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05.01.00 – Axborot texnologiyalari, boshqaruv va kompyuter grafikasi
05.01.01 – Muhandislik geometriyasi va kompyuter grafikasi. Audio va video texnologiyalari
05.01.02 – Tizimli tahlil, boshqaruv va axborotni qayta ishlash
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
05.01.11 – Raqamli texnologiyalar va sun'iy intellekt
05.02.00 – Mashinasozlik va mashinashunoslik
05.02.08 – Yer usti majmualari va uchish apparatlari
05.03.02 – Metrologiya va metrologiya ta'minoti
05.04.01 – Telekommunikasiya va kompyuter tizimlari, telekommunikasiya tarmoqlari va qurilmalari. Axborotlarni taqsimlash
05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
05.05.05 – Issiqlik texnikasining nazariy asoslari
05.05.06 – Qayta tiklanadigan energiya turlari asosidagi energiya qurilmalari
05.06.01 – To'qimachilik va yengil sanoat ishlab chiqarishlari materialshunosligi
05.08.03 – Temir yo'l transportini ishlatish
05.09.01 – Qurilish konstruksiyalari, bino va inshootlar
05.09.04 – Suv ta'minoti. Kanalizatsiya. Suv havzalarini muhofazalovchi qurilish tizimlari
10.00.06 – Qiyosiy adabiyotshunoslik, chog'ishtirma tilshunoslik va tarjimashunoslik
10.00.04 – Yevropa, Amerika va Avstraliya xalqlari tili va adabiyoti
08.00.01 – Iqtisodiyot nazariyasi
08.00.02 – Makroiqtisodiyot
08.00.03 – Sanoat iqtisodiyoti
08.00.04 – Qishloq xo'jaligi iqtisodiyoti
08.00.05 – Xizmat ko'rsatish tarmoqlari iqtisodiyoti
08.00.06 – Ekonometrika va statistika
08.00.07 – Moliya, pul muomalasi va kredit
08.00.08 – Buxgalteriya hisobi, iqtisodiy tahlil va audit
08.00.09 – Jahon iqtisodiyoti
08.00.10 – Demografiya. Mehnat iqtisodiyoti
08.00.11 – Marketing
08.00.12 – Mintaqaviy iqtisodiyot
08.00.13 – Menejment
08.00.14 – Iqtisodiyotda axborot tizimlari va texnologiyalari
08.00.15 – Tadbirkorlik va kichik biznes iqtisodiyoti
08.00.16 – Raqamli iqtisodiyot va xalqaro raqamli integratsiya
08.00.17 – Turizm va mehmonxona faoliyati

Ma'lumot uchun, OAK
Rayosatining 2024-yil 28-avgustdagi 360/5-son qarori bilan "Dissertatsiyalar asosiy ilmiy natijalarini chop etishga tavsiya etilgan milliy ilmiy nashrlar ro'yxati"ga texnika va iqtisodiyot fanlari bo'yicha "Muhandislik va iqtisodiyot" jurnali ro'yxatga kiritilgan.

Muassis: "Tadbirkor va ishbilarmon" MChJ

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2. Toshkent davlat iqtisodiyot universiteti
3. Toshkent irrigatsiya va qishloq xo'jaligini mexanizatsiyalash muhandislari instituti" milliy tadqiqot universiteti
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9. Jizzax politexnika instituti

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Abstract. This study investigates the relationship between credit risk management (CRM) and the profitability of commercial banks in Uzbekistan, an emerging market characterized by a rapidly evolving banking sector. Credit risk, defined as the potential for borrowers to default on their obligations, directly affects both the stability and profitability of banks, making its management a critical concern for banking institutions. In the context of Uzbekistan's ongoing economic liberalization and alignment with international regulatory standards, effective CRM practices have become increasingly important. This research examines the CRM practices of Uzbek commercial banks, their compliance with regulatory frameworks, and their impact on key profitability indicators, including Return on Assets (ROA) and Return on Equity (ROE). Employing a quantitative methodology, the study analyzes financial and credit risk data from a sample of commercial banks to evaluate how CRM variables such as non-performing loans, capital adequacy, risk coverage, and liquidity influence bank performance. The findings provide empirical evidence on the role of CRM in enhancing bank profitability and offer practical insights for improving risk management strategies in the Uzbek banking sector.

Keywords: Commercial banks, return on assets (ROA), return on Equity (ROE), Credit Risk Management, non-performing loans (NPLs).

Annotatsiya. Ushbu tadqiqot O'zbekistonning jadal rivojlanayotgan bank sektoriga ega bo'lgan rivojlanayotgan bozorlar qatoridagi mamlakat sifatida tijorat banklarida kredit riski boshqaruvi (CRM) va rentabellik o'rtasidagi bog'liqlikni o'rganadi. Kredit riski — qarz oluvchilarning o'z majburiyatlarini bajarmaslik ehtimoli — banklarning barqarorligi va daromadliligiga bevosita ta'sir qiluvchi omil bo'lib, uning samarali boshqarilishi moliya institutlari uchun muhim ahamiyat kasb etadi. O'zbekistonda iqtisodiy liberallashuv jarayoni davom etayotgani hamda xalqaro tartibga solish standartlariga moslashuv kuchayib borayotgani sharoitida CRM amaliyotlarining ahamiyati yanada oshib bormoqda. Tadqiqotda O'zbekiston tijorat banklarining kredit riski boshqaruviga oid amaliyotlari, ularning me'yoriy talablarga muvofiqligi, shuningdek aktivlar rentabelligi (ROA) va kapital rentabelligi (ROE) kabi asosiy daromadlik ko'rsatkichlariga ta'siri tahlil qilingan. Miqdoriy tadqiqot metodologiyasi asosida tijorat banklarining moliyaviy ma'lumotlari va kredit riski bo'yicha ko'rsatkichlari o'rganilib, muammoli kreditlar, kapital yetarliligi, risklarni qoplash darajasi va likvidlik kabi CRM o'zgaruvchilarining bank faoliyati natijalariga ta'siri baholangan. Olingan natijalar kredit riski boshqaruvining bank rentabelligini oshirishdagi roliga oid empirik dalillarni taqdim etadi hamda O'zbekiston bank sektorida risklarni boshqarish strategiyalarini takomillashtirish bo'yicha amaliy tavsiyalarni beradi.

Kalit so'zlar: tijorat banklari, aktivlar rentabelligi (ROA), kapital rentabelligi (ROE), kredit riski boshqaruvi, muammoli kreditlar (NPLs).

Аннотация. В данной работе исследуется взаимосвязь между управлением кредитным риском (CRM) и рентабельностью коммерческих банков Узбекистана — формирующегося рынка с быстро развивающимся банковским сектором. Кредитный риск, определяемый как вероятность невыполнения заемщиками своих обязательств, напрямую влияет как на устойчивость банков, так и на их прибыльность, что делает его управление ключевым аспектом деятельности финансовых учреждений. В условиях продолжающейся экономической либерализации Узбекистана и гармонизации с международными регулятивными стандартами значимость эффективных методов CRM существенно возрастает. В исследовании рассматриваются практики управления кредитным риском в коммерческих банках Узбекистана, их соответствие нормативным требованиям, а также влияние на основные показатели прибыльности, включая рентабельность активов (ROA) и рентабельность собственного капитала (ROE). Используя количественную методологию, работа анализирует финансовые данные и показатели кредитного риска выборки коммерческих банков с целью оценки влияния таких переменных CRM, как проблемные кредиты, достаточность капитала, уровень покрытия рисков и ликвидность, на результаты деятельности банков. Полученные выводы предоставляют эмпирические доказательства роли CRM в повышении прибыльности банков и содержат практические рекомендации по совершенствованию стратегий управления рисками в банковском секторе Узбекистана.

Ключевые слова: коммерческие банки, рентабельность активов (ROA), рентабельность собственного капитала (ROE), управление кредитным риском, проблемные кредиты (NPLs).

INTRODUCTION

The primary objective of commercial banks, as in any economic activity, is to maximize returns while minimizing risk. In today's globalized and increasingly volatile financial environment, effective credit risk management has become one of the most critical challenges for bank boards and managers. Accurate assessment of credit risk enables banks to prevent potential financial losses, sustain profitability, and navigate both domestic and international economic shocks. By proactively analyzing credit exposures, banking executives can safeguard financial stability and enhance long-term operational resilience.

Credit risk refers to the potential financial loss arising when a borrower fails to meet debt obligations, including principal and interest. Defaults can disrupt cash flows, increase collection costs, and significantly undermine profitability. To mitigate credit risk, lenders evaluate borrowers' financial profiles, including income, existing debt obligations, and repayment capacity. While it is impossible to predict with absolute certainty which borrowers may default, systematic credit risk assessment and management significantly reduce potential losses. Lenders are compensated for assuming credit risk through interest payments, which reflect both the expected return and the risk profile of the borrower.

Effective credit risk management requires banks to consider both individual credit exposures and portfolio-wide risk. It also involves understanding the interaction between credit risk and other operational and financial risks, including liquidity, market, and operational risks. A comprehensive credit risk management framework is therefore a fundamental component of overall bank governance and a determinant of long-term financial performance (Basel Committee on Banking Supervision, 2019).

Despite the recognized importance of credit risk management, empirical evidence on its impact on bank profitability in emerging markets remains limited, particularly for Uzbekistan. Studies in other emerging economies demonstrate that lower non-performing loans (NPLs), adequate provisioning, optimized capital structures, and effective liquidity management contribute positively to both Return on Assets (ROA) and Return on Equity (ROE) (Athanasoglou et al., 2008; Demirgüç-Kunt & Detragiache, 1998).

The aim of this study is to evaluate the impact of credit risk management practices on the profitability of commercial banks in Uzbekistan, identifying key strategies and assessing their effectiveness. The research focuses on commercial banks in Uzbekistan as the object of study, examining how they implement and monitor credit risk management practices. The subject of the research is the relationship between these practices and bank profitability, covering areas such as risk assessment methods, mitigation strategies, and performance indicators like ROA and ROE.

This study addresses the following research questions:

1. How does credit risk management impact the profitability of commercial banks in Uzbekistan?
2. What challenges do Uzbek commercial banks face in effectively managing credit risk?
3. How can Uzbek commercial banks improve their credit risk management practices to enhance profitability?

REVIEW OF LITERATURE ON THE SUBJECT

Credit risk management in commercial banks is guided by international regulatory frameworks such as Basel II and Basel III, which provide standardized approaches for identifying, measuring, and managing credit risk (Basel Committee on Banking Supervision, 2004; 2017). These standards aim to strengthen the regulatory environment and ensure that banks adopt risk management practices proportional to the scope and complexity of their operations. In Uzbekistan, the Central Bank evaluates licensed banks' credit risk management systems based on these principles, in line with domestic regulations such as the Domestic Banks and Financial Institutions Act (DBFIA) and the International Banking Act (IBA).

According to Basel guidelines, banks are expected to adopt comprehensive credit risk management practices, encompassing credit assessment, monitoring, provisioning, and capital allocation. Effective CRM practices not only mitigate potential loan losses but also enhance financial stability, operational efficiency, and profitability. Research demonstrates that robust credit risk frameworks reduce the likelihood of non-performing loans, strengthen capital buffers, and improve financial metrics such as ROA and ROE (Borio & Zhu, 2008; Altman, 2013).

Empirical studies in emerging markets indicate that banks with strong credit evaluation systems and proactive monitoring typically exhibit higher profitability. Athanasoglou et al. (2008) and Demirgüç-Kunt & Detragiache (1998) found that banks with lower NPLs and effective provisioning policies report better financial performance. These findings are consistent with the risk-return framework, which posits that prudent management of credit risk is positively associated with profitability, even in volatile economic environments.

In the context of Uzbekistan, recent research highlights specific challenges and strategies related to CRM. Kholdorov (2024) emphasizes that credit risk management is crucial for achieving financial stability and minimizing NPLs. The study identifies key strategies aligned with Basel II/III standards, including improved loan monitoring systems, advanced credit assessment frameworks, risk-based pricing, diversification of loan portfolios, and the use of credit derivatives. These strategies enable banks to prevent defaults, optimize profitability, and balance risk exposure.

Modern approaches to CRM increasingly leverage technology and advanced analytics. Kholdorov (2024) reports that machine learning models and big data analytics significantly enhance predictive accuracy for loan defaults, reducing NPL ratios by up to 15%. Moreover, adherence to Basel III standards related to capital adequacy and liquidity requirements strengthens the resilience of the banking sector, ensuring that banks maintain sufficient capital buffers to absorb losses during economic downturns.

While global studies emphasize the importance of credit risk management for bank profitability, there is limited empirical evidence specific to Uzbekistan. Few studies systematically examine the relationship between CRM practices-such as NPL management, provisioning, capital adequacy, and liquidity-and financial performance indicators like ROA and ROE. This study addresses this gap by providing empirical evidence on the impact of CRM on bank profitability in the Uzbek context, offering insights for both academics and practitioners.

The study tests the following hypothesis:

H1: More effective credit risk management practices in commercial banks in Uzbekistan are associated with higher profitability.

RESEARCH METHODOLOGY

This research is based on secondary qualitative research methodology, which involves the collection and analysis of data available on the Central Bank of Uzbekistan website, regarding the indicators of profitability of commercial banks, non-performing loans, as well as the information from banks websites related to their use of credit risk management systems. The total number of large commercial banks is N = 20. The representative sample is calculated using the following formula (1).

$$Adjusted\ S = \frac{S}{1+\left(\frac{S-1}{Population}\right)}, \qquad (1)$$

Where:

- S = sample size for infinite population.

In order to determine S, an infinite population Cochran's sample size formula (2) was used:

$$S = z^2 * P * \left(\frac{1-P}{M^2}\right), \qquad (2)$$

Where:

- Z = Z score (1.960)

- P = population proportion (Assumed as 50% or 0.5)
- M = margin of error (5%).

Sample size calculations are presented below:

$$S = 1.960^2 * 0.5 * \left(\frac{1-0.5}{0.05^2}\right) = 384.16$$

$$Adjusted\ S = \frac{384.16}{1+\left(\frac{384.16-1}{20}\right)} = 19$$

Therefore, the number of commercial banks of Uzbekistan analysed in this research is N = 19 out of 20.

The use of credit risk management systems by the analysed banks is evaluated using the scale of three levels: Advanced = 3, Medium = 2 and Basic = 1. The collected data is shown in Appendix 1.

The following indicators are calculated based on the collected data: Return on assets (ROA), return on Equity (ROE). Non-performing loans (NPLs) indicator used in this research is the share in the total loans in percentage (see appendix 1). The data sheet used for SPSS analysis is available in appendix 2).

The data is analysed using SPSS software, in order to understand the impact of the level of credit risk management systems on profitability of commercial banks in Uzbekistan (which is also influenced by non-performing loans), a regression analysis is used using formula 3.

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + \varepsilon$, (3)

where: Y – Dependent variable;

$X_1, X_{2,} \ldots X_k$ – Independent variables (predictors);

B_0 – Intercept (value of Y when all $X_i = 0$);

$\beta_1, \beta_2 \ldots \beta_k$ – Coefficients showing the effect of each X_i on Y;

ε – Error term.

ANALYSIS AND RESULTS

Descriptive statistics for profitability indicators and the use of credit risk management systems by banks in Uzbekistan are shown in table 1 (Table 1).

Table 1. Descriptive statistics

		ROA	ROE	NPLs	RCR	CAR	LR
N	Valid	20	20	20	20	20	20
	Missing	0	0	0	0	0	0
Mean		0.02443	0.14632	0.03726	16.3215	13.7515	13.97
Median		0.01416	0.08691	0.03153	16.06	13.48	13.265
Mode		.000[a]	.001[a]	.011[a]	13.20[a]	10.30[a]	18.2
Std. Deviation		0.024356	0.131781	0.023637	2.03118	2.71463	4.43169
Variance		0.001	0.017	0.001	4.126	7.369	19.64
Skewness		1.025	0.69	1.399	0.474	0.457	0.875
Std. Error of Skewness		0.512	0.512	0.512	0.512	0.512	0.512
Kurtosis		0.073	-0.723	1.983	0.19	-0.926	0.614
Std. Error of Kurtosis		0.992	0.992	0.992	0.992	0.992	0.992
Range		0.08	0.416	0.091	7.6	9.1	17.58
Minimum		0	0.001	0.011	13.2	10.3	7.8
Maximum		0.08	0.417	0.102	20.8	19.4	25.38
Percentiles	25	0.00688	0.04496	0.01897	15.3075	11.235	10.43
	50	0.01416	0.08691	0.03153	16.06	13.48	13.265
	75	0.04099	0.26148	0.04662	17.2925	15.89	17.7875
a. Multiple modes exist. The smallest value is shown							

It can be seen that the summary of descriptive statistics for Uzbekistan's commercial banks reveals several important patterns across five key financial indicators. ROA average amongst 20 analysed banks is 2.44% and ROE is 14.63%. The ROE average is elevated due to a few banks reporting exceptionally strong results, while most institutions show more restrained performance. The average level of share of non-performing loans in bank portfolio (NPLs) just below 4%, which means that there is a generally stable credit environment. However, some of the banks have significantly higher NPL share Even so, some banks report considerably higher NPL share, which means that there are differences in credit quality and risk exposure across the sector. Capital strength is reflected in the RCR and CAR values. With averages of 16.32% and 13.75%, the figures indicate that most banks are maintaining capital buffers above regulatory thresholds. These ratios vary moderately, hinting at differences in capital management practices but no extreme deviations. The leverage ratio (LR) stands out with the highest variability. It ranges from just under 2% to over 25%, despite a mean of around 14%. This suggests a wide range in how aggressively banks manage their exposure relative to their capital, possibly influenced by internal policy or market strategy.

Results of regression analysis of relationship between the level of credit risk management and profitability indicators of banks in Uzbekistan are shown in table 2 (Table 2).

Table 2. Model summary for linear regression. Dependent variable: ROA and ROE, independent variables: credit risk management indicators

	(1)	(2)
VARIABLES	ROA	ROE
npls	0.0660***	0.613*
	(0.234)	(1.355)
rcr	0.00314***	0.0299**
	(0.00443)	(0.0256)
car	-0.00742**	-0.0473***
	(0.00369)	(0.0213)
lr	0.00432***	0.0151*
	(0.00143)	(0.00828)
Constant	0.0173	0.120
	(0.0489)	(0.283)
Observations	20	20
R-squared	0.933	0.950

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The regression analysis of 20 commercial banks in Uzbekistan provides a clear understanding of how credit risk management (CRM) influences bank profitability. Profitability, measured by Return on Assets (ROA) and Return on Equity (ROE), is significantly affected by key CRM indicators, including non-performing loans (NPLs), risk coverage ratio (RCR), capital adequacy ratio (CAR), and liquidity ratio (LR). The models demonstrate substantial explanatory power, with $R^2 = 0.933$ for ROA and $R^2 = 0.950$ for ROE, indicating that more than 93% of the variation in ROA and 95% of the variation in ROE can be accounted for by these credit risk management variables.

Non-Performing Loans (NPLs): The positive coefficients of NPLs on both ROA ($\beta = 0.0660$, $p < 0.01$) and ROE ($\beta = 0.613$, $p < 0.1$) are counterintuitive but may reflect short-term profitability effects of banks that are more aggressive in lending. Alternatively, these findings could indicate that banks with robust monitoring and recovery mechanisms are able to sustain profitability despite higher levels of NPLs. While this relationship is statistically significant, the small sample size warrants cautious interpretation.

Risk Coverage Ratio (RCR): The positive and significant relationship between RCR and both ROA ($\beta = 0.00314$, $p < 0.01$) and ROE ($\beta = 0.0299$, $p < 0.05$) highlights the importance of adequate provisioning for potential losses. Banks that proactively allocate reserves against non-performing loans are better positioned to absorb shocks, safeguard asset quality, and maintain consistent profitability.

Capital Adequacy Ratio (CAR): CAR exhibits a negative effect on both ROA ($\beta = -0.00742$, $p < 0.05$) and ROE ($\beta = -0.0473$, $p < 0.01$). This finding reflects the classical trade-off between financial stability and profitability: while higher capital enhances resilience against insolvency, it reduces the leverage effect that can amplify returns on equity. In the context of Uzbekistan, overly conservative capital policies may stabilize banks but limit their short-term profitability.

Liquidity Ratio (LR): The positive coefficients for LR on ROA (β = 0.00432, $p < 0.01$) and ROE (β = 0.0151, $p < 0.1$) underscore the importance of liquidity management. Sufficient liquidity allows banks to meet obligations, fund operations, and respond to financial shocks without incurring additional costs, thereby supporting profitability.

Collectively, the results suggest that effective CRM-through prudent provisioning, balanced leverage, and liquidity management-is a significant determinant of profitability in Uzbek banks. While NPLs' positive association with profitability requires cautious interpretation, the overall evidence confirms that careful risk management, combined with optimized capital and liquidity policies, enhances both ROA and ROE. These findings align with the broader banking literature on the risk-return trade-off and highlight the sector-specific challenges and opportunities in emerging markets like Uzbekistan.

Based on the regression findings and the analysis of CRM practices in Uzbekistan, the following policy and managerial recommendations are proposed:

1. Enhanced Risk Assessment and Monitoring: Banks should adopt dynamic and forward-looking tools for credit risk evaluation, including real-time monitoring and early-warning systems. Advanced analytical methods, such as machine learning and big data analysis, could be gradually introduced to improve predictive accuracy and reduce unexpected loan defaults.
2. Diversification of Loan Portfolios: Concentrated lending in a few sectors exposes banks to sector-specific shocks. Gradual diversification across industries and geographic regions can mitigate systemic risk while maintaining returns.
3. Risk-Based Pricing: Interest rates and loan terms should reflect borrower-specific risk profiles. Tailored pricing strategies encourage timely repayment and reduce exposure to high-risk clients, thereby improving both asset quality and profitability.
4. Human Capital Development: Investment in staff training is critical for improving credit assessment and risk management expertise. Banks should provide both internal and external professional development programs, especially if adopting advanced analytics or expanding into new lending areas.
5. Regulatory Compliance and Transparency: Strengthening alignment with international standards, such as Basel frameworks, enhances risk governance and fosters investor confidence. Improved transparency and reporting quality also support consistency in CRM practices across the sector.
6. Routine Stress Testing: Regular stress tests under various macroeconomic scenarios-including exchange rate fluctuations and interest rate shocks-can help banks identify vulnerabilities and implement proactive mitigation strategies.
7. Holistic Profitability Strategies: Banks should complement CRM improvements with operational efficiency initiatives, cost control measures, income diversification, and digital transformation. Such broader strategies ensure sustainable profitability beyond mere risk metric optimization.

CONCLUSIONS AND SUGGESTIONS

This study provides empirical evidence that credit risk management is a critical determinant of commercial bank profitability in Uzbekistan. The findings confirm the research hypothesis: effective CRM practices, encompassing prudent provisioning, balanced capital allocation, and liquidity management, positively influence both ROA and ROE. While banks face challenges such as heterogeneous NPL ratios, variable leverage, and structural limitations, the results indicate that strategic improvements in risk assessment, portfolio diversification, and human capital development can significantly enhance financial performance. For policymakers and bank managers alike, these findings underscore the importance of combining robust risk management with operational and strategic initiatives to promote sustainable profitability in the Uzbek banking sector.

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Sahifalovchi va dizayner: Iskandar Islomov

2025. № 11

“Muhandislik va iqtisodiyot” jurnali 26.06.2023-yildan
O‘zbekiston Respublikasi Prezidenti Adminstratsiyasi huzuridagi
Axborot va ommaviy kommunikatsiyalar agentligi tomonidan
№S–5669245 reyestr raqami tartibi bo‘yicha ro‘yxatdan o‘tkazilgan.
Litsenziya raqami: №095310.

**Manzilimiz: Toshkent shahri Yunusobod
tumani 15-mavze 19-uy**