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Issues of Improving the Mechanisms for Regulating the Liquidity of Commercial Banks in Developed Countries

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Abstract---This article discusses the improvement of liquidity regulation mechanisms for commercial banks in developed countries. This article will consider such concepts as “liquidity”, “liquidity management”, “liquidity management mechanism”, and the existing approaches to its definition, as well as the bank’s information infrastructure, which is necessary and sufficient for the implementation of effective liquidity management. It should be noted that the emphasis will be placed on the aspects and approaches to liquidity management directly by the commercial bank itself, and not on prudential or other norms aimed at assessing the risk of a bank losing its liquidity. The purpose of this article is to consider the existing approaches to liquidity management, their advantages, and disadvantages, for possible use in the future as basic ones for the planned study.

Keywords---bank management, golden banking rule, liquidity, liquidity management, liquidity management mechanism.

Introduction

The term “liquidity” (from Latin liquidus - liquid, fluid) means the ease of implementation, sale, the transformation of material assets into cash (Ivanov, 2001). The liquidity of the bank is the ability to fulfill its obligations to depositors and creditors promptly and without losses (Lavrushin, 2000). However, a more common point of view defines the bank’s liquidity as a dynamic state, reflecting the ability to timely fulfill obligations to creditors and depositors by managing their assets and liabilities (Leonard, 2011). In turn, the “mechanism” is defined as a sequence of states, processes that determine any action (Azrilian, 2002). In the studied literature, it was not possible to find a definition of the term “liquidity management mechanism”, however, in our opinion, taking into account the above definitions of “liquidity” and “mechanism”, “liquidity management mechanism” is:

- as a set of methods for forecasting and regulating the bank’s liquidity, which makes it possible to diagnose promptly the current and future deficit of excess liquidity, to take prompt measures to change the state of the bank’s liquidity in the appropriate time frame.

Method

The theory of bank liquidity management appeared and developed almost simultaneously with the organization and development of commercial banks (Baxriddinovich, 2020). Initially, the question of bank liquidity had two theoretical approaches (Kiseleva, 2002). The first approach was based on the fact that the structure of the bank’s assets in terms of maturity should exactly correspond to the structure of its liabilities, and this practically eliminated the need for the bank to pursue a policy of managing its liquidity. On this theoretical basis, the “golden banking rule” was developed, which states that the size and timing of the bank’s financial requirements must correspond to the size and timing of its obligations (Banerjee & Mio, 2018). The second approach was based on a real mismatch between the structures of assets and liabilities of the balance sheet, and since it was this approach that made it possible to receive increased (compared to the first) income, it was he who was further developed in the process of evolutionary

transformations in two directions: asset management and bank liabilities management. Currently, the theory of asset management is based on three methodological statements.

- a bank can maintain liquidity if assets are placed in short-term loans and are repaid on time. However, this is possible only with normal economic development, but not in conditions of economic downturns, when liquid funds are especially needed. In addition, this approach does not take into account the needs for credit resources in the conditions of emerging markets, as well as, first of all, the known instability of the resource base;
- A bank can be liquid if its assets can be moved or sold to other creditors or investors. Practice shows that the sources of liquid resources are certain types of securities that can be easily converted into cash;
- The liquidity of the bank can be planned if the future income of the borrower is put based on the payment schedule in repayment of loans. Consequently, bank liquidity can be influenced by changing the maturity structure of assets by maturity. In practice, this is expressed in the formation and management of an investment portfolio using the step effect.

Liability management theory, in turn, is based on two statements:

- the bank must solve the liquidity problem by attracting additional funds, buying them on the capital market;
- A bank can secure its liquidity by resorting to extensive loans of funds, including from the Central Bank.

Results

But these are just theories and approaches that the bank can focus on in its activities at the discretion of the management and depending on the prevailing market situation (Bakhriddinovich & Davlatovich, 2020; Robin et al., 2018). In reality, the bank is primarily faced with the problem of defining a quantitative assessment mechanism and practical application of liquidity management methods. Let us consider two approaches to the problem of assessing liquidity and the main directions of assessing and managing a bank's liquidity related to them based on the concepts of liquidity as a "reserve" and as a "flow" accepted in the world banking theory. Liquidity as a "reserve" includes determining the level of the ability of a commercial bank to fulfill its obligations to customers at a certain specific point in time by changing the structure of assets in favor of their highly liquid items due to the unused reserves available in this area (Kiseleva, 2002; Ratnovski, 2013). This approach is typical (Lavrushin, 2000; Furfine, 2001).

- determination of the liquidity level based on data on the balance of assets and liabilities of the bank's balance sheet as of a certain date;
- measuring the level of liquidity in such a way when only those assets that can be converted into money are assessed, and then the available stock of liquid assets is compared with the need for liquid funds at a certain date;
- Assessment of the level of liquidity according to the balance sheet data relating to the past period. Within the framework of this approach, the following definition of balance sheet liquidity can be given: a bank's balance sheet is liquid if its condition allows, due to the rapid sale of the asset's funds, to cover (satisfy) obligations as they mature.

A historical example of assessing a bank's need for liquidity in terms of stocks is the approach of "demand for money theories" presented by the works of W. Baumol, J. Tobin, M. Miller, D. Orr, and E. Wahlen. One of the significant limitations of the model of W. Baumol and J. Tobin (Baumol's economic inventory ordering quantity (EOQ) model), making it inapplicable for bank liquidity management, is the assumption that funds are spent with a constant speed, and that cash flows in. Based on these assumptions, an optimal volume of liquidity balances is determined (Izbosarov, 2019; Borio & Zhu, 2012).

The best results are obtained by the Miller-Orr model (Miller, 1966; Chi & Li, 2017). The model developed by Miller and Orr is a trade-off between simplicity and reality. When applied to banks, it helps answer the question: how should a bank manage its liquidity stock if it is impossible to predict the daily cash outflow or inflow? Miller and Orr use the Bernoulli process when constructing a model - a stochastic process in which the receipt and expenditure of money from period to period are independent random events.

The balance of funds changes randomly until it reaches the upper limit. As soon as this happens, the entity starts buying a sufficient amount of liquid instruments to return the stock of funds to some normal level (point of return). If the stock of funds reaches the lower limit, then in this case the bank sells liquid assets and thus replenishes the stock of liquidity to the normal limit (Ryńca, 2016; Cao et al., 2021).

Requirements for the methodology of building a mechanism, taking into account the tasks of managing the bank's liquidity.

The task of managing the bank's liquidity can be formulated as follows: the ability to fulfill its obligations to depositors and creditors promptly and without losses. Taking into account this definition, as well as the recommendations of Western sources, the banking procedure for managing liquidity must meet the following requirements.

- take into account the flow of payments for all types of assets/liabilities of the bank's off-balance-sheet liabilities;
- carry out continuous, daily analysis and control over the state of liquidity;
- take into account the dynamics of data from previous periods when building forecasts of future events;
- rely on several options for the development of events in the future (scenario modeling);
- To be a management reporting tool for the bank's management to make decisions on attracting and placing funds and determining the bank's interest rate policy.

The stated requirements for the liquidity management mechanism allow, on the one hand, to analyze the current situation and make operational management decisions, on the other hand, to forecast the state of the bank's liquidity under various scenarios.

Mechanism characteristics

- The mechanism for assessing and forecasting the bank's solvency. Visual presentation of data. As mentioned previously, at present, most researchers of the problem of bank liquidity tend to use the forecast of cash flows (payment calendar) as the main instrument of liquidity management, providing the most reliable and objective forecast of the state of the bank's liquidity. The main rationale for choosing this form of liquidity analysis for us is the very goal of managing the bank's liquidity, defined as the ability to fulfill its obligations to depositors and creditors promptly and without losses (Diamond & Kashyap, 2016; Chadha & Corrado, 2012).
- Forecast period. We propose to use the liquidity forecast for the year ahead as the optimal forecast range. The reasons for choosing such a forecast period are as follows. On the one hand, the forecast period should provide a fairly free look into the future and end "not tomorrow", on the other hand, if the forecast is too long (for example, from a year to 3 years and further), the probability of forecast errors increases (Zhang et al., 2020; Yasa et al., 2020).
- Discreteness of the forecast. In general, the discreteness of the analysis and forecast of liquidity should depend on the goals set. In the case of instant liquidity management, a daily liquidity forecast is required.

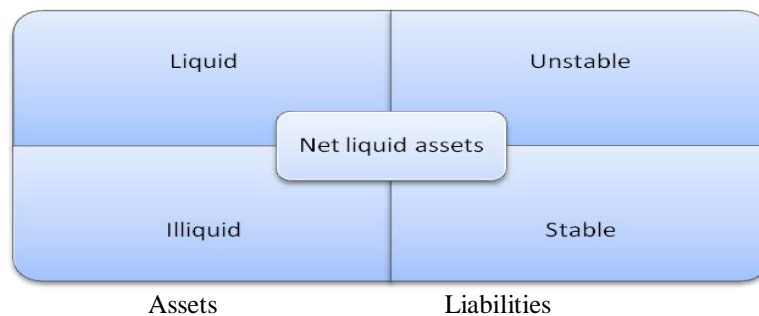


Figure 1. Bank balance sheet liquidity model

Having analyzed two options for organizational substructures for managing liquidity in a bank, we will highlight their advantages and disadvantages.

- The disadvantages of the first variant of the organizational substructure (organic type) are: lack of clear interaction between the departments of the bank, the results of which are highly dependent on each other; the imposition of vertical and horizontal ties undermines the principle of one-man management; the emergence of a frequent need to destroy departments and retrain employees in connection with a change in the liquidity management strategy; a large number of communication channels and decision-making centers; difficult psychological climate in the team. Such a substructure is forced for banks with a small number of staff, which does not allow the creation of a special department for liquidity management. As a result, almost all of the bank's specialists have to carry out certain functions of liquidity management. The advantages of the first option include: a small number of specialists, their close interaction, a small volume of operations, which allows making decisions as quickly as possible; the type of management is polycentric, that is, there is no clear hierarchy of power and the self-organization of the structure is increasing: the initiative of workers is growing, there is an opportunity to influence the adoption of managerial decisions; informal and indirect connections prevail.
- The substructure of the hierarchical type (option 2) guarantees the following advantages: a clear division of responsibilities and decisions of specialists by level allows to increase the quality and speed of making managerial decisions; monocentric type of leadership, rationally designed substructure; the predominance of formal ties. The disadvantages of the second option include the fact that the increased hierarchy of the structure leads to a decrease in the efficiency of making managerial decisions, frequent duplication of functions, an unnecessary increase in the working operations of employees of the bank's credit and deposit services; within departments, there are tendencies towards "shortening of goals"; because of the increase in the management staff, the bank's overhead costs are growing.

You can get rid of the lack of duplication of functions by using the method of creative management - functional cost analysis (FCA): make a table of functions by position and department; divide functions into main and auxiliary; build a matrix of functions, perform their ranking; select the first list of undesirable effects (often duplicated functions and consequences), build a graph of the costs of carrying out functions from the list of undesirable effects; draw up a diagnostic table (according to the levels of well-being and anxiety), highlight the second list of undesirable effects; choose the most unfavorable (costly) function and get rid of it or transfer it to another performer. To reduce the impact on the bank of an unstable external environment and the influence of negative factors, it is necessary to consider the bank's liquidity management in terms of identifying alternative scenarios for the development of events and searching for various options for management decisions aimed at reducing the liquidity risk and eliminating the deficit in the liquidity position of the bank's balance sheet.

Discussion

Based on the results of research on the digital economy, it can be divided into four groups depending on the level of development. The first group includes the United Kingdom, Japan, Singapore, and Hong Kong, where the digital economy is one of the fastest-growing sectors. The second group - Australia, South Korea, Western European countries, where the digital economy has reached a very high peak, but in recent years the level of innovation has been declining. The third group includes Russia, China, and India, which are expected to take the lead in the future. The fourth group includes the countries of Africa, South America, and the CIS, including the Republic of Uzbekistan, where the participation of the digital economy in the economy of these countries is insignificant and the level of development is very low (Kasprerskaya)

Table 1
The share of the digital economy in the G20 countries in the country's GDP
(as a percentage)

G20 countries	2010 y	2015y	2016 y	2017y
China	5,5	6,6	6,9	30,0
United Kingdom	8,3	11,2	12,4	15,0
South Korea	7,3	7,8	8	12,0

Eroittifq	3,8	5,4	5,7	7,8
India	4,1	5,2	5,6	7,6
United States	4,7	5,2	5,4	7,4
Japan	4,7	5,0	5,6	6,9
Germany	3	3,7	4	6,3
France	2,9	3,1	3,4	5,7
Mexico	2,5	3,8	4,2	5,2
Judge Arabia	2,2	3,3	3,8	4,6
Italy	2,1	3,3	3,5	4,5
Australia	3,3	3,5	3,7	4,4
Canada	3	3,4	3,6	4,4
Argentina	2	3,0	3,3	4,1
Russia	1,9	2,6	2,8	3,0
JAR	1,9	2,3	2,5	2,9
Brazil	2,2	2,2	2,4	2,8
Turkey	1,7	2,0	2,3	2,8
Indonesia	1,3	1,4	1,5	2,4

According to the table above, China is currently the fastest-growing digital economy among the G20 countries. At the end of 2017, compared to 2016, the share of the digital economy in the country's GDP increased by 23.1%.

The main reason for this is the rapid development of cryptocurrency and mining companies in the country. Among the G20 countries, the UK's share of the digital economy in the country's gross domestic product rises from 12.4 percent in 2016 to 15.0 percent in 2017, up 2.6 percentage points. Among the G20 countries, South Korea, like China, is one of the fastest-growing digital economies. In 2017, the share of the digital economy in the country's GDP grew by 4.0 percentage points compared to 2016. In contrast to the above, the regulation and control of liquidity of commercial banks are carried out by the Central Bank in several developed countries, and a special subdivision or independent regulators established within it. In particular, the function of regulating and supervising the activities of banks is divided into two into the United States, France, Germany, Japan, and other countries. Canadian and Swiss regulators operate separately from the Central Bank.

Table 2
Models of foreign practice of liquidity regulation and control of commercial banks

Module name	Procedure of implementation	Supervising institution
<i>German model</i>	The special supervisory body deals only with the regulation and supervision of the activities of banks	Federal Financial Supervision Agency (BAFin) in Germany
<i>The British model</i>	Megoregulators regulate and control the activities of various financial sectors (insurance companies, banking institutions, stock markets).	An independent department that oversees the activities of banks
<i>American model</i>	The regulation and supervision of the bank's activities is based on the principle of purpose, not functionality.	Federal Reserve System Deposit Insurance Federal Corporation

As a result of the study, the regulation of liquidity of commercial banks is carried out in each country, taking into account several socio-economic conditions and conditions. It is not possible to study and research them within a single study, so it would be expedient to identify their positive or negative aspects by grouping them into separate models. Accordingly, in foreign practice, it is expedient to group the regulation of liquidity of commercial banks like

the German model, the British model, and the American (Saxon) model. We will look at their pros and cons using the table above.

Conclusion

In short, the article carried out to research and analyze the problem of creating a liquidity management mechanism allows us to make the following conclusion.

- The analysis of various models of liquidity management is carried out and on its basis, the author's form of dynamic modeling of the bank's liquidity is proposed.
- A mathematical apparatus has been proposed and tested on practical data, which makes it possible to obtain an objective assessment of the future state of the bank's liquidity. The work showed that the future state of the bank's liabilities (as well as the bank's cash flows) lends itself to an objective forecast obtained using econometric models based on the analysis of historical bank data. The use of such a forecast should be the basis for constructing a cash flow forecast (respectively, a liquidity management mechanism in a bank).

It should be noted, however, that the result of the application of the liquidity management mechanism proposed in the work cannot be a one hundred percent true solution to optimize the bank's activities and minimize liquidity management risks. On the one hand, this is because the forecast of future cash flows of the bank is built with a certain probability; therefore, with an increase in the time horizon, the reliability of the solution results in decreases. Another aspect is the specificity of the developed countries' economy and the undetected dependence of the time series of the bank's liabilities on macroeconomic indicators (in particular, on oil prices), as well as possible seasonal and cyclical dependencies. In this regard, in the process of applying based on developed countries bank, the results of the proposed mechanism should be constantly analyzed taking into account the emergence of new internal and external factors and the possibilities of using other financial analysis tools.

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