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revista de ciencias sociales
ISSN 1696-7348

# Structural and risk-oriented determinants of the liquidity coverage ratio in the mechanism for ensuring the stability of the banking system of Ukraine

*Determinantes estruturais e orientados para o risco do índice de cobertura de liquidez no mecanismo para garantir a estabilidade do sistema bancário da Ucrânia*

*Factores estructurales y relacionados con el riesgo que determinan el coeficiente de cobertura de liquidez en el mecanismo para garantizar la estabilidad del sistema bancario de Ucrania*

**Mykola Dziamulych**
Ph.D. in Economics
Lutsk National Technical University, Ukraine

**Mykhailo Krupka**
Ph.D. in Economics
Ivan Franko National University of Lviv, Ukraine

**Halyna Markiv**
Ph.D. in Economics
Stepan Gzhytskyi Lviv National University of Veterinary Medicine and Biotechnologies, Ukraine

**Nataliia Chyzh**
Ph.D. in Economics
Lutsk National Technical University, Ukraine

**Rostyslav Martyniuk**
Ph.D. in Economics
Lesya Ukrainka Volyn National University, Ukraine

**Andriy Kotur**
Ph.D. candidate in Economics
Ivan Franko National University of Lviv, Ukraine

**Received in:** 13/03/2026
**Acepted in:** 29/05/2026
DOI: 10.23900/ra.Ed.Esp.v24i113.983

**Citation format:**
Dziamulych, M., Krupka, M., Markiv, H., Chyzh, N., Martyniuk, R., & Kotur, A. (2026). Structural and risk-oriented determinants of the liquidity coverage ratio in the mechanism for ensuring the stability of the banking system of Ukraine. *Aposta: Revista De Ciencias Sociales*, *24*(113), e983. https://doi.org/10.23900/ra.Ed.Esp.v24i113.983

## Abstract
The purpose of this study is to develop a dynamic econometric model for assessing the impact of structural, risk-oriented, and monetary factors on the formation of the Liquidity Coverage Ratio of the banking system of Ukraine under conditions of transformational shocks and structural restructuring of the financial sector. The main findings indicate that the level of the LCR is shaped by the configuration of the resource base, the structure of assets, the quality of the loan portfolio, the degree of capitalization, and the parameters of monetary policy. The principal conclusions suggest that the stability of the banking system is determined not by the mere maximization of liquidity per

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se, but by the structural optimization of balance sheet parameters within a controlled risk environment.

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**Keywords**
Liquidity Coverage Ratio, Liquidity, Liquidity Standards, Financial Stability, Monetary Policy, Risk-Oriented Factors.

**Resumo**
O objetivo deste estudo é desenvolver um modelo econométrico dinâmico para avaliar o impacto de fatores estruturais, orientados ao risco e monetários na formação do Índice de Cobertura de Liquidez do sistema bancário da Ucrânia em condições de choques transformacionais e reestruturação estrutural do setor financeiro. Os principais resultados indicam que o nível do LCR é determinado pela configuração da base de recursos, pela estrutura dos ativos, pela qualidade da carteira de empréstimos, pelo grau de capitalização e pelos parâmetros da política monetária. As principais conclusões sugerem que a estabilidade do sistema bancário é determinada não pela mera maximização da liquidez em si, mas pela otimização estrutural dos parâmetros do balanço patrimonial dentro de um ambiente de risco controlado.
**Palavras-chave**
Índice de Cobertura de Liquidez, Liquidez, Padrões de Liquidez, Estabilidade Financeira, Política Monetária, Fatores Orientados para o Risco.

**Resumen**
El objetivo de este estudio es desarrollar un modelo econométrico dinámico para evaluar el impacto de los factores estructurales, orientados al riesgo y monetarios en la formación del coeficiente de cobertura de liquidez del sistema bancario de Ucrania en un contexto de perturbaciones transformadoras y reestructuración estructural del sector financiero. Los principales resultados indican que el nivel del LCR viene determinado por la configuración de la base de recursos, la estructura de los activos, la calidad de la cartera de préstamos, el grado de capitalización y los parámetros de la política monetaria. Las conclusiones principales sugieren que la estabilidad del sistema bancario no viene determinada por la mera maximización de la liquidez en sí misma, sino por la optimización estructural de los parámetros del balance en un entorno de riesgo controlado.
**Palabras clave**
Ratio de Cobertura de Liquidez, Liquidez, Normas de Liquidez, Estabilidad Financiera, Política Monetaria, Factores Orientados al riesgo.

## 1. Introduction

Ensuring the stability of the banking system of Ukraine under current conditions characterized by the wartime transformation of the entire economic system and the structural reconfiguration of financial flows necessitates an in-depth analysis of the mechanisms underlying the formation of systemic liquidity. In this context, the Liquidity Coverage Ratio (LCR), serving as a key indicator of banks' short-term solvency, acquires not only regulatory relevance but also strategic significance for the banking system as a whole. This ratio most reliably reflects the capacity of the banking sector to withstand liquidity shocks associated with changes in monetary conditions, the structure of assets, and the quality of the loan portfolio. At the same time, the dynamics of the LCR in recent years

indicate a complex functional interaction between structural and risk-oriented factors that cannot be adequately explained solely by regulatory requirements or isolated financial indicators.

Under these conditions, the Liquidity Coverage Ratio ceases to be merely a technical regulatory benchmark and transforms into a systemic indicator of financial equilibrium within the banking sector. Its level reflects both the volume of high-quality liquid assets and the pattern of resource reallocation between government securities, lending operations, and the deposit base. Therefore, the analysis of the LCR requires consideration of the interdependence between structural shifts in banks' balance sheets and changes in their risk profiles.

The research problem lies in the absence of a comprehensive framework for identifying the determinants of the LCR at the level of the entire banking system, taking into account the inertia of this indicator and the specific factors influencing its dynamics. At the same time, the nature of liquidity implies that its reliability can be properly assessed only within a short-term horizon. The relationship between the structural reorientation of banks' assets and the resilience of their liquidity positions under heightened risk conditions also remains insufficiently explored. All these considerations determine the relevance of developing an analytical model capable of integrating structural and risk parameters into a coherent system for liquidity assessment, thereby substantiating directions for enhancing the macro-level stability of the banking system of Ukraine during periods of systemic wartime shocks.

## 2. Literature Review

Contemporary research on ensuring banking system liquidity considers the Liquidity Coverage Ratio (LCR) as a key instrument of macroprudential regulation. In particular, Aldasoro and Faia (2016) and Heuver and Berndsen (2022) demonstrate that the LCR affects systemic feedback mechanisms within the financial network and may generate channels for either the propagation or containment of shocks. In turn, Papadamou *et al*. (2021) and Schmitz (2013) argue that the implementation of Basel III standards at the systemic level alters the interaction between liquidity and monetary policy. At the same time, Bianchi and Bigio (2022) provide a theoretical justification for the role of liquidity management within the monetary transmission mechanism. Attention should also be drawn to the study by Li *et al*. (2017), which identifies the impact of the LCR on money supply formation processes. Moreover, Cetina and Gleason (2015) highlight the complexity of measuring this indicator, which constrains the analysis of liquidity dynamics in real time.

The interaction between liquidity, capital, and risk is examined in the works of Jordà *et al*. (2021), Oino (2021), and Arif and Anees (2012), who demonstrate that bank resilience is shaped

through the combination of liquidity and credit parameters. Furthermore, Bonner and Eijffinger (2016), as well as Bucher *et al*. (2019), show that liquidity regulatory requirements transform the structure of bank balance sheets and exert a significant influence on commercial banks' credit supply. It is also important to note that Acharya and Ryan (2016) emphasize the particular importance of reporting transparency for systemic stability. Meanwhile, Thakor and Edison (2024) consider liquidity creation as a function of banks' funding structure.

In the regional and Ukrainian context, the works of Cherchyk *et al*. (2020), Druhov and Druhova (2022) and Kravchuk (2023) analyze the transformation processes of the banking system under the influence of internal and external shocks. Shubalyi (2008), Savluk and Zhurakhovska (2025) address this issue in terms of ensuring banking system resilience under wartime shocks. At the same time, Yehorycheva and Vovchenko (2020) substantiate the need for systemic monitoring of banks' financial stability through the integration of liquidity, capitalization, and asset risk indicators, emphasizing the role of regulatory metrics in the timely detection of macro-financial imbalances in Ukraine. In addition, Mozhovyi and Pavliuk (2020) and Novak *et al*. (2025) develop the theoretical foundations of risk-oriented supervision, directly linked to the interpretation of the LCR as an indicator of systemic resilience. Consideration should also be given to the issue of structural shifts and investment reallocation of assets, examined in the works of Antoniuk *et al*. (2025), Rudenko *et al*. (2023), and Shmatkovska *et al*. (2022), which enables a broader interpretation of balance sheet transformations as liquidity-related factors.

Nevertheless, the academic literature lacks a comprehensive study that integrates structural and risk-oriented determinants of LCR formation within a dynamic econometric framework at the level of the entire banking system of Ukraine.

## 3. Materials and Methods

The empirical basis of the study consists of official statistical data from the National Bank of Ukraine for the period 2023–2026, ensuring the representativeness of the analyzed indicators in a dynamic perspective. The use of aggregated system-level data made it possible to assess the impact of determinants at the level of the entire banking system, minimizing distortions associated with the individual characteristics of specific institutions.

The Liquidity Coverage Ratio is defined in accordance with the Basel III standard as:

$$LCR = \frac{HQLA}{NCA} \times 100\%, \qquad (1)$$

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where:

HQLA denotes the stock of high-quality liquid assets;

NCO represents net cash outflows expected over a 30-day stress period.

To evaluate the impact of various factors on the LCR, a dynamic ARX (Autoregressive with Exogenous Variables) model was applied:

$$LCR_t = \alpha + \beta_1 x_{1_t} + \beta_2 x_{2_t} + \cdots + \beta_k x_k + \varphi LCR_{t-1} + \varepsilon_t, \qquad (2)$$

Where:

$x_k$ is the vector of structural and risk-oriented variables;

$\varphi$ is the inertia coefficient;

$\varepsilon_t$ is the error term.

Parameter estimation was carried out using the ordinary least squares method:

$$\beta = (x'x)^{-1}x'y \qquad (3)$$

Model adequacy was evaluated using the coefficient of determination:

$$R^2 = 1 - \left(\frac{\sum e_t^2}{\sum (y_t - \bar{y})^2}\right), \qquad (4)$$

as well as the adjusted coefficient of determination:

$$Adj\ R^2 = 1 - \left[\frac{(1-R^2)(n-1)}{(n-k-1)}\right] \qquad (4)$$

The overall statistical significance of the model was tested using the Fisher F-statistic:

$$F = \frac{R^2/k}{(1-R^2)/(n-k-1)} \qquad (5)$$

The significance of individual parameters was assessed using the Student's t-statistic:

$$t = \frac{\beta}{SE(\beta)} \qquad (6)$$

To analyze the relationships among variables, a Pearson pairwise correlation matrix was constructed:

$$r_{xy} = \frac{\sum((x_i - \bar{x})(y_i - \bar{y}))}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}} \qquad (7)$$

Forecasting was performed through recursive application of the estimated equation, taking into account the lagged dependent variable, formally expressed as:

$$\widehat{LCR_{t+1}} = \alpha + \sum_{i=1}^{k} \hat{\beta}_i x_{i,t+1} + \hat{\varphi} LCR_t \qquad (8)$$

For multi-step forecasting, the equation is specified as:

$$\widehat{LCR_{t+h}} = \hat{\alpha} + \sum_{i=1}^{k} \hat{\beta}_i x_{i,t+h} + \hat{\varphi} \widehat{LCR}_{t+h-1}, \qquad (9)$$

where:

$\widehat{LCR}_{t+h-1}$ denotes the forecasted value of the previous period, substituted into the model in place of the actual observation.

Under the assumption of fixed exogenous variables, the long-run stationary value is determined as:

$$LCR^* = \frac{\alpha + \sum_{i=1}^{k} \widehat{\beta_i} \bar{x}_i}{1 - \varphi} \qquad (10)$$

This approach made it possible to estimate the equilibrium level of liquidity under stable parameters of the factor environment.

The applied methodological framework enabled the integration of structural, risk-oriented, and monetary factors into a unified system for evaluating the mechanism of LCR formation and ensuring the stability of the banking system of Ukraine.

## 4. Results

Under current conditions of heightened macro-financial uncertainty, ensuring the stability of the banking system of Ukraine directly depends on the nature of its liquidity position formation. Particular importance is therefore attached to specific factors that exert a direct influence on the formation of the Liquidity Coverage Ratio at the level of the entire banking system. From a practical perspective, these factors can be divided into two functional groups: structural and risk-oriented. Structural determinants of the LCR reflect the configuration of banks' assets and liabilities, determining their capacity to transform available resources into high-quality liquid instruments without undermining financial equilibrium. In contrast, risk-oriented factors characterize asset quality and the level of potential losses that shape commercial banks' demand for liquidity buffers. However, only the synergy between structural balance and controlled risk exposure can ensure an adequate level of banks' adaptability to external shocks and support the continuity of their obligations (Cetina and Gleason, 2015). Accordingly, the integration of these determinants into the liquidity management framework forms the foundation of systemic resilience in the banking sector.

It should be emphasized that the significance of structural determinants of the Liquidity Coverage Ratio lies in their role in shaping the architecture of the banking system's balance sheet and the ratio between liquid and long-term assets. Unlike short-term market fluctuations, structural parameters are relatively persistent and reflect the strategic behavior model of banks. In the context of implementing new liquidity standards, the complementary Net Stable Funding Ratio (NSFR) indeed enables commercial banks to reduce long-term funding risk by reorienting their operations toward more stable sources of financing. This underscores that the structural configuration of funding sources and ass*et al*location forms the basis of long-term liquidity and systemic stability. Since the structure of the deposit base, the share of government securities, and the scale of lending activity determine banks' ability to maintain the required volume of high-quality liquid assets without compromising profitability and financial balance, it is appropriate to examine the dynamics of these indicators in the banking system of Ukraine in recent years (Figure 1).

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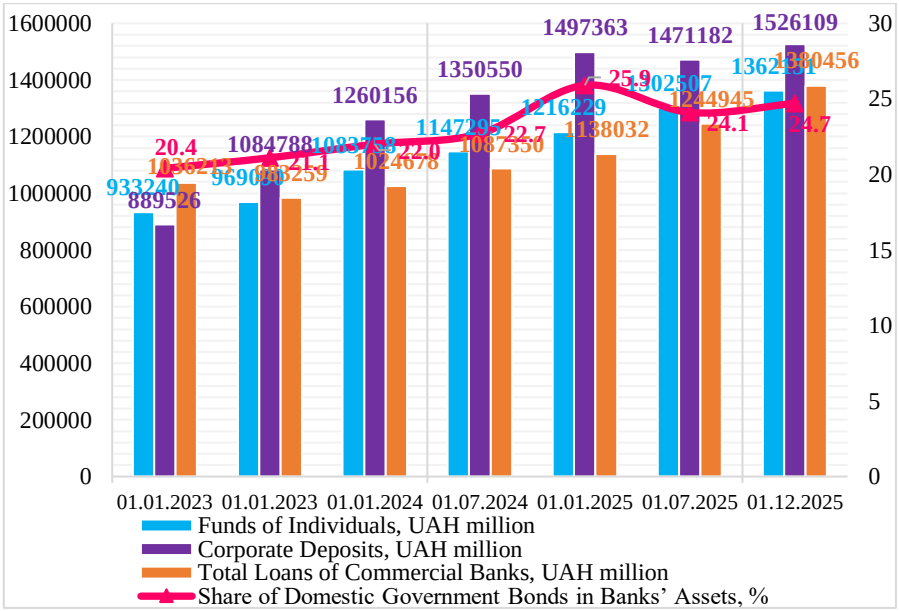
**Figure 1**

*Dynamics of structural determinants influencing the Liquidity Coverage Ratio of the banking system of Ukraine in 2023–2025.*




*Source:* compiled by the author based on (National Bank of Ukraine, 2025).

The presented dynamics of structural determinants indicate that, within the mechanism for ensuring the stability of the banking system of Ukraine, the key factor is not the mere increase or decrease of individual indicators, but rather the transformation of their relative proportions. The evolution of the analyzed variables demonstrates a gradual reconfiguration of the funding base and asset structure, as the simultaneous expansion of the deposit segment and lending activity occurs against the backdrop of a significant share of government securities in total assets. This structural combination reflects a reorientation of the banking sector toward a model in which liquidity is formed not only through the volume of high-quality liquid assets but also through the balanced composition of funding sources.

In particular, the growing share of government bonds combined with the expansion of deposits produces a dual effect. On the one hand, the HQLA buffer is strengthened, directly affecting the numerator of the LCR. On the other hand, the increase in corporate liabilities potentially raises the volume of expected cash outflows, thereby altering the liquidity risk profile.

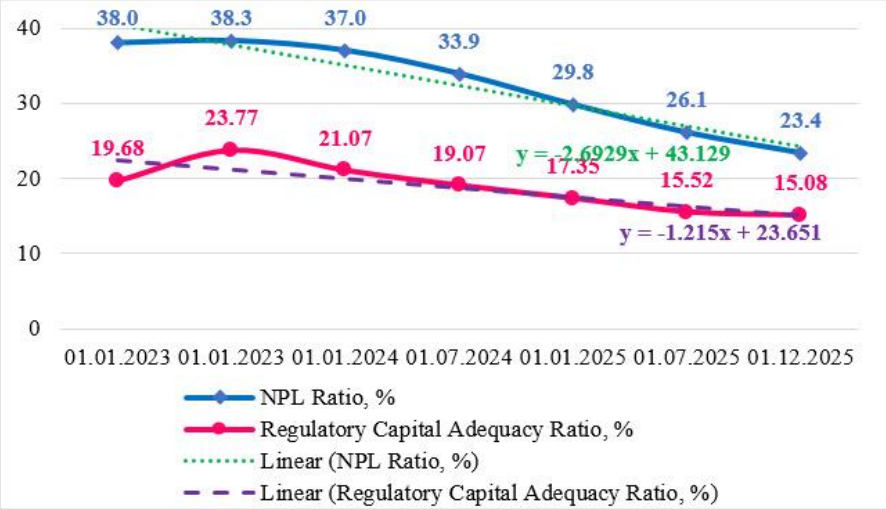
It is also important to note that the loan portfolio of commercial banks expanded in parallel with the deposit base during the analyzed period, indicating the preservation of the financial intermediation function even amid structural restructuring of the banking system. Thus, the analysis reflects not a static liquidity position but a process of establishing structural equilibrium between

asset allocation and the nature of liabilities. This confirms that structural determinants define the boundaries of the system's liquidity flexibility and form the foundation of banking sector resilience under heightened risk conditions.

With regard to risk-oriented determinants, they constitute the qualitative basis of the banking system's liquidity position, as they reflect the level of credit risk and the adequacy of capital buffers to absorb potential losses. Therefore, integrating these parameters into the LCR management framework ensures not only formal compliance with regulatory requirements but also contributes to maintaining systemic resilience in conditions of elevated uncertainty. Accordingly, the dynamics of selected risk-oriented determinants affecting the LCR of the banking system are presented below (Figure 2).

**Figure 2**

*Dynamics of structural determinants influencing the Liquidity Coverage Ratio of the banking system of Ukraine in 2023–2025.*




*Source:* compiled by the author based on (National Bank of Ukraine, 2025)

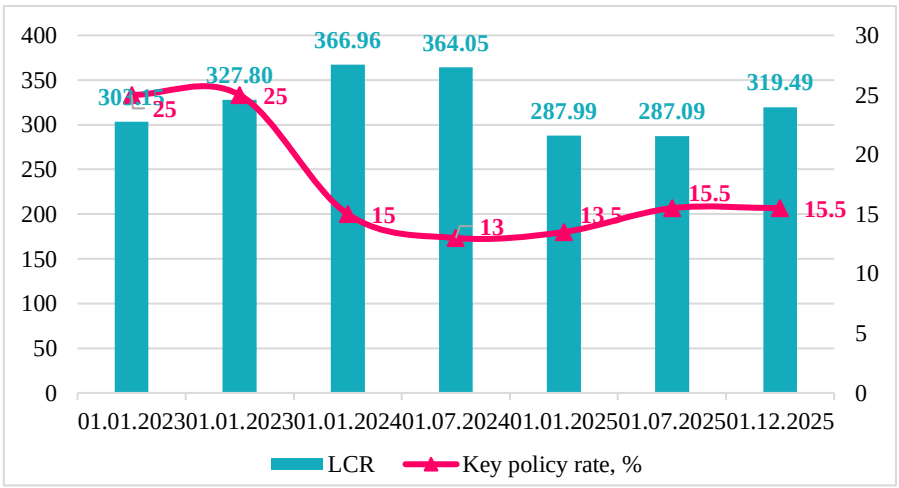
The dynamics of risk-oriented determinants indicate that the linear trend for the non-performing loans ratio (NPL) is described by the equation y = –2.6929x + 43.129, which reflects a systemic decline in credit risk at an average rate of approximately 2.7% over the observation period. The negative slope signifies a gradual normalization of asset quality, thereby reducing potential pressure on liquidity buffers and diminishing the need for additional provisioning. At the same time, the trend of the regulatory capital adequacy ratio (y = –1.215x + 23.651) demonstrates a more moderate downward trajectory—approximately 1.2% over the period—indicating the preservation of a relatively stable capitalization level despite structural transformations in banks' balance sheets.

A comparative analysis of the slope coefficients shows that the rate of decline in credit risk exceeds the pace of change in the capital buffer, generating a favorable effect for liquidity resilience. Thus, the overall trajectory of the analyzed trends suggests a reduction in the risk burden on the LCR and confirms that improvements in asset quality constitute an important factor in sustaining the systemic stability of the banking system of Ukraine.

Finally, it should be noted that the key monetary determinant of the Liquidity Coverage Ratio is the policy rate of the National Bank of Ukraine, as the interest rate transmission channel directly affects funding costs and the structure of banks' balance sheet positions. Changes in the policy rate modify incentives either to accumulate high-quality liquid assets or to transform them into credit instruments, thereby indirectly influencing both the numerator and the denominator of the LCR. Since monetary policy defines the boundaries of liquidity flexibility and shapes the macro-financial conditions for maintaining banking system stability, it is appropriate to examine its evolution during the analyzed period together with the dynamics of the LCR itself (Figure 3).

**Figure 3**

*Dynamics of the LCR of the banking system of Ukraine and the policy rate of the National Bank of Ukraine in 2023–2025.*




*Source:* compiled by the author based on (National Bank of Ukraine, 2025)

Figure 3 indicates that, while the key policy rate remained elevated at 25%, the LCR fluctuated within the range of 303–328%. The subsequent normalization of monetary conditions (a reduction to 15–13%) was accompanied by an increase in the LCR to 366.96%, reflecting banks' adaptation to changes in the interest rate environment. At the same time, the stabilization of the policy rate at 15–

15.5% correlates with the alignment of the LCR within the range of 287–319%, suggesting the formation of a new equilibrium between funding costs and the structure of liquid assets.

Thus, the numerical parameters confirm that monetary policy acts as a trigger for the reallocation of commercial banks' resources; however, the ultimate level of the LCR is determined by a combination of structural and risk-oriented factors that collectively shape the mechanism of banking system resilience.

To identify the impact of individual determinants on the Liquidity Coverage Ratio of the banking sector of Ukraine, a correlation and regression analysis was conducted to detect and quantitatively interpret the relevant relationships. The variables employed in the model correspond to the LCR determinants discussed above (Table 1).

**Table 1**

*Dynamics of the analyzed indicators for constructing the correlation and regression model of factors influencing the LCR of the banking system of Ukraine in 2023–2025.*

| Date | LCR, % (y) | Policy rate, % ($x_1$) | Funds of business entities, UAH million ($x_2$) | Share of domestic government bonds in banks' assets, % ($x_3$) | Share of non-performing loans, % ($x_4$) | Regulatory capital adequacy ratio ($x_5$) |
|---|---|---|---|---|---|---|
| 01.01.2023 | 303.15 | 25 | 889526 | 20.4 | 38 | 19.68 |
| 01.02.2023 | 366.35 | 25 | 913321 | 21.1 | 37.9 | 19.84 |
| 01.03.2023 | 404.77 | 25 | 935459 | 21.8 | 37.9 | 20.34 |
| 01.04.2023 | 352.41 | 25 | 978917 | 22 | 38.1 | 20.8 |
| 01.05.2023 | 341.39 | 25 | 1019522 | 21.2 | 38.4 | 20.95 |
| 01.06.2023 | 324.11 | 25 | 1056623 | 21.7 | 38.9 | 22.8 |
| 01.07.2023 | 327.8 | 25 | 1084788 | 21.1 | 38.3 | 23.77 |
| 01.08.2023 | 353.45 | 22 | 1123389 | 21.1 | 38.1 | 24.3 |
| 01.09.2023 | 361.51 | 22 | 1112592 | 21.1 | 37.9 | 24.94 |
| 01.10.2023 | 339.88 | 20 | 1101005 | 21.4 | 37.6 | 24.99 |
| 01.11.2023 | 369.37 | 16 | 1115385 | 22.1 | 37.5 | 25.31 |
| 01.12.2023 | 385.68 | 16 | 1142474 | 22.4 | 37.4 | 25.41 |
| 01.01.2024 | 366.96 | 15 | 1260156 | 22 | 37 | 21.07 |
| 01.02.2024 | 401.89 | 15 | 1243306 | 22.5 | 36.5 | 20.57 |
| 01.03.2024 | 371.51 | 15 | 1259628 | 22.6 | 36.1 | 19.98 |
| 01.04.2024 | 366.63 | 14.5 | 1296561 | 22.5 | 35.4 | 20.44 |
| 01.05.2024 | 380.75 | 13.5 | 1328148 | 22.9 | 34.8 | 18.38 |
| 01.06.2024 | 384.7 | 13 | 1339992 | 22.4 | 34.6 | 19.07 |
| 01.07.2024 | 364.05 | 13 | 1350550 | 22.7 | 33.9 | 19.07 |
| 01.08.2024 | 341.78 | 13 | 1366924 | 22.9 | 32.7 | 19.85 |
| 01.09.2024 | 354.98 | 13 | 1357214 | 23.1 | 32.3 | 19 |
| 01.10.2024 | 339.64 | 13 | 1342130 | 24.5 | 31.6 | 19 |
| 01.11.2024 | 331.65 | 13 | 1366734 | 25.5 | 30.8 | 20.62 |
| 01.12.2024 | 309.28 | 13 | 1369768 | 26.7 | 30.3 | 20.5 |
| 01.01.2025 | 287.99 | 13.5 | 1497363 | 25.9 | 29.8 | 17.35 |
| 01.02.2025 | 313.79 | 14.5 | 1437818 | 26 | 29.4 | 16.98 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 01.03.2025 | 302.51 | 14.5 | 1429464 | 25.1 | 29 | 16.91 |
| 01.04.2025 | 303.84 | 15.5 | 1461630 | 25.2 | 28.3 | 16.23 |
| 01.05.2025 | 319.13 | 15.5 | 1481319 | 24.4 | 27.6 | 14.49 |
| 01.06.2025 | 299.58 | 15.5 | 1459462 | 24.5 | 27 | 15.49 |
| 01.07.2025 | 287.09 | 15.5 | 1471182 | 24.1 | 26.1 | 15.52 |
| 01.08.2025 | 296.7 | 15.5 | 1459347 | 25 | 25.4 | 15.31 |
| 01.09.2025 | 337.54 | 15.5 | 1458389 | 25 | 25 | 15.02 |
| 01.10.2025 | 320.09 | 15.5 | 1478379 | 24.8 | 24.2 | 15.43 |
| 01.11.2025 | 314.03 | 15.5 | 1519974 | 24.9 | 23.7 | 15.26 |
| 01.12.2025 | 319.49 | 15.5 | 1526109 | 24.7 | 23.4 | 15.08 |

*Source:* (National Bank of Ukraine, 2025)

To account for the dynamic nature of liquidity formation and the inertia of financial indicators, it is necessary to include a lagged dependent variable in the model, namely the value of the Liquidity Coverage Ratio in the previous period. Accordingly, the baseline regression specification was extended to a dynamic ARX (autoregressive with exogenous variables) model, which substantially enhances the explanatory power of the model and adequately captures the temporal dependence of the LCR.

Based on the data presented in Table 1, a dynamic autoregressive model with a one-period lag of the LCR was estimated. The resulting equation is as follows:

$$LCRt = 1065.876 + 0.1918LCRt{-}1 - 7.5267X_1 - 0.0002357X_2 - 10.5766X_3 - 1.4875X_4 - 3.2318X_5 \quad (11)$$

The coefficient on the lagged LCR (0.1918) indicates moderate inertia: an increase in the LCR in the previous month by 1% is associated, on average, with a 0.19 percentage point increase in the current LCR, ceteris paribus. The parameter for the policy rate (–7.5267) suggests that a 1 percentage point increase in the rate is associated with an approximate 7.5 percentage point decrease in the LCR, implying that monetary tightening is statistically linked to weaker liquidity conditions in the banking system.

The estimate for funds of business entities (–0.0002357) indicates that an increase of UAH 1 billion is associated, on average, with a 0.236 percentage point decrease in the LCR. This value may reflect structural shifts over time and potential multicollinearity effects, as coefficients of trending variables may partially absorb each other's influence.

The coefficient for the share of domestic government bonds in assets (–10.5766) implies a 10.6 percentage point decrease in the LCR following a 1 percentage point increase in this share. This result may capture not the liquidity properties of government bonds per se, but rather asset and

liability reallocation during periods of shifting risk conditions and policy adjustments. The effects of the share of non-performing loans (–1.4875) and the regulatory capital adequacy ratio (–3.2318) appear statistically weaker in this specification; therefore, their interpretation as robust effects should be approached with caution.

Table 2 presents the main coefficient characteristics of the developed regression model describing the impact of explanatory variables on the LCR of the banking sector of Ukraine.

**Table 2**

*Coefficient characteristics of the ARX model of explanatory variables influencing the Liquidity Coverage Ratio of the banking sector of Ukraine (y).*

| Factor | Coefficient (B) | Standard error | t-statistic | p-value |
|---|---|---|---|---|
| LCR (y) | 1065.876 | 357.91 | 2.98 | 0.006 |
| $LCR_{t-1}$ | 0.1918 | 0.0868 | 2.21 | 0.035 |
| Policy rate ($x_1$) | −7.5267 | 2.17 | −3.47 | 0.002 |
| Funds of business entities ($x_2$) | −0.0002357 | 0.0000816 | −2.89 | 0.007 |
| Share of domestic government bonds in banks' assets ($x_3$) | −10.5766 | 4.01 | −2.64 | 0.013 |
| Share of non-performing loans ($x_4$) | −1.4875 | 1.23 | −1.21 | 0.235 |
| Regulatory capital adequacy ratio ($x_5$) | −3.2318 | 2.1 | −1.54 | 0.134 |

*Source:* own research

The main parameters of the developed ARX model assessing the impact of factors on the LCR indicate the following.

– The coefficient of determination $R^2 = 0.791$ demonstrates a high explanatory power of the model, as approximately 79% of the variation in the LCR is explained by the combined effect of the included determinants and the lagged value of the dependent variable. This confirms the adequacy of the selected specification for analyzing the dynamics of banking system liquidity.

– The adjusted coefficient of determination Adj. $R^2 = 0.746$ is close to the baseline $R^2$, indicating the absence of substantial model overfitting and the acceptable stability of the estimates, given the sample size and the number of explanatory variables.

– The Fisher F-statistic $F = 17.66$ with a significance level of $p = 2.36 \cdot 10^{-8}$ confirms the overall statistical significance of the model and allows rejection of the null hypothesis of no joint effect of the explanatory variables on the LCR. This result supports the econometric robustness of the estimated specification.

– The analysis of the Student's t-statistics shows that the lagged LCR, the policy rate, funds of business entities, and the share of domestic government bonds in assets are statistically significant at the 5% level (p-value < 0.05). The share of non-performing loans and the regulatory capital adequacy ratio appear statistically insignificant within this specification, suggesting a secondary role of these variables compared to monetary and structural-funding determinants in shaping liquidity dynamics.

In addition, the Pearson pairwise correlation matrix is presented below (Table 3).

**Table 3**

*Coefficient characteristics of the ARX model of explanatory variables influencing the Liquidity Coverage Ratio of the banking sector of Ukraine (y)*

| Indicators | LCR (y) | Policy rate ($x_1$) | Funds of business entities ($x_2$) | Share of domestic government bonds in banks' assets ($x_3$) | Share of non-performing loans ($x_4$) | Regulatory capital adequacy ratio ($x_5$) |
|---|---|---|---|---|---|---|
| LCR (y) | 1.000 | −0.679 | −0.585 | −0.675 | 0.815 | 0.110 |
| Policy rate ($x_1$) | −0.679 | 1.000 | 0.748 | 0.426 | −0.872 | 0.020 |
| Funds of business entities ($x_2$) | −0.585 | 0.748 | 1.000 | 0.871 | −0.960 | −0.612 |
| Share of domestic government bonds in banks' assets ($x_3$) | −0.675 | 0.426 | 0.871 | 1.000 | −0.923 | −0.503 |
| Share of non-performing loans ($x_4$) | 0.815 | −0.872 | −0.960 | −0.923 | 1.000 | 0.509 |
| Regulatory capital adequacy ratio ($x_5$) | 0.110 | 0.020 | −0.612 | −0.503 | 0.509 | 1.000 |

*Source:* own research

At the same time, it should be emphasized that the evaluation of the Pearson pairwise correlation matrix within the framework of the ARX model is auxiliary in nature and does not determine econometric validity. This is due to the fact that the analysis is based on time series data, for which high correlation coefficients may result from common trend dynamics rather than from direct causal relationships. Moreover, the ARX specification incorporates the lagged dependent variable, which substantially modifies the structure of conditional relationships among variables compared to simple pairwise correlation analysis. Accordingly, the multifactor regression model and the corresponding t- and F-statistics are of primary importance for assessing the impact of the explanatory variables, whereas the Pearson matrix serves only as a preliminary diagnostic tool for

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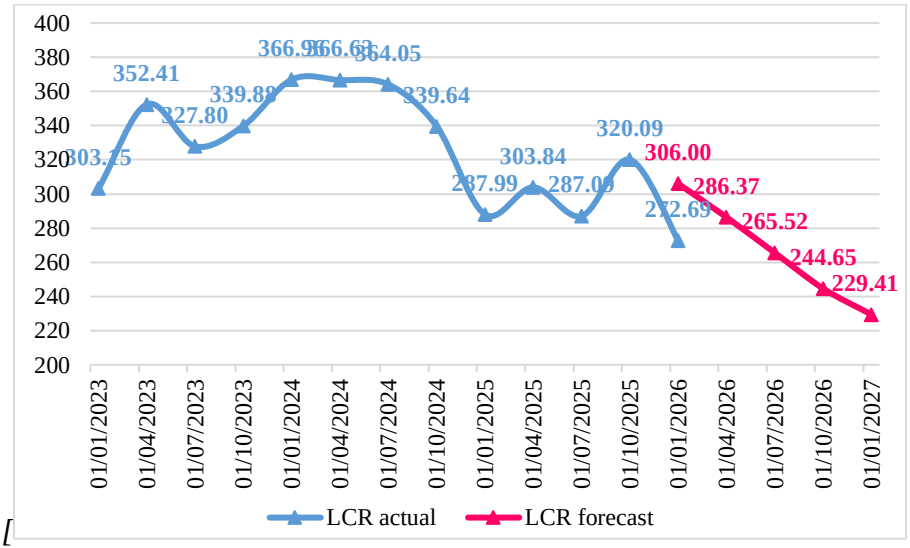
revista de ciencias sociales
ISSN 1696-7348

detecting potential multicollinearity. Given that the relevant statistical criteria remain within acceptable bounds, the developed ARX model can be considered econometrically robust.

Furthermore, based on the estimated correlation and regression relationship, a forecast of the LCR trajectory for the banking system of Ukraine through 2027 is conducted, taking into account the National Bank of Ukraine's announced gradual reduction of the policy rate (Figure 4).

**Figure 4**

*Forecast of changes in the Liquidity Coverage Ratio of the banking system of Ukraine through 2027, %*




*Source:* own research

The results of the forecasting model provide grounds to assert a gradual normalization of the Liquidity Coverage Ratio of the banking system of Ukraine in the medium term. The forecast curve, constructed on the basis of the dynamic regression relationship, indicates a decline in the LCR from actual values exceeding 300% in 2023–2025 to approximately 272.69% at the beginning of 2026 and a further decrease to about 229.41% in 2027. This corresponds to a reduction of nearly 70–80 percentage points over the forecast horizon, reflecting a transition of the banking system from the accumulation of excess liquidity toward a more balanced level.

It can be expected that the primary contribution to this dynamic will stem from the structural reallocation of assets and the gradual recovery of lending activity by commercial banks, leading to a reduced share of high-quality liquid assets in their balance sheets. At the same time, the decline in risk exposure and the stabilization of the deposit base are likely to moderate the pace of LCR reduction, preventing it from approaching the minimum regulatory threshold. Overall, the projected

trajectory reflects the evolutionary nature of the transformation of the banking sector's liquidity position and confirms that, even with a declining LCR, the system will retain a substantial resilience buffer in the medium term.

## 5. Discussion

The obtained results confirm that, under conditions of transformation of the banking system of Ukraine, the Liquidity Coverage Ratio serves as an integrated indicator of the interaction between structural, risk, and monetary parameters. The estimated ARX model demonstrates that the inertia of the LCR is combined with a significant influence of the policy rate, the corporate funding base, and the share of government securities in assets. These findings are consistent with international research emphasizing the role of liquidity as an element of macroprudential regulation; however, they also reveal the specificity of the Ukrainian context, where the structural reorientation of assets triggered by wartime shocks substantially modifies conventional relationships. In particular, the negative relationship between monetary conditions and the LCR indicates that the tight interest rate policy of the National Bank not only affects funding costs but also functionally reshapes the balance between lending and the accumulation of high-quality liquid assets by banks.

The forecast estimates point to an evolutionary transition from excess liquidity toward a more balanced level, correlating with the normalization of monetary policy. This implies that, in the medium term, the resilience of the banking system will be determined not by the maximization of liquidity buffers per se, but by the optimization of their structure in accordance with the risk profile of banking activities. Thus, the findings extend existing approaches to interpreting the LCR by proposing its consideration as a specific systemic indicator of structural equilibrium within the banking sector under conditions of wartime shocks and post-shock adaptation.

## 6. Conclusions

Thus, it can be concluded that the level of the LCR is determined not by isolated parameters, but by a set of interrelated structural and risk-oriented determinants, modified by monetary conditions. The dynamic econometric model confirms the inertial nature of banks' liquidity positions and demonstrates that changes in asset structure, the funding base, and loan portfolio quality exert a systemic influence on liquidity parameters within the banking system. It has been established that the structural reorientation of assets and the stabilization of the deposit base form the foundation of liquidity flexibility, while the level of credit risk and capitalization define the boundaries of the banking system's adaptation to external shocks. The results indicate a gradual transition of Ukrainian

commercial banks from the accumulation of excess liquidity toward a more balanced configuration, reflecting the evolutionary normalization of the financial environment. At the same time, the preservation of a substantial liquidity buffer provides sufficient room for maintaining macro-financial stability in the medium term.

The integration of structural and risk-oriented approaches within a dynamic LCR assessment framework makes it possible to interpret the LCR as a specific indicator of balance sheet equilibrium rather than merely a regulatory requirement of the National Bank of Ukraine. Such an approach may contribute to improving the effectiveness of monetary and macroprudential policy decisions aimed at strengthening the resilience of the Ukrainian banking sector in the face of transformational challenges.

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