidity to the point where certain assets cannot be used to mitigate liquidity risks and to manage liquidity. The introduction of international liquidity standards concerns the short-term (30-day) insurance against liquidity shocks, and a long-term (1 year) high level of structural liquidity.

The liquidity coverage ratio is calculated using the following formula:

$$LCR = \frac{\text{High quality liquid assets}}{\text{Total net liquidity outflows over 30 days}} \geq 100\% \quad (1)$$

For calculating the net stable funding ratio, the calculation relation is used:

$$NSFR = \frac{\text{Aviable amount of stable funding}}{\text{Required amount of stable fundng}} \geq 100\% \quad (2)$$

The Systemic Liquidity Risk Index (SLRI) covers the usual increase in spreads of financial instruments that may occur during periods of stress. In order to address the specific set of investment strategies for investors in normal times, clearing positions can be opened in order to maintain low spreads (which makes them without risk), but this can not be done during periods of tension , Because there is a lack of funding.

The systemic risk-likely (LSR) liquidity model combines financial balance and market data for the calculation of the prospective liquidity risk indicator for financial institutions. Using this model, we can calculate the expected shortage of liquidity on a number of banks and the individual contribution of banks to the formation of such a deficit.

One of the most important features of systemic liquidity risk is that the financial sector is not capable of effectively neutralizing the causes of the accumulation of potential crises and avoiding the conditions for generating systemic liquidity risk. The imperfection of the market mechanism, in particular the perception of information by individuals, certain behavioral reasons of market participants, question the possibility of a systemic liquidity risk warning mechanism without reducing the effectiveness of the financial sector as a whole. Because of this, the state should play a special role in neutralizing the premises of the systemic crisis. The role of the state in regulating

systemic liquidity risk can be specified in the ultimate creditor policy. The central bank of any country may act as a creditor of last resort. There are two approaches to limiting systemic liquidity risk by the state. The traditional approach is to provide micro-prudential banking supervision, the second is the macro-prudential regulation of the entire system. Theoretically and practically, microprudential methods are ineffective in detecting, evaluating, and neutralizing systemic risk.

Indicators of the threat of systemic liquidity risk are presented in Table 2.

Table 2. Indicators of the threat of systemic liquidity risk

INDICATOR	CONTENT	DANGEROUS LEVEL OF INDICATOR
DYNAMICS OF HIGHLY LIQUID ASSETS, THE RATIO OF LIQUID ASSETS TO TOTAL ASSETS.	THE HIGH VOLATILITY OF VERY LIQUID ASSETS AND A SMALL SHARE OF LIQUID ASSETS IN TOTAL ASSETS INDICATE A SYSTEMIC RISK OF LIQUIDITY RISK.	THE RATIO OF LIQUID ASSETS TO TOTAL ASSETS - LESS THAN 10%.
THE "PROFITABILITY-LIQUIDITY" CURVE ON THE INTERBANK MARKET	THE HIGH VOLATILITY OF INTEREST RATES ON THE INTERBANK MARKET INDICATES THE EXISTENCE OF A SYSTEMIC RISK OF LIQUIDITY RISK.	A HIGH LEVEL AND A SHARP RISE IN INTEREST RATES.
VOLATILITY OF DAILY BALANCES IN NBM ACCOUNTS	HIGH VOLATILITY INDICATES AN UNCERTAIN AMOUNT OF BANK MONEY BALANCES WITH THE NBM, WHICH MAY AFFECT THE THREAT OF SYSTEMIC LIQUIDITY RISK.	REDUCED VOLUME AND A DRASTIC REDUCTION OF BALANCES OF CORRESPONDENT AND TRANSIT ACCOUNTS WITH THE NBM.
CORRESPONDENCE BETWEEN BANK ACCOUNTS WITH NBM AND BANK LIABILITIES	THE HIGHER THE VALUE OF THE INDICATOR, THE GREATER THE BANK'S ABILITY TO MEET ITS OBLIGATIONS.	A LOWER VALUE INDICATES A GREATER FAILURE OF THE BANK TO MEET ITS OBLIGATIONS.
SHARE OF PROBLEMATIC ASSETS IN THE TOTAL ASSETS OF THE BANKING SYSTEM	THE HIGHER THE RATIO OF NON-PERFORMING ASSETS TO THE TOTAL ASSETS OF THE BANKING SYSTEM, THE GREATER THE THREAT OF A SYSTEMIC CRISIS.	THE SHARE OF PROBLEMATIC ASSETS IN ASSETS - 15-20% (DEPENDING ON THE SIZE OF THE BANK AND OTHER FACTORS).
WITHDRAWAL OF DEPOSITS FROM TIME DEPOSITS AND SIGHT DEPOSITS OF BANKING INSTITUTIONS	WITHDRAWAL OF FUNDS HAS A NEGATIVE IMPACT ON BANKS' RESOURCES BASE, THERE IS A NEED FOR REFINANCING OPERATIONS BY THE NBM, GENERALLY INCREASING THE THREAT OF SYSTEMIC LIQUIDITY RISK.	10% -20% (DEPENDING ON VARIOUS FACTORS THAT MAY AFFECT THE BANKING INSTITUTION).
VOLATILITY OF THE PAID-UP LIABILITIES OF THE BANKING SYSTEM	THE LACK OF THE ANALYTICAL TREND OF PAID LIABILITIES DEMONSTRATES THE THREAT OF SYSTEMIC LIQUIDITY RISK.	THE TREND OF THE DETERMINATION COEFFICIENT FOR THE ANALYSIS OF PAID LIABILITIES IS APPROACHING ZERO.

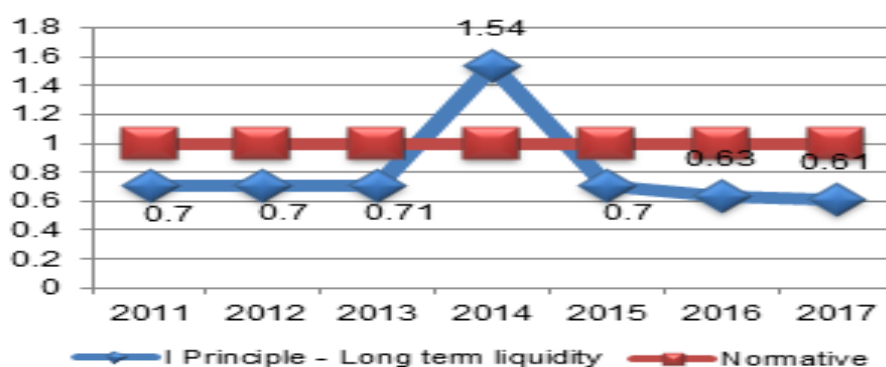
The characteristics of the banking sector in the Republic of Moldova that contribute to the accumulation of systemic risks are:

- the low level of high-quality long-term investment in the real economy;
- strong dependence on the economic conjuncture of individual markets, influenced by speculative speculation and recession;
- insufficient diversification of certain types of risks in the balance sheet of banks;
- the lack of effective mechanisms that would fulfill some of the functions of the banking sector to ensure the security of the banking system;
- high debt substitution over time before the banking system crisis;
- high dependence of banks on NBM refinancing.

Transforming cash flows between different segments in order to obtain speculative market gains.

In order to identify the likelihood of systemic liquidity risk in the banking sector of the Republic of Moldova, we will analyze the evolution of the long-term liquidity ratio, reflected in Figure 3.

Figure 3. Change in long-term liquidity ratio

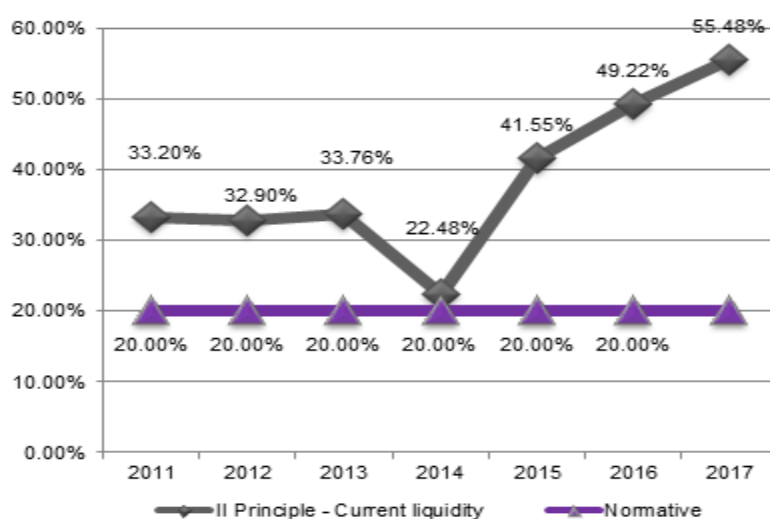


Source: elaborated by the author based on data from www.bnm.md/md/finacial_indices_of_bank_system.

As we can see, the value of the indicator analyzed during the years 2011 - 2013 and 2015 - 2016 respects the norm imposed by the NBM, which invokes the lack of liquidity problems in the banking sector. At the same time, for the year 2014 the situation is less good, because the long-term liquidity ratio exceeds the NBM limit due to the theft in the banking sector. Respectively, for the end of 2014, the banking sector collapsed with a lack of liquidity that generated a systemic liquidity risk in all banks in the sector. One of the solutions taken by the NBM was the increase of the basic interest rate, which caused the increase of the interest on the bank deposits, but also the increase of the interest on the bank credits.

Current bank liquidity outcomes indicate that in the short term there were no shortcomings in the liquidity provision of banking operations, as the norm recommended by the NBM, even in 2014, when there were prerequisites for the emergence of systemic liquidity risk, was observed.

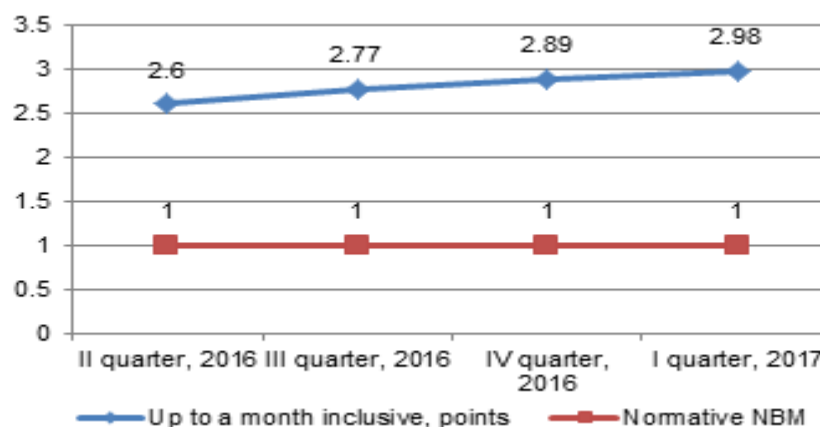
Figure 4: Change in current liquidity



Source: elaborated by the author based on data from www.bnm.md/md/finacial_indices_of_bank_system.

To comply with BASEL III, the NBM has imposed banks to report from July 2016 data on the third principle of liquidity, which provides for liquidity on maturity bands up to one month; 1-3 months; 3-6 months; 6-12 months and over 12 months, expressed as the ratio between the actual liquidity and the required liquidity on each maturity band, shall not be less than the ratio established by the Bank's liquidity regulation. Principle III is to be calculated as the ratio between the actual liquidity and the required liquidity on each maturity band and must not be less than 1 per maturity band. If a liquidity surplus is recorded in any of the maturity bands, except for the last bands, it will be added to the actual liquidity of the next maturity bands.

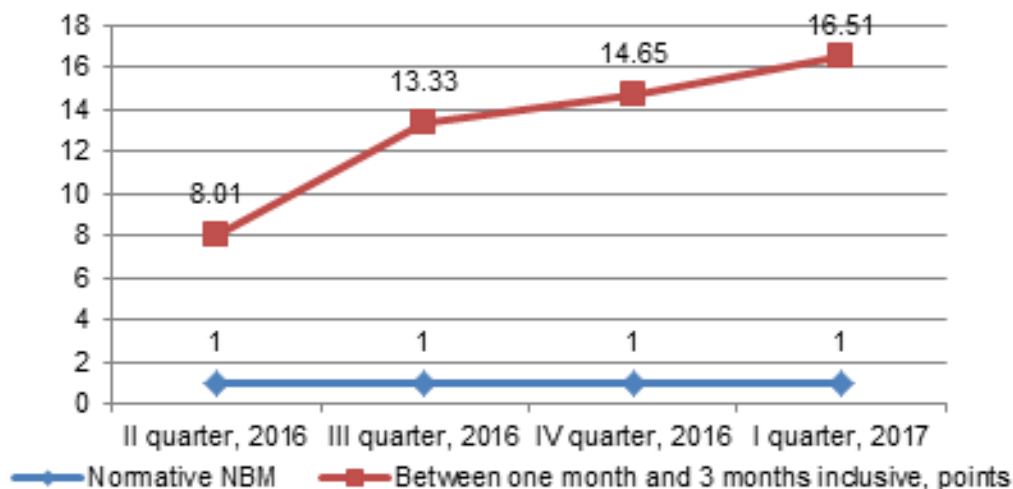
Figure 5. Evolution of liquidity on maturity bands, up to one month



Source: elaborated by the author based on data from www.bnm.md/md/financial_indices_of_bank_system.

Thus, according to the data submitted by the NBM for the second quarter of 2016 - the first quarter of 2017, liquidity on the maturity band up to one month is higher compared to the norm imposed by the NBM and reflects a positive situation of liquidity existence. However, in order to sterilize excess liquidity and improve the transmission mechanism of monetary policy decisions, the Executive board of the NBM decided to increase the required reserve ratio of the attracted funds in moldovan lei and in non-convertible currency by 3.0 percentage points Up to 40.0 percent of the calculation base for the maintenance period of the required reserves in Moldovan Lei: May 8, 2017 - June 7, 2017. At the same time, the reserve requirement of the attracted funds in freely convertible currency is maintained at The current level of 14.0% of the base.

Figure 6. Dynamics of liquidity on maturity bands, between one month and 3 months

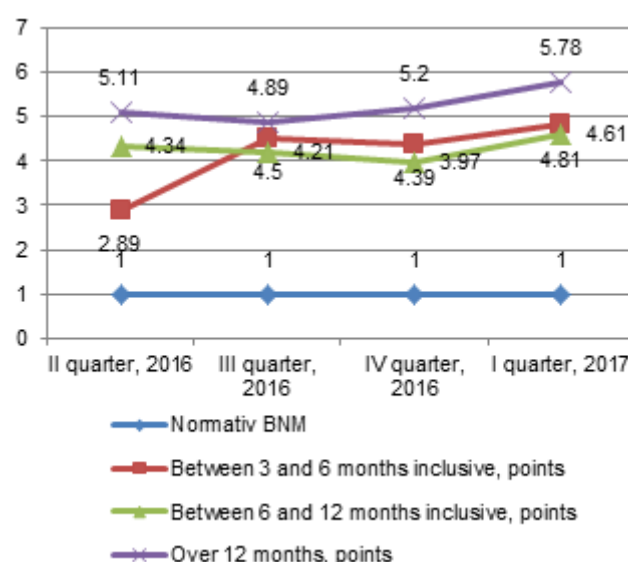


Source: elaborated by the author based on data from www.bnm.md/md/financial_indices_of_bank_system.

From the data reflected in Figure 6, it is noted that for the period of one month to three months, liquidity on maturity bands is higher than the NBM norm and points to excess liquidity that does not generate economic growth.

A similar situation is also present for the other temporary intervals reflected in Figure 7

Figure 7. Trend of liquidity on maturity bands



Source: elaborated by the author based on data from www.bnm.md/md/financial_indices_of_bank_system.

3. Conclusion

The main stages of early warning of systemic risks of the banking system are as follows: definition of signal indicators, implementation of a preliminary assessment, clarification and verification using mathematical models and use of the management of indicator calculations, quantification and determination of the final evaluation.

As a result of the research, we propose the following measures for the timely and effective prevention of systemic liquidity risk:

To draw up plans, programs and stress scenario testing a liquidity risk system of the banking system of the Republic of Moldova;

Ensure transparency of banks and disclosure of maturities on assets and liabilities, which will appropriately assess the increase in liquidity risk in the banking system;

Implement a better evaluation of the overall cost-effectiveness of the various macro-prudential tools. For example, the additional capital requirement to limit insolvency risk among systemically important banks;

The inclusion of macro prudential instruments in liquidity risk management policy, which would provide for a more efficient separation of public and private debt from systemic liquidity risk;

Set the minimum value of investment in liquid assets and improve the role of the NBM as a last resort creditor, in which he provides liquidity during periods of stress;

Development of a banking system diagnostic concept to identify systemic liquidity risk in an integrated manner using the proposed neutralization measures;

Improve measures to curb speculative trends in foreign exchange markets due to the high sensitivity of the interbank lending market to the speculative dynamics of other assets.

Implementation of these and the use of BASEL III liquidity indicators will help ensure that banks have sufficient liquidity and can pay for their obligations without resorting to the sale of their assets or loans from the central bank.

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