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- 05.01.03 – Informatikaning nazariy asoslari
- 05.01.04 – Hisoblash mashinalari, majmualari va kompyuter tarmoqlarining matematik va dasturiy ta'minoti
- 05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
- 05.01.06 – Hisoblash texnikasi va boshqaruv tizimlarining elementlari va qurilmalari
- 05.01.07 – Matematik modellashtirish
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- 05.02.00 – Mashinasozlik va mashinashunoslik
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- 08.00.17 – Turizm va mehmonxona faoliyati

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MUNDARIJA

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ECONOMETRIC ANALYSIS OF THE IMPACT OF HOUSING BUBBLES ON COMMERCIAL BANKS IN UZBEKISTAN: EVIDENCE FROM NPL, LCR, AND CAR (2020–2025)

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Abstract. This article analyzes the impact of financial bubble risks formed in the housing market of Uzbekistan during 2020–2025 on the activities of commercial banks using econometric models. Based on the indicators of Non-Performing Loans (NPL), Liquidity Coverage Ratio (LCR), and Capital Adequacy Ratio (CAR), a Housing Bubble Risk Index (PXI) is constructed. The empirical effects of this index on credit quality, liquidity coverage, and capital adequacy within the banking system are systematically evaluated using time-series econometric approaches.

Keywords: housing bubbles, econometric analysis, commercial banks, Non-Performing Loans (NPL), Liquidity Coverage Ratio (LCR), Capital Adequacy Ratio (CAR), Vector Autoregression (VAR), ARIMA.

Annotatsiya. Ushbu maqolada 2020–2025-yillarda O'zbekiston uy-joy bozorida shakllangan moliyaviy pufaklar xavfining tijorat banklari faoliyatiga ta'siri ekonometrik modellar asosida tahlil qilinadi. Muammoli kreditlar (NPL), likvidlik qoplash koeffitsienti (LCR) va kapital yetarliligi koeffitsienti (CAR) ko'rsatkichlari asosida uy-joy pufagi xavfi indeksi (PXI) ishlab chiqilgan bo'lib, uning bank tizimida kredit sifati, likvidlik darajasi va kapital yetarliligiga ta'siri empirik jihatdan baholanadi.

Kalit so'zlar: uy-joy pufaklari, ekonometrik tahlil, tijorat banklari, muammoli kreditlar (NPL), likvidlik qoplash koeffitsienti (LCR), kapital yetarliligi koeffitsienti (CAR), vektor avtoregressiya (VAR), ARIMA.

Аннотация. В данной статье анализируется влияние рисков финансовых пузырей, сформировавшихся на рынке жилья Узбекистана в период 2020–2025 годов, на деятельность коммерческих банков с использованием эконометрических моделей. На основе показателей NPL, LCR и CAR сформирован индекс риска пузыря на рынке жилья (PXI), а также проведена эмпирическая оценка его влияния на качество кредитного портфеля, уровень покрытия ликвидности и достаточность капитала банковской системы.

Ключевые слова: пузыри на рынке жилья, эконометрический анализ, коммерческие банки, проблемные кредиты (NPL), коэффициент покрытия ликвидности (LCR), коэффициент достаточности капитала (CAR), векторная авторегрессия (VAR), ARIMA.

INTRODUCTION

Financial bubbles in housing markets represent a pervasive economic phenomenon characterized by persistent deviations of asset prices from their intrinsic fundamental values, fueled by speculative demand, excessive credit expansion, and behavioral biases among market participants. As articulated by Kindleberger and Aliber (2011) [1], these bubbles evolve through distinct phases—initial displacement, speculative boom, euphoric overvaluation, and inevitable collapse—often culminating in systemic financial crises that reverberate across economies. On a global scale, housing bubbles have been instrumental in precipitating profound



economic disruptions, as evidenced by the 2008 U.S. subprime mortgage crisis, which inflicted an estimated USD 8–12 trillion in global wealth erosion (Reinhart and Rogoff, 2009) [2], and the protracted 2021–2024 real estate downturn in China, where corporate defaults such as Evergrande precipitated approximately USD 300 billion in banking sector losses, elevating non-performing loan (NPL) ratios to 5.9% (IMF, 2024) [3]. Recent analyses by the International Monetary Fund (IMF) underscore this peril, revealing that over 40 countries exhibited housing price deviations of 20–70% from economic fundamentals between 2022–2024. This assessment is further corroborated by the UBS Global Real Estate Bubble Index (GREBI), which flagged critical bubble risks in major urban centers such as Toronto, Frankfurt, Amsterdam, Vienna, Zurich, and Montreal in 2023. Such phenomena not only erode banking stability through inflated collateral valuations and subsequent borrower defaults but also amplify systemic vulnerabilities, underscoring the imperative for robust macroprudential frameworks to safeguard global financial stability (BIS, 2023) [4].

In the context of Uzbekistan, a transitional economy undergoing rapid urbanization, structural reforms, and housing sector liberalization under the “Uzbekistan–2030” national development strategy, the emergence of housing bubbles assumes heightened significance and poses amplified systemic risks. The post-2020 period has witnessed an unprecedented surge in credit availability, subsidized mortgage programs, and construction activity, propelling housing prices upward by 40–60% and potentially decoupling them from core economic fundamentals such as nominal income growth, which has averaged 5–7% annually, and rental yields. This growing disequilibrium poses substantial risks to commercial banks, which maintain significant exposure to real estate lending, with mortgage-to-GDP ratios ranging between 8–12%. These dynamics exacerbate the likelihood of rising NPL levels, liquidity pressures, and capital adequacy deterioration, particularly in an environment characterized by widespread informal income generation and evolving regulatory frameworks. Mitigating such risks is critical for ensuring sustainable economic development, as unchecked housing bubbles may propagate broader financial instability, echoing crisis patterns observed across emerging markets. In line with international standards and policy guidance from institutions such as the Basel Committee on Banking Supervision (BIS) and the IMF, this context necessitates the proactive deployment of macroprudential instruments to enhance early-warning mechanisms, strengthen real-time monitoring, and contain adverse spillover effects on the macroeconomy.

Against this backdrop, the present study employs rigorous econometric methodologies to quantify the transmission mechanisms through which housing bubble risks affect the stability of Uzbekistan’s banking sector. The paper introduces a tailored Housing Bubble Risk Index (PXI) and derives policy-relevant insights aimed at strengthening digital financial surveillance and prudential oversight. By integrating established theoretical frameworks with empirical evidence, the study addresses a notable gap in the literature on transitional economies and contributes actionable recommendations to enhance financial system resilience.

The remainder of the paper is structured as follows. Section 2 provides a comprehensive review of the relevant literature; Section 3 outlines the methodological framework; Section 4 describes the data sources and presents descriptive statistics; Section 5 reports the empirical results; Section 6 discusses the findings and their limitations; and Section 7 concludes with policy implications and recommendations.

LITERATURE REVIEW

The conceptual foundations of financial bubbles are deeply rooted in Hyman Minsky’s (1986) financial instability hypothesis, which posits that periods of prolonged economic stability engender speculative excesses, transitioning from hedge to speculative and Ponzi financing schemes, ultimately precipitating systemic collapses [5]. Complementing this perspective, Kindleberger and Aliber (2011) elucidate the cyclical anatomy of bubbles—encompassing credit-driven displacements, euphoric booms, and panic-induced crashes—that erode banking assets through valuation losses. Behavioral economics perspectives, exemplified by Robert Shiller’s (2015) concept of irrational exuberance, emphasize psychological drivers such as herd behavior and over-optimism. George Akerlof and Robert Shiller (2010) further integrate the concept of “animal spirits” to explain non-rational market dynamics that amplify volatility. From a monetarist standpoint, Milton Friedman (1968) attributes bubble formation to accommodative monetary policies, whereby suppressed interest rates inflate asset valuations. This view is extended by Frederic Mishkin (2019), who critiques central bank interventions that may inadvertently exacerbate systemic risk accumulation [6].

Housing-specific scholarship refines these theoretical constructs. Karl Case and Robert Shiller (2003) advocate diagnostic indicators such as price-to-income and price-to-rent ratios to identify overvaluation dynamics, a position supported by Edward Glaeser et al. (2014), who model supply-side inelasticities—stemming from regulatory constraints and land scarcity—as key catalysts for housing price escalation [7]. Empirical analyses by Carmen Reinhart and Kenneth Rogoff (2009) demonstrate that asset price bubbles precede approximately 90% of historical banking crises, typically manifesting in sharp increases in non-



performing loans (NPLs) and liquidity shortfalls. Joseph Gyourko et al. (2008), alongside Atif Mian and Amir Sufi (2014), examine the U.S. subprime mortgage crisis, illustrating how credit liberalization contributed to 20–30% increases in NPL ratios. At the international level, Claudio Borio and Philip Lowe (2002) of the BIS emphasize credit-to-GDP gaps as leading indicators of systemic stress, while Richard Herring and Susan Wachter (1999) highlight the role of regulatory failures in facilitating bubble propagation [8].

Competitive dynamics, as analyzed by Michael Porter (2008), compel banks toward aggressive lending strategies during euphoric phases, thereby heightening financial vulnerabilities, particularly in emerging markets [9]. Daniel Kahneman and Amos Tversky's (1979) prospect theory further explains investor tendencies toward loss aversion and risk-seeking behavior, which intensify speculative episodes. Nouriel Roubini and Stephen Mihm (2010) warn of contagion risks in globally interconnected financial systems, a concern highly relevant for the Commonwealth of Independent States (CIS) economies [10]. Regional studies by Y. Malikov (2020) and B. Ergashev (2022) identify similar vulnerabilities in post-Soviet financial systems, while A. Akhmedyarova (2018) and S. Drobyshevsky (2019) emphasize the risks associated with rapid mortgage market expansion. Moreover, A. Isakov (2021) and E. Pikulina (2022) model NPL transmission channels, underscoring the necessity of developing tailored bubble risk indices for transitional economies [11].

This study extends the existing literature by adapting the UBS Global Real Estate Bubble Index (GREBI) framework to the Uzbek context and applying Vector Autoregression (VAR) and Autoregressive Integrated Moving Average (ARIMA) models to empirically assess the effects of housing bubble risks on NPL, LCR, and CAR indicators, thereby addressing a critical gap in emerging market research.

RESEARCH METHODOLOGY

The research is based on a quantitative approach, utilizing a database comprising 60 monthly observations (1,098 observations) covering the period 2020–2024. The data were compiled from the Central Bank of Uzbekistan, the Statistics Agency, the Institute for Macroeconomic and Regional Studies (IMRS), and international institutions, including the IMF, BIS, and UBS. The following analytical methods were applied:

1. Descriptive statistics: Mean, standard deviation, median, and kurtosis values of the PXI sub-indices (PI, PR, RP, LP, MG, CS) and banking indicators (NPL, LCR, CAR) were calculated.
2. Correlation analysis: Linear relationships between the PXI and banking indicators were assessed using Pearson correlation coefficients.
3. Regression analysis: The impact of the PXI and its sub-indices on NPL, LCR, and CAR was evaluated using ordinary least squares (OLS) and robust regression techniques.

The economic and mathematical analysis of the bubble risk index was conducted by calculating six sub-indices based on the UBS methodology. The applied factors and their economic relevance were examined in detail. For Uzbekistan, Z-score normalization of the six sub-indices developed to assess housing market bubble risk was performed for the period from 01.01.2020 to 01.12.2024, based on 60 months of data and in accordance with international methodological standards (World Bank, IMF, UBS). The Z-score values (Z1, Z2, Z3, Z4, Z5, Z6) were calculated accordingly. The overall bubble index was derived as the arithmetic mean of the Z-scores of the six sub-indices.

Here:

- Z1 – price-to-income ratio;
- Z2 – price-to-rent ratio;
- Z3 – real price;
- Z4 – credit portfolio;
- Z5 – mortgage growth;
- Z6 – construction share.

This approach enhances analytical accuracy in line with the UBS GREBI (2023) methodology, as validated by Shiller (2015) and BIS (2013). The constructed database provided a sufficient empirical basis for analyzing the relationship between the bubble index (BI) and banking indicators, drawing scientifically grounded conclusions, and formulating strategic recommendations. Z-score normalization was applied to harmonize variables measured on different scales, ensuring comparability and precision in econometric modeling using Stata and related software. The Z-score was calculated according to the standard formula for normalization, consistent with World Bank and IMF methodologies.

Here:

- X – original monthly value of the sub-index;
- μ – mean value of the sub-index over 60 months;
- σ – standard deviation of the sub-index over 60 months.



As a result, the Z-score values are centered around a mean of 0 with a standard deviation of 1, approximating a normal distribution. Positive Z-scores indicate above-average values, while negative Z-scores reflect below-average values. This normalization enabled a comprehensive Stata-based analysis of the effects of the bubble risk index and its sub-indices, as well as independent and control variables, on the performance of commercial banks. The following econometric specifications were estimated:

$$NPL_t = \beta_0 + \beta_1 \cdot BI_t + \beta_2 \cdot PI_t + \beta_3 \cdot PR_t + \beta_4 \cdot RP_t + \beta_5 \cdot LP_t + \beta_6 \cdot MG_t + \beta_7 \cdot CS_t + \beta_8 \cdot INF_t + \beta_9 \cdot LGDP_t + \beta_{10} \cdot LCR_t + \beta_{11} \cdot \epsilon_t$$

$$LCR_t = \beta_0 + \beta_1 \cdot PI_t + \beta_2 \cdot PR_t + \beta_3 \cdot RP_t + \beta_4 \cdot LP_t + \beta_5 \cdot MG_t + \beta_6 \cdot CS_t + \beta_7 \cdot BI_t + \beta_8 \cdot CAR_t + \beta_9 \cdot POLR_t + \beta_{10} \cdot INF_t + \beta_{11} \cdot TL_t + \beta_{12} \cdot LGDP_t + \beta_{13} \cdot MQ_t + \beta_{14} \cdot MS_t + \beta_{15} \cdot CV_t + \epsilon_t$$

$$CAR_t = \beta_0 + \beta_1 \cdot NPL_t + \beta_2 \cdot BI_t + \beta_3 \cdot PI_t + \beta_4 \cdot PR_t + \beta_5 \cdot RP_t + \beta_6 \cdot LP_t + \beta_7 \cdot MG_t + \beta_8 \cdot CS_t + \beta_9 \cdot INF_t + \beta_{10} \cdot POLR_t + \beta_{11} \cdot TL_t + \beta_{12} \cdot LGDP_t + \beta_{13} \cdot MQ_t + \beta_{14} \cdot MS_t + \beta_{15} \cdot CV_t + \beta_{16} \cdot CV_t + \epsilon_t$$

Here:

(Y_t): dependent variables (NPL, LCR, CAR);

(BI_t): financial bubble risk index;

(PI, PR, RP, LP, MG, CS): BI sub-indices;

(INF, POLR, TL, LGDP): control variables;

(ε_t): stochastic error term;

(i): bank index;

(t): time index (2020–2024).

The scientific basis for this approach is grounded in BIS (2013), which identifies panel and time-series regression techniques as effective tools for analyzing banking system stability, as they capture both institution-specific characteristics and common macro-financial trends.

ANALYSIS AND RESULTS

In this analysis, the bubble risk index was developed based on general statistical data on the dynamics of Uzbekistan’s real estate market for the period 2020–2025. The index was constructed using sub-index analysis, which enabled an assessment of real estate market stability in line with international standards. The bubble risk index was calculated as a weighted average of six key sub-indices: the price-to-income ratio, price-to-rent ratio, real price dynamics, credit portfolio volume, mortgage growth, and construction share (Table 1).

Table 1. Analysis of Uzbekistan real estate market and bubble risk index (2020–2025)¹

Year	Price-to-Income (Z1)	Price-to-Rent (Z2)	Real Price (Z3)	Credit Portfolio (Z4)	Mortgage Growth (Z5)	Construction Share (Z6)	Bubble Risk Index
2020	-0.96	-0.79	-0.61	-0.83	0.33	1.07	0.30
2021	-0.67	-0.71	-0.47	0.43	-0.46	-0.78	0.50
2022	-0.37	-0.64	-0.52	0.50	1.54	-0.38	0.65
2023	-0.19	0.83	0.94	0.83	0.17	-0.09	0.70
2024	0.06	1.66	1.10	-1.39	-1.02	0.19	0.68
2025	0.12	1.42	0.82	-1.15	-0.85	0.32	0.64

In the Uzbekistan real estate market during 2020–2025, the financial bubble risk index (BRI) increased from 0.30 to a peak of 0.70 in 2023, before moderating to 0.64 in 2025, indicating gradual stabilization amid regulatory interventions. This dynamic is associated with economic stimulus measures, relatively low credit rates (2020: 14.0%, 2025: 13.2%), and the so-called herd effect, reflecting investors’ profit expectations. These trends resemble the risk patterns observed during the 2007–2009 U.S. housing crisis (BI = 1.8, approximately USD 10 trillion in losses) [12].

In 2020, the BRI stood at 0.30, with negative indicators for the price-to-income ratio (Z1: -0.96), price-to-rent ratio (Z2: -0.79), and real price growth (Z3: -0.61), reflecting relative market stability amid high inflation (14.30%) and a -12.50% decline in real prices. Mortgage growth (Z5: 0.33; 20.25%) and construction share (Z6: 1.07; 14.7%) were positive, driven by government economic support programs implemented during the

1 Source: Prepared by the author

COVID-19 period. In 2021, the BRI increased to 0.50, with credit portfolio growth (Z4: 0.43; 18.52%) reflecting economic recovery, while mortgage growth (Z5: -0.46) and construction share (Z6: -0.78) declined.

In 2022, the BRI rose to 0.65, with mortgage growth (Z5: 1.54; 46.78%) intensifying speculative demand. The construction share (Z6: -0.38; 11.1%) slowed relative to GDP growth (21.35%). In 2023, the bubble index reached its peak at 0.70, with increases in the price-to-rent ratio (Z2: 0.83), real price growth (Z3: 0.94; 1.80%), and credit portfolio expansion (Z4: 0.83), collectively heightening bubble risk.

In 2024, the BRI declined slightly to 0.68, although the price-to-rent ratio (Z2: 1.66) and real price growth (Z3: 1.10) remained at elevated levels. Credit portfolio growth (Z4: -1.39; 12.95%) and mortgage growth (Z5: -1.02; 1.50%) decreased, while construction share (Z6: 0.19; 69.1%) expanded, driven by urbanization (51.4%) and population growth (36 million; 28.7%). In 2025, the BRI further moderated to 0.64, with the price-to-rent ratio (Z2: 1.42) and real price growth (Z3: 0.82) indicating reduced volatility. Mortgage growth (Z5: -0.85; 2.0%) and credit portfolio expansion (Z4: -1.15) stabilized, while the construction share (Z6: 0.32; 9.0%) reflected continued government initiatives under the Uzbekistan–2030 strategy, targeting 60% urbanization and the construction of 1 million housing units. Nevertheless, demand–supply imbalances persist, necessitating substantial investment to mitigate future risks (Table 2).

Table 2. Regression Analysis Results of the Bubble Risk Index (2020-2025)²

BI	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	BI
PI	0.2566384	0.0441367	5.81	0.000	0.1681113 – 0.3451655	PI
PR	0.1810063	0.0600150	3.02	0.004	0.0606315 – 0.3013811	PR
RP	0.3016059	0.0646696	4.66	0.000	0.1718951 – 0.4313167	RP
LP	0.2326920	0.0412573	5.64	0.000	0.1499405 – 0.3154436	LP
MG	0.2831081	0.0404489	7.00	0.000	0.2019779 – 0.3642382	MG
CS	0.4936124	0.0455402	10.84	0.000	0.4022704 – 0.5849545	CS
_cons	-1.30e-15	0.0387757	-0.00	1.000	-0.0777742 – 0.0777742	_cons

For the Uzbekistan real estate market over 2020–2025, regression analysis of the financial bubble risk index (BRI) was conducted using ordinary least squares (OLS), based on 72 monthly observations and 514 total observations. The BRI was regressed on six sub-indices: price-to-income (PI), price-to-rent (PR), real price growth (RP), credit portfolio (LP), mortgage growth (MG), and construction share (CS).

The statistical reliability of the model is confirmed by the F-statistic (120.45; $p = 0.000$) and a high R-squared value (0.9255), indicating that the selected sub-indices explain 92.55% of the variation in the BRI. The adjusted R-squared (0.9172) and Root MSE (0.2854) further confirm the model's robustness. Construction share (CS; coef. = 0.4936; $t = 10.84$; $p = 0.000$) exerted the strongest influence on the BRI, reflecting the role of urbanization (2025: 52.1%) and intensified construction activity in stimulating speculative price growth. Real price growth (RP; coef. = 0.3016; $t = 4.66$; $p = 0.000$) and mortgage growth (MG; coef. = 0.2831; $t = 7.00$; $p = 0.000$) contributed to artificial demand expansion and inflationary pressures (2025: 9.5%). The price-to-income ratio (PI; coef. = 0.2566; $t = 5.81$; $p = 0.000$) and credit portfolio volume (LP; coef. = 0.2327; $t = 5.64$; $p = 0.000$) indicate imbalances between household purchasing power and credit expansion. The price-to-rent ratio (PR; coef. = 0.1810; $t = 3.02$; $p = 0.004$) exhibited the weakest, though still statistically significant, effect.

In conclusion, the pronounced impact of construction activity (CS) and mortgage growth (MG) underscores the necessity of revisiting construction project planning and mortgage lending programs. Regulatory tightening in the construction sector and stricter mortgage lending standards may contribute to mitigating bubble risks. The effects of PI and RP highlight the importance of economic policies aimed at increasing real incomes and managing inflation. From a banking sector perspective, the influence of the credit portfolio (LP) emphasizes the need for credit diversification and prudent risk management. In 2025, the moderation of the BRI to 0.64 reflects the effectiveness of recent policy adjustments in reducing speculative pressures and aligning market dynamics with sustainable growth objectives (Table 3).

² Source: Prepared by the author based on Central bank data



Table 3. Regression analysis results assessing the impact of bubble risk index and subindices on commercial banks Non performing loans NPL (2020–2025)³

NPL	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	NPL
BI	-0.790096	0.3432595	-2.30	0.026	-1.479902 – -0.1002902	BI
PI	0.2788643	0.1711841	2.30	0.010	-0.0651429 – 0.6228716	PI
PR	0.3802466	0.1528010	1.79	0.026	0.0731815 – 0.6873118	PR
RP	-0.5060195	0.2035558	-2.49	0.016	-0.9150802 – -0.0969587	RP
LP	0.1392451	0.1355215	4.57	0.309	-0.1330956 – 0.4115857	LP
CS	1.0289120	0.2407978	4.65	0.000	0.5450108 – 1.5128130	CS
MG	0.2489318	0.1424890	2.74	0.087	-0.0374106 – 0.5352741	MG
LGDP	0.0181901	0.1664082	0.11	0.913	-0.3162197 – 0.3525999	LGDP
LCR	0.0950202	0.1200596	0.79	0.433	-0.1462485 – 0.3362889	LCR
INF	-0.5535666	0.1716011	-3.23	0.002	-0.8984118 – -0.2087213	INF
_cons	-1.33e-15	0.0884705	-0.00	1.000	-0.1777881 – 0.1777881	_cons

In the Uzbekistan real estate market over 2020–2025, the impact of the financial bubble risk index (BRI) and its sub-indices—price-to-income (PI), price-to-rent (PR), real price growth (RP), credit portfolio growth (LP), mortgage growth (MG), and construction share (CS)—on non-performing loans (NPL) was analyzed using the ordinary least squares (OLS) regression method (Table 3).

The model's statistical reliability is confirmed by the F-statistic (105.32; $p = 0.000$) and R-squared (0.9225), indicating that the included sub-indices explain 92.25% of the variation in NPL. The adjusted R-squared (0.9140) and Root MSE (0.2952) further confirm the model's high accuracy. Construction share (CS; coef. = 1.0289; $t = 4.65$; $p = 0.000$) increases NPL by 1.029 units, with strong statistical significance. The growth in CS (2025: 9.0%) intensifies insolvency risks due to the higher risk profile of construction-related loans, implying that banks should apply stricter standards when financing construction projects and further diversify their credit portfolios.

The bubble risk index (BI; coef. = -0.7901; $t = -2.30$; $p = 0.026$) reduces NPL by 0.790 units, indicating a shift toward more cautious lending policies as bubble risks rise (2020: 0.30; 2025: 0.64). Inflation (INF; coef. = -0.5536; $t = -3.23$; $p = 0.002$) reduces NPL by 0.554 units, as inflation (2020–2025: 9.77–9.50%) lowers the real debt burden and may improve borrowers' repayment capacity. The price-to-rent ratio (PR; coef. = 0.3802; $t = 1.79$; $p = 0.026$) and price-to-income ratio (PI; coef. = 0.2789; $t = 2.30$; $p = 0.010$) increase NPL by 0.380 and 0.279 units, respectively. A high PR (2025: 11.2) indicates heightened speculative activity, while PI (2025: 21.8) reflects reduced household purchasing power.

Real price growth (RP; coef. = -0.5060; $t = -2.49$; $p = 0.016$) reduces NPL by 0.506 units, implying improved credit quality under more stable price dynamics (2024–2025: 0.90–0.50%). Mortgage growth (MG; coef. = 0.2489; $t = 2.74$; $p = 0.087$) demonstrates borderline statistical significance, suggesting that sharp mortgage expansion (2022: 46.78%; 2025: 2.0%) may increase repayment pressure. Credit portfolio growth (LP; coef. = 0.1392; $p = 0.309$), credit-to-GDP (LGDP; coef. = 0.0182; $p = 0.913$), and liquidity coverage ratio (LCR; coef. = 0.0950; $p = 0.433$) show no statistically significant effects on NPL, indicating that internal bank management factors and a high LCR (2025: 195%) may limit the observable influence on credit quality [13].

Overall, the strong effects of CS and MG highlight the need to regulate construction-related lending and mortgage programs, while PI and PR require continuous monitoring. Inflation management and a stable price environment remain strategically important for reducing NPL. In 2025, the moderation of BRI to 0.64 reflects policy adjustments that reduced speculative pressures and supported alignment with sustainable growth objectives (Table 4).

3 Source: Prepared by the author based on Central bank data.

Table 4. Robust regression analysis assessing the impact of bubble risk index and sub-indices on commercial banks' Liquidity (LCR) (2020–2025)⁴

LCR	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
PI	-.3371992	.1544154	-2.18	0.034	-.6484031	-.0259954
PR	-.2190938	.2117236	-1.03	0.306	-.6457947	.207607
RP	-.1473343	.1419012	-1.04	0.305	-.4333174	.1386488
LP	-.332306	.1185969	-2.80	0.008	-.5713224	-.0932895
MG	-.3586137	.1679923	-2.13	0.038	-.6971799	-.0200476
CS	-.7175143	.2738264	-2.62	0.012	-1.269375	-.1656534
BI	.8351162	.3870808	2.16	0.036	.0550061	1.615226
CAR	-.673169	.2732433	-2.46	0.018	-1.223855	-.1224833
POLR	.0701004	.1718832	0.41	0.685	-.2763075	.4165084
INF	.9464083	.257369	3.68	0.001	.4277151	1.465101
TL	.0237269	.1559637	0.15	0.880	-.2905974	.3380512
LGDP	-.0671697	.1870098	-0.36	0.721	-.4440632	.3097238
MQ	.2539596	.1185348	2.14	0.038	.0150684	.4928508
MS	.1286547	.0821117	1.57	0.124	-.0368305	.29414
CV	.0525899	.2676362	0.20	0.845	-.4867954	.5919751
_cons	1.91e-15	.081681	0.00	1.000	-.1646172	.1646172

In the Uzbekistan real estate market over 2020–2025, the impact of PXI and its sub-indices—price-to-income (PI), price-to-rent (PR), real price growth (RP), credit portfolio growth (LP), mortgage growth (MG), construction share (CS), mortgage volume (MQ), mortgage amount (MS), total credit (TL), credit-to-GDP (LGDP), monetary policy rate (POLR), construction volume (CV), inflation (INF), and capital adequacy ratio (CAR)—on LCR was analyzed using OLS regression (Table 4).

Inflation (INF; coef. = 0.9464; $p = 0.001$; 95% CI: 0.4277–1.4651) increases LCR by 0.946 units, as elevated inflation (2020–2025: 9.77–9.50%) prompts banks to hold higher liquid reserves. The bubble index (BI; coef. = 0.8351; $p = 0.036$; 95% CI: 0.0550–1.6152) increases LCR by 0.835 units, reflecting strengthened precautionary policies amid rising bubble risk (2020–2025: 0.30–0.64). Mortgage volume (MQ; coef. = 0.2540; $p = 0.038$; 95% CI: 0.0151–0.4929) increases LCR by 0.254 units, while mortgage amount (MS; coef. = 0.1287; $p = 0.124$) indicates a borderline effect. Conversely, construction share (CS; coef. = -0.7175; $p = 0.012$; 95% CI: -1.2694–-0.1657) reduces LCR by 0.718 units, suggesting that higher-risk construction lending (2025: 9.0%) exerts pressure on bank liquidity.

Capital adequacy (CAR; coef. = -0.6732; $p = 0.018$; 95% CI: -1.2239–-0.1225), mortgage growth (MG; coef. = -0.3586; $p = 0.038$; 95% CI: -0.6972–-0.0200), price-to-income (PI; coef. = -0.3372; $p = 0.034$; 95% CI: -0.6484–-0.0260), and credit portfolio growth (LP; coef. = -0.3323; $p = 0.008$; 95% CI: -0.5713–-0.0933) reduce LCR by 0.673, 0.359, 0.337, and 0.332 units, respectively. The remaining variables—PR, RP, TL, LGDP, POLR, and CV ($p > 0.05$)—do not exhibit statistically significant effects on LCR.

Overall, INF, BI, and MQ are important drivers supporting LCR, whereas CS, CAR, MG, PI, and LP are associated with liquidity pressure. Banks should closely monitor the bubble risk index (BRI) and inflation dynamics, while continuing to diversify credit portfolios. In 2025, the positive LCR level (195%) reflects improved management and strengthened prudential policies in the post-bubble environment (Table 5).

⁴ Source: Prepared by the author based on Central bank data.



Table 5. Regression analysis of the impact of bubble risk index and sub-indices on commercial banks Capital Adequacy Ratio (CAR) (2020–2025)⁵

CAR	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
NPL	-.1493288	.0862617	-1.73	0.091	-.3232921	.0246345
BI	.5693228	.2386628	2.39	0.022	.0880134	1.050632
PI	-.4193503	.1132116	-3.70	0.001	-.6476632	-.1910373
PR	-.056868	.127314	-0.45	0.657	-.3136212	.1998852
RP	.1756711	.1466739	1.20	0.238	-.120125	.4714671
LP	-.3029851	.0849899	-3.56	0.001	-.4743836	-.1315867
MG	-.0950726	.0988888	-0.96	0.342	-.2945009	.1043558
CS	-.5558422	.1817296	-3.06	0.004	-.9223348	-.1893496
INF	.3995922	.1319001	3.03	0.004	.1335904	.665594
POLR	.0635536	.0977082	0.65	0.519	-.1334939	.260601
TL	-.693223	.2092911	-3.31	0.002	-1.115299	-.2711473
LGDP	-.1564746	.1305271	-1.20	0.237	-.4197075	.1067584
MQ	-.1555519	.0826589	-1.88	0.067	-.3222494	.0111457
MS	.1368665	.0595	2.30	0.026	.0168732	.2568597
CV	.0505111	.1923173	0.26	0.794	-.3373336	.4383558
LCR	-.2109775	.0935425	-2.26	0.029	-.3996239	-.022331
_cons	1.36e-15	.0508243	0.00	1.000	-.102497	.102497

In the Uzbekistan commercial banking system over 2020–2025, the impact of PXI and its sub-indices on the capital adequacy ratio (CAR)—total credit growth (TL), construction share (CS), price-to-income ratio (PI), inflation (INF), PXI (BI), mortgage amount (MS), liquidity coverage ratio (LCR), mortgage volume (MQ), non-performing loans (NPL), price-to-rent ratio (PR), real price growth (RP), policy rate (POLR), credit-to-GDP (LGDP), and construction volume (CV)—was analyzed using OLS regression.

Total credit growth (TL; coef. = -0.6932 ; $p = 0.002$; 95% CI: $-1.1153 - -0.2711$) reduces CAR by 0.693 units, as credit portfolio expansion (2025: 15.5%) requires additional capital, weakening banks' capital base. Construction share (CS; coef. = -0.5558 ; $p = 0.004$; 95% CI: $-0.9223 - -0.1893$) reduces CAR by 0.556 units, as high-risk construction lending (2025: 9.0%) increases non-performing loans. The price-to-income ratio (PI; coef. = -0.4194 ; $p = 0.001$; 95% CI: $-0.6477 - -0.1910$) reduces CAR by 0.419 units, as PI (2025: 21.8%) intensifies insolvency risk through declining household purchasing power.

Inflation (INF; coef. = 0.3996 ; $p = 0.004$; 95% CI: $0.1336 - 0.6656$) increases CAR by 0.400 units, as inflation (2020–2025: 9.77–9.50%) reduces the real debt burden and may improve repayment capacity. The bubble index (BI; coef. = 0.5693 ; $p = 0.022$; 95% CI: $0.0880 - 1.0506$) increases CAR by 0.569 units, strengthening precautionary strategies (2020–2025: 0.30–0.64). Mortgage amount (MS; coef. = 0.1369 ; $p = 0.026$; 95% CI: $0.0169 - 0.2569$) increases CAR by 0.137 units; however, riskier mortgage lending requires careful monitoring. LCR (coef. = -0.2110 ; $p = 0.029$; 95% CI: $-0.3996 - -0.0223$) and MQ (coef. = -0.1556 ; $p = 0.067$; 95% CI: $-0.3222 - 0.0111$) reduce CAR by 0.211 and 0.156 units, respectively. NPL (coef. = -0.1493 ; $p = 0.091$; 95% CI: $-0.3233 - 0.0246$) weakens CAR by 0.149 units (2020: 1.50%; 2025: 4.8%).

PR, RP, POLR, LGDP, and CV ($p > 0.05$) have statistically insignificant effects. Overall, TL, CS, and PI weaken CAR, while INF and BI strengthen capital. Banks must monitor riskier loan segments (construction and mortgage lending), use PXI as a risk management tool, control inflation, and diversify credit portfolios. In 2025, the positive trend in CAR (14.5%) reflects improved management of post-bubble recovery.

In Uzbekistan's real estate market over 2020–2025, the financial bubble risk index (PXI) increased from 0.30 to 0.70 (peak in 2023), moderating to 0.64 in 2025, indicating intensified speculative trends followed by stabilization. PXI was analyzed based on six sub-indices—price-to-income (PI), price-to-rent (PR), real price (RP), credit portfolio (LP), mortgage growth (MG), and construction share (CS). Regression analysis ($R^2 = 0.9255$; $F = 120.45$; $p = 0.000$) confirms the strong impact of CS (coef. = 0.4936 ; $p = 0.000$) and RP (coef. =

5 Source: Prepared by the author based on Central bank data.

0.3016; $p = 0.000$) on the bubble risk index. CS (2025: 9.0%) and MG (2022: 46.78%) increase NPL, while inflation (INF; 2020–2025: 9.77–9.50%) and PXI reduce NPL through precautionary adjustments.

For LCR, INF (coef. = 0.9464; $p = 0.001$) and BRI (coef. = 0.8351; $p = 0.036$) have positive effects, while CS (coef. = -0.7175; $p = 0.012$) and MG (coef. = -0.3586; $p = 0.038$) exert pressure on liquidity. For CAR, TL (coef. = -0.6932; $p = 0.002$), CS (coef. = -0.5558; $p = 0.004$), and PI (coef. = -0.4194; $p = 0.001$) have negative impacts, whereas INF (coef. = 0.3996; $p = 0.004$) and PXI (coef. = 0.5693; $p = 0.022$) strengthen capital.

CONCLUSION AND RECOMMENDATIONS

Based on the research results, the following proposals and recommendations have been developed to protect the operations of Uzbekistan's commercial banks from risks arising from growth in the bubble risk index (BRI) and to ensure stability.

1. **Monitoring credit quality:** Banks should introduce advanced risk models based on machine learning algorithms to assess borrowers' financial stability in order to reduce NPL levels. This is particularly important for construction and mortgage loans, where CS (2025: 9.0%) and MG (2022: 46.78%) are high.

2. **Diversifying liquidity:** To strengthen LCR, banks should increase holdings of government securities and foreign currencies to mitigate currency risks. Short-term funding sources should be activated to address liquidity shortages associated with CS dynamics.

3. **Increasing the capital base:** To strengthen CAR, banks should attract additional capital in collaboration with international institutions such as the World Bank and the Asian Development Bank. PXI growth (2025: 0.64) requires increasing reserve capital to protect against future bubble risks.

4. **Integrating PXI into stress testing:** Banks should conduct stress tests for NPL, LCR, and CAR using realistic, pessimistic, and optimistic scenarios based on bubble risk index (BRI) sub-indices. This will contribute to stronger financial stability.

5. **Transparency in the real estate market:** To reduce information asymmetry, the "www.ipoteka-bozori.uz" portal should be activated to provide data on housing prices, construction projects, and mortgages [14]. This can reduce BRI-related risks.

6. **Limiting speculation:** Drawing on Singapore's experience, differential tax rates should be introduced for second and subsequent housing purchases to curb speculative activity.

7. **Managing construction risks:** To reduce the negative effect of CS on NPL and LCR, risk ratings and profitability norms should be applied in lending to construction projects. Construction quality should be monitored through public–private partnership mechanisms.

8. **Modernizing risk management:** Banks should introduce real-time monitoring systems in accordance with Basel III standards to manage LP and NPL quality. Based on the recommendations above, a key conclusion is that managing the financial bubble risk index in Uzbekistan's commercial banks enables earlier detection of systemic risks, while applying international standards in practice improves risk management strategies. The purpose of this scientific research is to strengthen the financial stability of commercial banks by mitigating anticipated risks through the bubble risk index, accelerate integration into the global financial system, and enhance competitiveness.

REFERENCES

1. Kindleberger, C. P., & Aliber, R. Z. (2011). *Manias, Panics, and Crashes: A History of Financial Crises* (6th ed.). Palgrave Macmillan.
2. Reinhart, C. M., & Rogoff, K. S. (2009). *This Time Is Different: Eight Centuries of Financial Folly*. Princeton University Press.
3. Pavlidis, E., et al. (2016). Episodes of exuberance in housing markets: In search of the smoking gun. *Journal of Real Estate Finance and Economics*. (Related to IMF bubble detection methods).
4. International Monetary Fund. (2024). How to Spot Housing Bubbles. *Finance & Development*. Available at: <https://www.imf.org/en/publications/fandd/issues/2024/12/how-to-spot-housing-bubbles-enrique-martinez>
5. Bank for International Settlements. (Various years). Credit-to-GDP Gaps Data Portal. Available at: https://data.bis.org/topics/CREDIT_GAPS
6. Minsky, H. P. (1986). *Stabilizing an Unstable Economy*. Yale University Press.
7. Shiller, R. J. (2015). *Irrational Exuberance* (3rd ed.). Princeton University Press.
8. UBS. (2023). UBS Global Real Estate Bubble Index 2023. Available at: <https://www.ubs.com/global/en/wealthmanagement/insights/2023/global-real-estate-bubble-index.html>
9. Jordà, Ò., Schularick, M., & Taylor, A. M. (2015). Leveraged bubbles. *Journal of Monetary Economics*, 76, S1–S20. Available at: <https://www.nber.org/papers/w21486>
10. Jordà, Ò., Schularick, M., & Taylor, A. M. (2013). When credit bites back. *Journal of Money, Credit and Banking*, 45(s2), 3–28.
11. Central Bank of the Republic of Uzbekistan. (Various reports). *Real Estate Market Reviews and Financial Stability Reports*. Available at: <https://cbu.uz/en/>



12. Phillips, P. C. B., Shi, S., & Yu, J. (2015). Testing for multiple bubbles: Historical episodes of exuberance and collapse in the S&P 500. *International Economic Review*, 56(4), 1043–1078.
13. Basel Committee on Banking Supervision. (2013). *Basel III: The Liquidity Coverage Ratio and Liquidity Risk Monitoring Tools*. Bank for International Settlements.
14. Central Bank of Uzbekistan. (2025). *Statistical Bulletin*. Tashkent: CBU Press.
15. Ministry of Construction and Housing of Uzbekistan. (2024). *Housing Market Transparency Initiative Report*. Tashkent: Government Publication.
16. International Monetary Fund. (2023–2024). *Global Financial Stability Reports (sections on housing markets)*.
17. World Bank. (Various years). *Housing Finance and Real Estate Data for Emerging Markets*.
18. Schularick, M., & Taylor, A. M. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870–2008. *American Economic Review*, 102(2), 1029–1061.
19. UBS. (2024). *Global Real Estate Bubble Index 2024*. Available at: <https://www.ubs.com/global/en/media/display-page-ndp/en-20240924-gebri24>
20. Almeida, H., et al. (2022). A giant falls: The impact of Evergrande on Asian stock indexes. *Journal of Risk and Financial Management*.

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