TASHKENT STATE UNIVERSITY OF ECONOMICS

International journal of topics

INNOVATION SCIENCE AND TECHNOLOGY

Scopus || Electronic journal specializing in Scopus

ISSUE 1

Acceptance of papers **January, 2026**

Acceptance of papers

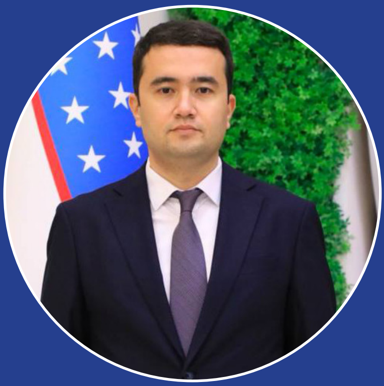
Published monthly

Topics

economics, technology, social sciences

ISSN 3060-5229

Electronic publication, Issue 1. 240 pages.
Approved for publication on January, 2026.



THE SCIENTIFIC-POPULAR ELECTRONIC JOURNAL **"INNOVATION SCIENCE AND TECHNOLOGY"** HAS BEEN REGISTERED UNDER THE NUMBER **C-5669633** BY THE AGENCY FOR INFORMATION AND MASS COMMUNICATIONS (AOKA) OF THE REPUBLIC OF UZBEKISTAN, EFFECTIVE FROM OCTOBER 9, 2024.

CONTACTS

Phone: **+998 50 737 87 88**

Website: https://ist-journal.uz

Email: innovationist2025@gmail.com

The scientific electronic journal “Innovation Science and Technology” has been included in the list of scientific publications recommended for the publication of main scientific results of dissertations for the award of PhD and DSc degrees in economics and technical sciences, in accordance with the Resolution No. 370 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan, dated May 8, 2025.

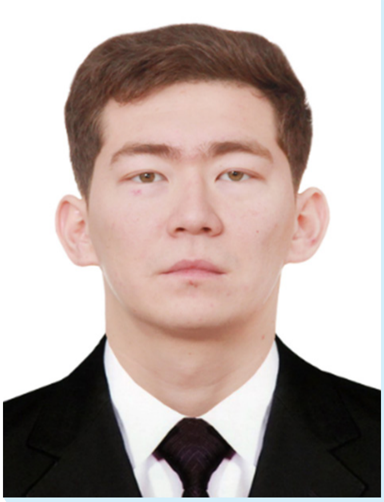
Editorial board:

CONTENTS

CONTENTS

CONTENTS

CONTENTS



MAIN WAYS TO DEVELOP INTEREST RATE RISK MANAGEMENT PRACTICES IN COMMERCIAL BANKS OF UZBEKISTAN

Seytnazarov Daniyar Baxadirovich
Independent researcher of the University of Innovative Technologies
Email: daniyarseytnazarov@gmail.com

Abstract: This article examines the current state of interest rate risk management in Uzbek commercial banks and ways to improve it. The issues of reducing the imbalance between banks' assets and liabilities in the context of global economic volatility and digital transformation of monetary policy are analyzed. During the study, modern methods of assessing interest rate risk (Gap analysis, Duration and Stress test) were considered, and practical recommendations were developed to ensure the financial stability of banks. In particular, the possibilities of automating the risk management system and using derivative instruments in the Uzbek banking system, based on international experience, were substantiated.

Key words: commercial banks, interest rate risk, asset and liability management (ALM), Gap analysis, Duration (duration), financial stability, Uzbek banking system, derivatives, stress test.

Annotatsiya: Mazkur maqolada O‘zbekiston tijorat banklarida foiz stavkasi riskini boshqarishning hozirgi holati va uni takomillashtirish yo‘llari tahlil qilinadi. Global iqtisodiy beqarorlik va pul-kredit siyosatining raqamli transformatsiyasi sharoitida banklar aktivlari va majburiyatlari o‘rtasidagi nomutanosiblikni kamaytirish bilan bog‘liq masalalar ko‘rib chiqilgan. Tadqiqot jarayonida foiz stavkasi riskini baholashning zamonaviy usullari — Gap tahlili, duration va stress-testlar tahlil qilinib, banklarning moliyaviy barqarorligini ta’minlashga qaratilgan amaliy tavsiyalar ishlab chiqildi. Xususan, xalqaro tajribaga tayangan holda, O‘zbekiston bank tizimida risklarni boshqarish tizimini avtomatlashtirish va derivativ moliyaviy instrumentlardan foydalanish imkoniyatlari asoslab berildi.

Kalit so‘zlar: tijorat banklari, foiz stavkasi riski, aktiv va majburiyatlarni boshqarish (ALM), Gap tahlili, duration, moliyaviy barqarorlik, O‘zbekiston bank tizimi, derivativlar, stress-test.

Аннотация: В статье рассматривается современное состояние управления процентным риском в коммерческих банках Узбекистана и пути его совершенствования. Проанализированы проблемы снижения дисбаланса между активами и обязательствами банков в условиях глобальной экономической нестабильности и цифровой трансформации денежно-кредитной политики. В ходе исследования были изучены современные методы оценки процентного риска, такие как Gap-анализ, дюрация и стресс-тестирование, а также разработаны практические рекомендации, направленные на обеспечение финансовой устойчивости банков. В частности, на основе международного опыта обоснованы возможности автоматизации системы риск-менеджмента и использования производных финансовых инструментов в банковской системе Узбекистана.

Ключевые слова: коммерческие банки, процентный риск, управление активами и обязательствами (ALM), Gap-анализ, дюрация, финансовая устойчивость, банковская система Узбекистана, деривативы, стресс-тест.

INTRODUCTION

Today, instability in world financial markets, volatility of the geopolitical situation, and transformations in the monetary policy of central banks of leading countries directly affect the activities of commercial banks. In particular, in the context of modernization of the economy of Uzbekistan and reform of the banking system, the imbalance of interest rates on the operations of banks’ assets and liabilities has made interest rate risk management one of the most pressing issues.

Implementation of the tasks set out in the Decree of the President of the Republic of Uzbekistan "On the Strategy for Reforming the Banking System of the Republic of Uzbekistan for 2020-2025" № DP-5992[1], privatization of banks and increasing their competitiveness directly require the introduction of a modern risk management system. During the transition to free market mechanisms, banks must protect themselves not only from credit risks, but also from possible losses from fluctuations in interest rates arising from market conditions.

The level of study of the problem. The theoretical and methodological foundations of interest rate risk management have been widely studied by foreign scientists, economists such as J. Sinki, F. Mishkin, P. Rose. Also, our domestic economists are conducting a lot of scientific work on bank risk management. However, the specific features of the Uzbek banking system - the presence of long-term preferential loans, the short-term nature of the resource base, and the fact that the money market is in the process of formation - require a reanalysis of this topic based on national conditions.

The purpose and objectives of the study. The main purpose of this study is to analyze the current state of interest rate risk management in commercial banks of Uzbekistan and develop scientific and practical proposals on promising ways of its development. To achieve this goal, the following tasks were set:

- To assess the causes of interest rate risk in commercial banks and its impact on the bank's net interest income;
- To analyze the effectiveness of Gap Analysis and Duration methods in asset and liability management;
- To forecast the impact of changes in market interest rates on the economic value of bank capital using econometric models;
- To substantiate the possibilities of using financial market instruments (derivatives) to hedge interest rate risk.

REVIEW OF LITERATURE ON THE SUBJECT

Interest rate risk is one of the main manifestations of market risks faced by commercial banks and has long been the focus of attention of economists.

In classical banking management theory, scholars such as Jurs Sinki and Peter Rose defined interest rate risk as a factor that negatively affects the bank's net interest income and the fair value of its capital. F. Mishkin in his research analyzed the impact of interest rate fluctuations on bank liquidity and investment attractiveness through the transmission mechanism.

In particular, J. Sinki emphasizes the importance of matching the term of assets and liabilities and the use of the duration model in managing interest rate risk in banks. In his opinion, banks should focus not only on current income, but also on protecting the long-term economic value of the bank.

The international methodological framework for regulating interest rate risk was developed by the Basel Committee on Banking Supervision (BCBS). The Committee's principles on "Interest Rate Risk in the Banking Book" (IRRBB) established standard measurement units for banks. These standards oblige banks to conduct not only traditional analyses, but also complex stress tests and scenario analyses when assessing interest rate risk.

Uzbek economists have also conducted significant research on bank risk management. For example, Sh. Abdullayeva analyzed the classification of bank risks and their assessment methodology based on the conditions of the national banking system. A. Omonov proposed mechanisms for taking into account interest rate sensitivity when developing asset and liability management strategies in commercial banks.

Also, N. Karimov and other researchers studied alternative ways of managing interest rate risk in the conditions of underdeveloped derivatives in the financial market, in particular, issues of diversifying the bank balance sheet.

The analysis of the literature shows that in developed countries, the derivatives market (swaps, options) is widely used to manage interest rate risk. However, in developing markets such as Uzbekistan, the lack of these instruments forces banks to look for new management methods. The existing literature has not yet sufficiently revealed the issue of optimizing the gap between long-term fixed-rate loans and short-term resources in Uzbekistan using digital technologies.

RESEARCH METHODOLOGY

The following set of methodological approaches was used to assess the stability of Uzbek commercial banks to changes in interest rates and improve the risk management mechanism:

As the empirical basis for the study, statistical data of the Central Bank of the Republic of Uzbekistan, annual financial statements (Audit reports) of commercial banks and open data on the state of assets and

1 https://lex.uz/docs/6972970

liabilities were taken. As a sample, the activities of large state-owned banks of systemic importance and private banks that are rapidly implementing digital transformation were studied.

Traditional and dynamic Gap Analysis were used to assess the impact of rate changes on the bank's interest income. In this case, the bank's assets and liabilities were grouped according to the interest rate repricing maturity:

This method determined the "interest rate sensitivity" of the bank. If the Gap is positive, an increase in interest rates is beneficial to the bank, and if it is negative, it is detrimental to the bank.

A multifactor regression analysis was conducted to determine the relationship between the net interest margin (NIM) of commercial banks and external economic factors (Central Bank key rate, inflation rate, interbank deposit rates).

Pairwise correlation: To determine the direct relationship between the key rate and lending rates.

Coefficient of determination (R^2): Used to check the suitability (reality) of the developed model to banking practice.

A computer model was used to study the impact of unexpected (shock) changes in interest rates (for example, a change in the key rate by +/- 2-5 percentage points) on bank liquidity and profits based on "What-if analysis" scenarios.

ANALYSIS AND RESULTS

As part of the study, the analysis conducted on the basis of the financial statements of commercial banks of Uzbekistan for 2021–2025 and data from the Central Bank showed the following results:

1. Gap analysis results and maturity mismatch

When analyzing the composition of assets and liabilities of commercial banks of Uzbekistan, a systematic negative Gap was identified.

Short-term (up to 1 year) liabilities of banks (mainly demand deposits and short-term deposits) significantly exceed their interest-sensitive assets of the same maturity.

An increase in the central bank's key rate increases banks' interest expenses (on deposits) faster than their interest income (on loans). This leads to a decrease in the bank's Net Interest Margin (NIM).

2. Results of correlation-regression analysis

When studying the relationship between the central bank's key rate (X) and the average lending rates of commercial banks (Y), the pairwise correlation coefficient was r = 0.82.

Coefficient of determination (R^2): R^2 = 0.67. This means that 67% of the change in lending rates of commercial banks is directly related to the Central Bank's policy, and the remaining 33% is due to the bank's internal costs and competitive environment.

It was found that the correlation coefficient for deposits is lower (r = 0.58). This indicates that the resource base in banks is less responsive to interest rate changes (sticky deposits).

3. Duration and cost of capital sensitivity

According to the results of the duration analysis, the Duration Gap indicator in Uzbek banks has a positive value. The average term of the loan portfolio (especially due to mortgage and investment loans) is long, and the average term of the resource base (deposits) is short. An increase in interest rates by 1% will lead to a greater decrease in the market value of bank assets than the value of liabilities. This will negatively affect the economic value of bank capital (EVE).

4. Stress test results

The analysis of the conducted scenarios showed that an unexpected 3-5 percentage points increase in interest rates could reduce the net profit of banks by an average of 12-15%. In particular, it was found that banks with a high share of long-term fixed-rate loans within the framework of state programs will suffer the most.

Strategy for Improving Interest Rate Risk Management in Commercial Banks of Uzbekistan (Table 1).

Table 1. This table summarizes the current challenges and proposed strategic solutions

Focus Area	Current State (Problem)	Development Path (Solution)	Expected Outcome
Pricing Mechanism	Dominance of long-term fixed-rate loans.	Increasing the share of floating interest rate loans.	Stability of the bank's net interest margin during market fluctuations.
Hedging Instruments	Lack of mechanisms to hedge risk in domestic markets.	Implementing Interest Rate Swaps (IRS) and futures contracts.	Financial protection against unexpected losses.

Analytical Methods	Reliance on static Gap-analysis and historical reporting.	Implementing Dynamic Gap-analysis and AI-based forecasting.	Dynamic Gap-analysis and AI-based forecasting.
Resource Base	Maturity mismatch between short-term deposits and long-term loans.	Issuing long-term bonds and incentivizing long-term savings deposits.	Reduction of the Duration Gap between assets and liabilities.

For the "Methodology" or "Discussion" section, the following hierarchical structure is recommended to describe the management cycle:

Stages of the Framework:

Identification: Continuous monitoring of market interest rates and central bank policies.

Measurement: Conducting Gap-analysis, Duration Gap calculations, and Stress-testing.

Control: Decision-making by the Asset and Liability Committee (ALCO) regarding limit setting.

Mitigation (Hedging): Closing risk positions using derivative financial instruments (swaps, options).

The results obtained show that the sensitivity of Uzbek commercial banks to interest rate risk is systemic. The negative Gap situation identified during the study confirms that the resource base of local banks is formed mainly from short-term deposits, while assets (loans) are long-term and often at fixed rates.

Theoretical and practical analysis of the results

Asset-liability mismatch: A positive Duration Gap indicator identified as a result of Duration analysis means that when market interest rates increase, the market value of bank assets decreases faster than liabilities. This is a clear manifestation of the "economic value risk" highlighted in the theories of J. Sinki and P. Rose.

Weakness of the transmission mechanism: Correlation analysis showed that deposit rates (r = 0.58) are less flexible to the Central Bank refinancing rate than lending rates (r = 0.82). This indicates the presence of "sticky deposits" in banks and the weak response of the resource base to market changes.

Systemic risks: Stress test results showed that an unexpected increase in interest rates by 3-5 percentage points can reduce banks' net profit by 12-15%. This poses a risk of serious financial losses, especially for banks that issue long-term fixed-rate loans under government programs.

International experience (for example, in Basel III standards) recommends hedging interest rate risk through derivatives (swaps, futures). However, the fact that the financial derivatives market in Uzbekistan is still in its infancy forces banks to limit themselves to changing the balance sheet structure (for example, introducing floating rates) in risk management.

The results of the study show that in the context of digital transformation and changes in the monetary policy of the Central Bank, it is critical for banks to move from static Gap Analysis to dynamic analysis methods and introduce forecasting systems based on artificial intelligence.

CONCLUSIONS AND SUGGESTIONS

Based on the research conducted on improving interest rate risk management practices in the commercial banks of Uzbekistan, the following conclusions have been reached:

Analysis of the Current Situation: A significant "maturity mismatch" is currently evident in the balance sheets of local banks. While a large portion of bank assets (loans) are long-term with fixed interest rates, liabilities (deposits) consist primarily of short-term resources. This structural imbalance puts negative pressure on the banks' Net Interest Margin (NIM) in an environment where the Central Bank's main rate increases.

Gap Analysis Findings: The "negative gap" identified during the study indicates that Uzbek banks are currently more positioned to profit from falling interest rates rather than rising ones. However, in an economy with high inflationary expectations, the likelihood of rate hikes poses a serious risk of financial loss for these institutions.

Methodological Gaps: Banks still largely rely on static methods to measure interest rate risk. The insufficient implementation of Dynamic Gap Analysis and Duration Analysis prevents accurate forecasting of future losses and limits the strategic maneuverability of the banks.

Based on the findings of this study, the following strategic directions are proposed to develop interest rate risk management practices in the banking sector:

Optimization of Asset and Liability Structure: Commercial banks should widely implement floating interest rates for long-term loans. This ensures that as market rates rise, the yield on assets grows proportionately with the cost of liabilities, maintaining the bank's spread.

Digitalization of ALM (Asset-Liability Management) Systems: It is essential to integrate modern software solutions into the risk management process. This includes real-time monitoring of balance sheet sensitivity and conducting regular, automated Stress-Tests to prepare for various economic scenarios.

Developing the Market for Financial Derivatives: In cooperation with the Central Bank and commercial banks, a robust interbank market for Interest Rate Swaps (IRS) must be established. This would allow banks to exchange interest rate positions with one another to mitigate risk effectively.

Ensuring the Stability of the Resource Base: To extend the maturity of funds attracted from the public, banks should increase the issuance of long-term (3–5 years) savings certificates and corporate bonds. This strategy will directly help in reducing the Duration Gap and balancing the long-term sensitivity of the balance sheet.

List of used literature:

1. O‘zbekiston Respublikasining 05.11.2019 yildagi “Banklar va bank faoliyati to‘g‘risida”gi O‘RQ-580-son Qonuni // https://lex.uz/docs/-4581969
2. O‘zbekiston Respublikasi Prezidentining 12.05.2020 yildagi “2020 — 2025-yillarga mo‘ljallangan O‘zbekiston Respublikasining bank tizimini isloh qilish strategiyasi to‘g‘risida”gi PF-5992-son Farmoni // https://lex.uz/docs/-4811025
3. Central Bank of the Republic of Uzbekistan. (2020). Regulation on Minimum Requirements for Risk Management in Commercial Banks.
4. Basel Committee on Banking Supervision (BCBS). (2016). Interest rate risk in the banking book (IRRBB). Bank for International Settlements (BIS).
5. Mishkin, F. S. (2018). The Economics of Money, Banking and Financial Markets (12th ed.). Pearson Education.
6. Rose, P. S., & Hudgins, S. C. (2012). Bank Management & Financial Services (9th ed.). McGraw-Hill Education.
7. Saunders, A., & Cornett, M. M. (2014). Financial Institutions Management: A Risk Management Approach. McGraw-Hill.
8. Abdullayeva, Sh. Z. (2011). Bank risks (Bank Risks). Tashkent: Economy-Finance.
9. Karimov, N. G. (2018). Management of Financial Market Instruments in Commercial Banks. Tashkent.
10. Omonov, A. A. (2015). Management of Assets and Liabilities of Commercial Banks. Tashkent: Finance.
11. Central Bank of the Republic of Uzbekistan. (2025). Statistical Data and Reports. Retrieved from www.cbu.uz.
12. Bank for International Settlements (BIS). (2025). Banking Statistics and Standards. Retrieved from www.bis.org.

Proofreader: Zokir ALIBEKOV

Layout and Designer: Oloviddin Sobir ugli

2026. № 1

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot_77. Based on this, we will send the latest issue of the journal to your address each month.

“The journal “INNOVATION SCIENCE AND TECHNOLOGY” has been registered by the Agency for Information and Mass Communications under the Administration of the President of the Republic of Uzbekistan from 09.10.2024 under the registration number №390637. License number: C-5669633. PNFL: 30407832680027

Our address: Tashkent city, Yunusobod district, 19th block, House 17.