

## SYSTEMIC LIQUIDITY RISK: FEATURES OF IDENTIFICATION AND THE NEED TO IMPROVE REGULATION

## СИСТЕМНИЙ РИЗИК ЛІКВІДНОСТІ: ОСОБЛИВОСТІ ІДЕНТИФІКАЦІЇ ТА НЕОБХІДНІСТЬ ВДОСКОНАЛЕННЯ РЕГУЛЮВАННЯ

*The importance and danger of systemic liquidity risk in the financial sector are proved. Approaches to the interpretation of the concept of systemic risk by domestic and foreign authors and international financial organizations are considered. The concept of systemic liquidity risk, features of its action, and the main types are defined. Three methods for measuring the systemic liquidity risk according to international standards are outlined and the main parameters of its estimation in the domestic banking sector are formulated. Complex analysis of the banking system of Ukraine is conducted to identify the systemic liquidity risk and draw some conclusions. The crucial role of systemically important banking institutions in the process of preventing systemic liquidity risk is analysed. Described approaches to the definition of such institutions and the establishment of tougher requirements for supervision over them. Proposed measures to prevent the development of systemic liquidity risk.*

**Key words:** systemic risk, liquidity risk, systemic liquidity risk, high liquid assets, refinancing, systemically important institutions.

*Доведено важливість та небезпечність системних ризиків фінансового сектору. Розглянуто підходи до трактування поняття системного ризику вітчизняними та зарубіжними авторами, а також міжнародними фінансовими організаціями. Визначено поняття системного ризику ліквідності, особливості його дії та основні види. Зазначено три методи для виміру системного ризику ліквідності за міжнародними стандартами та сформульовано основні параметри його оцінки в вітчизняному банківському секторі. Проведено комплексний аналіз банківської системи України на предмет виявлення системного ризику ліквідності, зроблено відповідні висновки. Проаналізована*

*вирішальна роль системно важливих банківських установ у процесі попередження системного ризику ліквідності. Описано підходи до визначення таких установ та встановлення жорсткіших вимог нагляду за ними. Запропоновані заходи для попередження розвитку системного ризику ліквідності.*

**Ключові слова:** системний ризик, ризик ліквідності, системний ризик ліквідності, високоліквідні активи, рефінансування, системно важливі установи.

*Доказана важність і небезпечність системних ризиків фінансового сектору. Рассмотрены подходы к трактовке понятия системного риска отечественными и зарубежными авторами, а также международными финансовыми организациями. Определено понятие системного риска ликвидности, особенности его действия и основные виды. Отмечено три метода для измерения системного риска ликвидности по международным стандартам и сформулированы основные параметры его оценки в отечественном банковском секторе. Проведен комплексный анализ банковской системы Украины на предмет выявления системного риска ликвидности, сделаны соответствующие выводы. Проанализирована решающая роль системно важных банковских учреждений в процессе предупреждения системного риска ликвидности. Описаны подходы к определению таких учреждений и установление более жестких требований надзора за ними. Предложенные меры по предупреждению развития системного риска ликвидности.*

**Ключевые слова:** системный риск, риск ликвидности, системный риск ликвидности, высоколиквидные активы, рефинансирование, системно важные учреждения.

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**Introduction.** Globalization of financial markets and structural imbalances in economic processes have led to fundamentally new approaches to global banking regulation and supervision. From the beginning of the 21st century, more and more attention was concentrated on ensuring financial stability as a perfect state of the market for the effective functioning of all its entities. Among the main threats to stability, the global risks of financial systems, or as they are called at present – systemic risks, deserve the greatest attention nowadays. Systemic risks of the financial sector are mainly localized in the banking sector, which is the main channel for intermediary and redistribution of financial resources.

Taking into account the specifics of the last two financial crises: the global crisis of 2007–2009 and the national crisis of 2014–2016, studying the issues about the emergence and ways for overcoming

systemic risks, including the systemic liquidity risk, becomes of special relevance in the context of securing world financial stability.

**Literature review.** The problem of systemic risk has been paid much attention by such foreign and domestic scientists as J. Kaufman, K. Scott, E. Cerutti, J. Sinkey, H. Karcheva, L. Prymostka, and others. O. Baranovskiy [1], S. Naumenkova and V. Mishchenko [2] focus attention on the disclosure of the essence of systemic risks and the danger of their spread. The work of M. Samsonov [4] is devoted to the consideration of processes of supervision and monitoring of the systemic risks of the banking sector. However, not enough attention is paid to the study of certain types of systemic risk, including the systemic liquidity risk, which complicates the process of their prevention and regulation.

**Problem statement.** The purpose of the article is to determine the need to prevent systemic liquid-

ity risk in the banking sector, to describe the main parameters of its identification, and to provide proposals to avoid the development of systemic liquidity risk in the domestic banking sector.

**Research results.** Systemic risks concept is quite complicated and dangerous. In our time, there is no doubt that uncontrolled local risks can easily be transformed into unregulated systemic risks that pose a serious threat to financial stability and economic growth of both individual economies and the global economic system as a whole.

Despite the considerable attention given to the systemic risks study, there is still no clear interpretation of it. A well-known domestic researcher and professor O. Baranovskyi defines systemic risk as a risk of violating the whole system with potentially serious negative consequences for the domestic market and the real economy [1]. Others domestic researchers, S. Naumenkov and V. Mishchenko, have the opinion that systemic risk should be considered as a risk that objectively follows from the existence of systemic interconnection and the accumulation of imbalances in the activities of certain sectors or financial institutions on the basis of the implementation of mechanisms for the transmission of risks and potential mutual contamination because of insufficient management of financial processes in certain financial institutions or in the financial system as a whole [2, p. 188].

Consequently, the interpretation of the systemic risk concept reduces to a violation of the financial system on the basis of the contamination of unstable, high-risk institutions of other participants in the financial system and lead to negative consequences for economic stability.

Instead, foreign scientist J. Sinkey considers systemic risk as uncertainty, which is associated with the possibility of the financial system collapse [3, p. 775]. And researcher M. Samsonov [4, p. 274-275] generally identifies three approaches (microeconomic, macroeconomic, and combined) to determine the systemic risk concept.

The systemic risk concept is also considered by international financial organizations, such as the European Central Bank, the World Bank, International Monetary Fund and others. For example, the European Central Bank describes this category as a risk that the provision of necessary financial products and services by the financial system will be impaired to a point where economic growth and welfare may be materially affected [5]. In addition, it is precisely the prevention of the rise of systemic risk representatives of the European Central Bank called the state of financial stability, which only once again proves the interdependence of these financial concepts. Moreover, the fact that the representatives of the European Central Bank identify the financial stability as a state whereby the build-up of systemic risk is prevented

only once again proves the interdependence of these financial concepts. A similar interpretation is provided by the World Bank [6, p. 6]: systemic risk is limited to financial shocks that are likely to be serious enough to damage the real economy. Definitions of the European Central Bank and the World Bank are mainly reduced to the economic side of possible problems, while the International Monetary Fund focuses on the social aspects of systemic risk manifestation, considering it as a threat confidence in the financial system and a substantive threat of growth and living standards [7, p. 5].

Note that the current legislation of Ukraine defines systemic risk only in the context of the stock market risks, which is interpret as “the risk of losses in a large number of institutions because of the impossibility of meeting their liabilities in connection with non-fulfilment (late fulfilment) of liabilities by one institution as a result of implementation the credit risk, the liquidity risk or other risk in this institution” [8].

The evidence of the total threat of systemic risks can be the creation of the European Systemic Risk Board after the global financial crisis of 2007–2009, the main task of which is to identify potential systemic risks of the financial sector and struggle with them through macro-prudential recommendations and approaches.

It is important to note that in 2015, the Financial Stability Board was created in Ukraine, which is assigned the task of identifying systemic risks and minimizing their negative impact on the financial system of Ukraine.

Systemic risks are even more worrying because they are difficult to predict and more difficult to overcome. Because they capture the whole financial system, it can be argued that exactly the systemic risks are responsible for a series of major-scale crises in the history of mankind.

One of these risks is the liquidity risk, which is an integral part of banking activity and serves as the mainstay of the systemic crisis. Liquidity risk reflects the possibility of banks' losses because of the inability to pay off for all their liabilities in time and the inability to ensure an increase in assets of the institution for income generation within the chosen direction of development. The liquidity risk in the banking always exists, despite the fact that it is spoken only in a situation when it becomes significant and leads to a deterioration of the financial state either a separate institution or the whole banking system. In the case of its extension to the whole banking system, it is advisable to speak of the systemic nature of its manifestation.

The systemic liquidity risk concept is currently underestimated by domestic researchers, while global regulatory institutions in the face of the Basel Committee on Banking Supervision (BCBS), the International Monetary Fund (IMF), and the European Central Bank (ECB) are paying more and more attention

to this issue. Systemic liquidity risk can be defined as a risk of simultaneous liquidity constraints in several financial institutions. However, this category has a deeper background. According to the IMF (2011) [9, p. 76], systemic liquidity risk reflects the tendency of financial institutions to collectively underestimate the risk of liquidity in the period of financial stability when markets receive funding from the central bank without any obstacles. Underestimation of possible threats that may arise because of liquidity risk from financial institutions that mistakenly believe that in the event of stress can uninterruptedly obtain the necessary funding from the regulator, pushes them to direct more and more of their assets to high-risk operations, and keeping a smaller amount of liquid assets that is necessary to meet the needs of customers and timely fulfilment of all their liabilities. The more such institutions in the banking system, the greater probability of development of the systemic liquidity risk, which, through a domino effect, will capture all its entities.

Systemic liquidity risk depending on the source of the crisis can be divided into 2 types:

1) external (global) systemic liquidity risk – arises outside the country and through a domino effect spread into national banking institutions because of close interconnections of financial market institutions around the world. For example, this type of systemic liquidity risk can be the global economic crisis of 2007–2009;

2) domestic (national) systemic liquidity risk – arises in the national banking market with the probability of spread into the banking systems of foreign countries and the spread of destabilization to foreign banking institutions. Such a course of events was characteristic of the crisis in Ukraine for 2014–2015.

It can be concluded that the systemic liquidity risk is the probability of a global liquidity crisis, reflecting the inability of most of the institutions of the banking system of a country/group of countries or the world at all (including systemically important banks) to fulfil their liabilities to creditors and depositors characterized by a decrease in banks' capital, a significant outflow of funds from the banking system, a sharp decrease in revenues because of a deterioration of the loan and investment portfolio, and causes a negative financial climate, reduction of confidence to banking system/banking systems of countries of the world on a global scale and falling economic activity.

For successful prevention and control of systemic liquidity risk, it is important to identify it in time. Nowadays it is difficult to do; there is no clear approach to its evaluation. Appropriate techniques are still under development and their implementation has some difficulties. Some methods are complicated mathematical models, for the others the problem is the lack of necessary data. In addition, existing methods are discussed mainly for developed countries, while recent events have shown that this issue is also important for developing countries.

However, in its report on financial stability in April 2011, the International Monetary Fund proposed three methods for measuring systemic liquidity risk [9, p. 98]:

- Systemic Liquidity Risk Index;
- Systemic Risk-Adjusted Liquidity Model;
- Stress-Testing Framework.

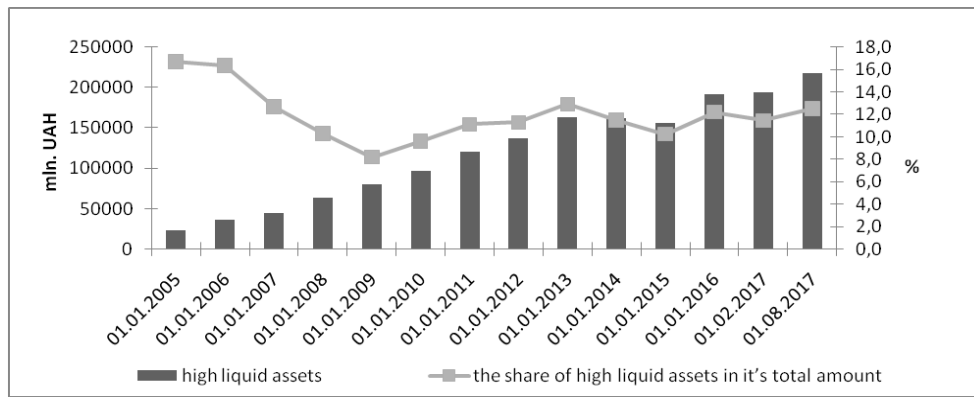
Unfortunately, these methods cannot be called universal and fully understandable for use, which prevents their immediate use for monitoring the situation with liquidity in the financial market of Ukraine. Consequently, the primitive instruments that signal the emergence (occurrence) of a systemic liquidity risk in the Ukrainian banking market can be:

- decrease in the share of high liquid assets by more than 2 percentage points (p.p.) during the year;
- outflow of deposit resources from the banking system of the country (by 5-10% during the year), characterized by the emergence of panic among the population;
- default on mandatory liquidity standards by banks,
- growth of volumes of refinancing operations (by 2-3 times a year) as the main tool for maintaining liquidity;
- increase in the share of toxic assets in its total amount of banking institutions (by 5% or more during the year), etc.

High liquid assets of the banking sector characterize the degree of protection of financial institutions from various macroeconomic (systemic) shocks, in other words, they act as an emergency stock. Note that in recent years, there has been a positive trend in the growth of high liquid assets. Compared to the beginning of 2015 (10.2%), the share of high liquid assets in its total amount of Ukrainian banks gradually increased (up to 12.5% as of 01.08.2017), which confirms the gradual restoration of the banking system of the country after a long period of crisis shocks.

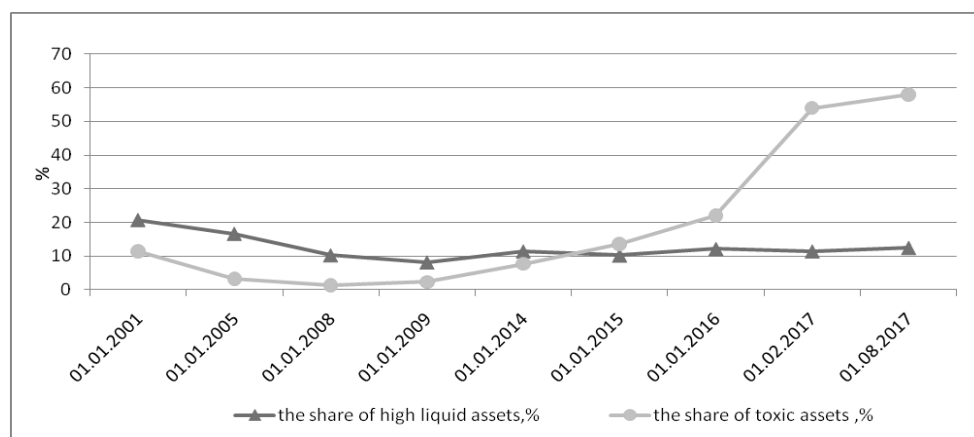
It should be noted that the lowest level of high liquid assets was observed in 3 periods: 1) during the crisis of 2008–2009 – 8.2% and 9.6% respectively; 2) during the national crisis of 2014 – 10.2% (Fig. 1). Consequently, there is a direct link: the lower level of high liquid assets, the greater exposure to systemic liquidity risk by the banking system of the country.

The significant amount of problematic (toxic) assets poses an increase in systemic liquidity risk, which leads to lack of revenue from banks and negatively affects their liquidity and financial performance (Fig. 2). The credit activity of the banks after the crisis of 2014–2015 has significantly decreased because of geopolitical factors and difficult macroeconomic situation. In connection with a decrease in the resource base, worsening solvency and payment discipline of borrowers, banks reduced lending to both businesses and population.



**Fig. 1. Dynamics of high liquid assets of the banking system of Ukraine for 2005–2017**

Source: compiled by the author with the help of [10]



**Fig. 2. Assessment of systemic liquidity risk of Ukrainian banks in 2000–2017 years**

Source: compiled by the author with the help of [10]

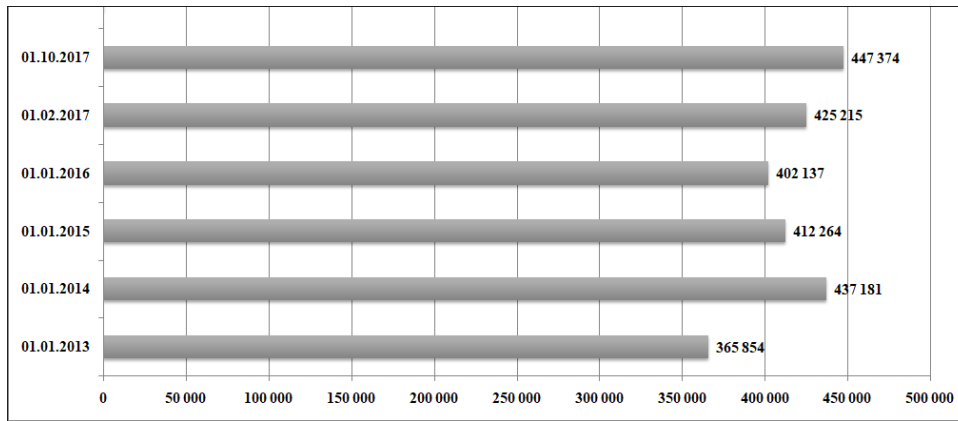
Since 2017, lending has gradually begun to recover but mainly in the segment of consumer lending. But even despite this, because of the low solvency of borrowers and the massive debt on foreign currency loans, the share of overdue loans has grown rapidly: if as of January 1, 2016, this indicator was 22.1%, then as of August 1, 2017, it reached 58.0%, increasing by more than 2.5 times in almost two years. Such data testify to the fact that the Ukrainian banking system cannot recover from the negative consequences of the crisis for 2014–2015.

As systemic liquidity risk arises because of the impossibility for most banks of the system to fulfil its liabilities, in this case, we can talk about a decrease in confidence to banking institutions and a massive outflow of deposits of individuals. Therefore, to assess the systemic liquidity risk, it is advisable to analyse the dynamics of the deposit portfolio of individuals in the banking system of the country (Fig. 3).

According to the table, there is a slight volatility of the deposit portfolio of individuals. Thus, during 2012–2013, there is a growth of the portfolio (approximately on 19%), but during the next 2 years – its grad-

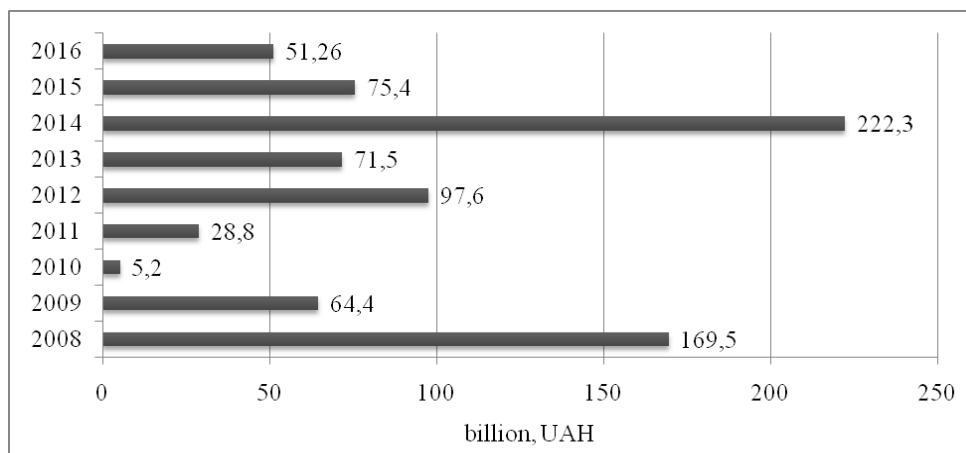
ual decrease (by 8% compared with January 1, 2014). From 2016, the volume of deposits grows again until the period of October 1, 2017 (11% compared to the indicator as of January 1, 2016). That is, during the period of the national crisis of 2013–2015, the volume of the deposit portfolio of individuals decreases, which characterizes the distrust of the population during this period and the withdrawal of deposits from the banking system.

Taking into account the deep systemic crisis of Ukraine's banking sector in 2013–2015 and the complicated post-crisis period, many financial institutions were unable to cope with the difficulties and lack of liquidity. In such difficult circumstances, the role of the national regulator comes to the fore, because from its work depends not only the predestination of bank services' market but also the predestination of all economy of the country. The NBU, as the central management body in accordance with the functions assigned to it, provides support of banks' liquidity by various instruments, among which the main role is played by refinancing operations.



**Fig. 3. Dynamics of the deposit portfolio of individuals during 2012–2017 years**

Source: compiled by the author with the help of [10]



**Fig. 4. Dynamics of volume of refinancing operations in 2008–2016**

Source: compiled by the author with the help of [10]

Systemic liquidity risk can also be estimated depending on the volume of lending that was sent to refinancing operations to maintain the liquidity of banking institutions. The bigger amounts of refinancing were provided to banks, the bigger problems with maintaining liquidity were observed in the banking sector of the country and to a certain extent, it shows the existence of a systemic liquidity risk (Fig. 4).

Based on this data, the largest amount of refinancing is observed in 2014 (222.3 billion UAH), which indicates a deeper crisis of the banking system of Ukraine in this period, in contrast to the global financial crisis of 2008 (169.5 billion UAH). Note that a significant reduction in lending since 2015 indicates a gradual exit from the “debt pit” of Ukrainian banks, reducing the risk of developing systemic liquidity risk.

Taking into account the massive outflow of deposits from the country’s banking system, the high volatility of high liquid assets, the growth in the share of toxic assets and the largest amounts of refinancing operations (in 2014), we can conclude that the domestic (national) systemic liquidity risk occurred

during the crises of 2013–2015, the results which still hinders the economic development of Ukraine and does not allow fully achieving the pre-crisis level of profitability of banking.

The systemic liquidity risk concept is closely linked to the problem of systemically important banking institutions. The issue of systemic importance has been studied since the 80s years of the XX century and has become a special significance issue in modern realities. It is believed that the phrase “too big to fail” has a 27-year history. The first time it was formulated by US Congressman Stewart B. McKinney on September 19, 1984, in a speech about the salvation of the Continental Illinois Bank, which faced insolvency because of unskilled lending [11]. In the general sense, systemically important institutions are financial institutions with a significant share of the financial services market and the bankruptcy of which will cause irreparable damage to the normal functioning of financial markets or other financial institutions operating within these markets.

Since a significant share of assets is concentrated in these institutions, increasing liquidity risk in them



will cause significantly worse results than, for example, problems in a pocket bank that is not so closely interlinked with other participants in the financial system. Besides this, failure to meet current liabilities that may arise in a systemically important bank can provoke a banking panic and total “invasion” not only on this but also on others banking institutions. That is why each country defines the criteria for systemically important banking institutions, which require more control over their activities by regulators.

According to international practice, there are three approaches to the identification of systemically important banking institutions:

- 1) qualitative assessment based on specific indicators;
- 2) analysis of the interbank network (interconnections);
- 3) assessment of the financial institution's contribution to the overall systemic risk.

In Ukraine, the criteria for the systemic importance of banks are: the size of the bank, the degree of financial interconnections, and the direction of activity [12]. Every year, the National Bank of Ukraine defines systemically important banks that have the greatest impact on the entire banking sector in the country. Thus, in the 2016–2017 years, only three banks were considered systemically important – the largest in assets of PJSC CB “PrivatBank”, JSC “Oschadbank”, and JSC “Ukreximbank”. It should be noted that since 2015, the status of the systemic importance of banks with foreign participation in the capital – “Raiffeisen

Bank Aval”, PJSC “Ukrsotsbank” (UniCredit Bank), PJSC “Prominvestbank”, and PJSC “Sberbank” has been eliminated. For such systemic banks, tougher requirements should be set for economic standards. Besides this, in 2015 the Instruction of Banking Regulation in Ukraine No. 368 dated 28.08.2001 was supplemented with a new section (Section X. Requirements for Systemically Important Banks). In particular, according to the section, the instant liquidity standard (H4) for systemically important banks should be no less than 30%, compared to the usual 20%, and the maximum credit risk per borrower standard (H7) – 20% or less, compared with usual 25%.

At the global level, the list of systemically important banking institutions is also annually determined. The Financial Stability Board and the Basel Committee on Banking Supervision identified a list of 30 systemically important banks in 2017. These institutions are subject to increased capital requirements (according to Table 1).

Taking into account the foregoing, in order to effectively prevent and eliminate the systemic liquidity risk, it is necessary to implement a number of measures:

1. Improve existing banking regulation and supervision practices, especially issue of developing key indicators of liquidity risk of the financial system, and timely mechanisms of action in the case of their significant change.
2. Develop scenarios for stress testing of systemic liquidity risk for the banking system according to international practice.

Table 1

**Global systemically important banks, as of November 2017 allocated to buckets corresponding to required levels of additional capital buffers**

| Bucket               | Global systemically important banks |   |
|----------------------|-------------------------------------|---|
| <b>5</b><br>(3,5%)   | -                                   |   |
| <b>4</b><br>(2,5%)   | JP Morgan Chase                     |   |
| <b>3</b><br>(2,0%)   | Bank of America                     | Deutsche Bank                                   |
|                      | Citigroup                           | HSBC  |
| <b>2</b><br>(1,5%)   | Bank of China                       | Goldman Sachs                                   |
|                      | Barclays                            | Industrial and Commercial Bank of China Limited |
|                      | BNP Paribas                         | Mitsubishi UFJ FG                               |
|                      | China Construction Bank             | Wells Fargo                                     |
| <b>1</b><br>(1,0%)   | Agricultural Bank of China          | Royal Bank of Scotland                          |
|                      | Bank of New York Mellon             | Santander                                       |
|                      | Credit Suisse                       | Société Générale                                |
|                      | Groupe Crédit Agricole              | Standard Chartered                              |
|                      | ING Bank                            | State Street                                    |
|                      | Mizuho FG                           | Sumitomo Mitsui FG                              |
|                      | Morgan Stanley                      | UBS   |
|                      | Nordea                              | Unicredit Group                                 |
| Royal Bank of Canada |                                     |   |

Source: [13]

3. Intensify requirements for systemically important banks, conduct on-site and off-site inspections, and conduct weekly monitoring of the efficiency of such institutions in order to prevent early liquidity problems.

4. Conduct a balanced monetary policy, supporting liquidity only in cases of exceptional needs, based on a careful examination of the solvency of banking institutions that apply to the NBU for obtaining the necessary funding, etc.

**Conclusions.** Further studying and understanding of systemic liquidity risk is the first step to effective management and regulation. Systemic liquidity risk is usually associated with the impossibility of fulfilling its liabilities by individual financial institutions, which has a negative impact on all financial system.

Systemically important banks, as the main sources of systemic risk development, require tougher control and supervision by the regulator. And the introduction of a number of these measures will help ensure the stability of the banking system and reduce systemic risks, including in terms of violating the requirements of liquidity of banks.

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