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THE ROLE OF INTERMEDIATION AND NON-INTEREST SERVICES IN BANK PERFORMANCE: A STATISTICAL-ECONOMETRIC FRAMEWORK FOR UZBEKISTAN

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Abstract

This thesis examines how intermediation-related and non-interest services can be incorporated into statistical and econometric assessments of commercial bank performance in Uzbekistan. Official Central Bank data show that banking-sector non-interest income increased from UZS 55.1 trillion to UZS 73.1 trillion between the reporting dates of 1 January 2025 and 1 January 2026, an increase of about 32.6%, while the interest margin rose by about 11.1%. The approximate share of non-interest income in the sum of interest and non-interest income increased from 33.0% to 36.4%. These descriptive changes indicate stronger diversification of revenue sources, but they do not by themselves prove that diversification improves efficiency or stability. International literature provides mixed evidence: fee-based and non-interest activities can diversify revenue, but may also be volatile or associated with weaker risk-adjusted performance. The thesis therefore proposes a bank-level panel model in which ROA, ROE, cost-to-income ratio and Z-score are explained by the non-interest income share, diversification indices and controls for size, capital, asset quality and liquidity.

Keywords: bank performance, non-interest income, fee income, intermediation services, diversification, ROA, ROE, panel data, econometrics, Uzbekistan.



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1. Introduction

Commercial banks traditionally earn income from maturity transformation: they attract deposits and other funding and allocate these resources to loans and securities. Digitalisation, payment services, guarantees, transfers, asset management and other fee-based activities have broadened the revenue structure of modern banks. This process changes how bank performance should be statistically evaluated. Profitability based only on the interest margin may understate the role of transactional and intermediary services, while a high non-interest-income share may reflect either healthy diversification or greater exposure to volatile market-based revenue.

Uzbekistan's banking sector provides evidence of a growing role for non-interest activity. According to Central Bank statistics, interest income increased from UZS 111.9 trillion to UZS 127.7 trillion between 1 January 2025 and 1 January 2026. Over the same reporting comparison, non-interest income increased from UZS 55.1 trillion to UZS 73.1 trillion, and net non-interest income (after relevant non-interest and operating expenses as reported by the CBU table) rose from UZS 8.8 trillion to UZS 15.0 trillion (CBU, 2026).

The research problem is therefore not whether non-interest services are expanding, but whether their expansion improves bank efficiency and financial stability after controlling for risk, scale and business model. The purpose of this thesis is to formulate a statistical-econometric framework for testing this question in Uzbekistan under specialty 08.00.06.

2. Literature Review

International evidence on income diversification is mixed. DeYoung and Rice (2004), using U.S. commercial-bank data, found that marginal increases in non-interest income were associated on average with less favorable risk-return trade-



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offs, suggesting that non-interest activities coexist with rather than simply replace traditional intermediation. Stiroh (2004) similarly reported limited diversification benefits and greater volatility for some non-interest components.

Laeven and Levine (2007) found a diversification discount in financial conglomerates, consistent with the view that agency costs can offset economies of scope. More recent evidence from other banking systems, however, finds positive relationships between diversified non-interest income and performance in some contexts. These differences indicate that the sign and magnitude of the effect are likely to depend on the composition of non-interest income, regulatory environment, bank size, technology and competition.

For Uzbekistan, the rapid expansion of digital payment services, remote banking and fintech cooperation may change the economics of fee-based activity. Transaction services can create recurring fee streams, improve customer retention and generate data that reduce information asymmetry. At the same time, aggressive expansion into unfamiliar businesses can increase operational, cyber and conduct risk. Statistical analysis should therefore separate stable fee/commission income from trading, foreign-exchange or one-off income whenever the data permit.

3. Descriptive Statistics from the Uzbekistan Banking Sector

Indicator, UZS bn	01.01.2025	01.01.2026	Change
Interest income	111,866	127,702	+14.2%
Interest expense	77,675	89,703	+15.5%
Interest margin	34,192	38,000	+11.1%
Non-interest income	55,120	73,104	+32.6%
Non-interest expense	22,619	27,842	+23.1%
Operating expense	23,715	30,250	+27.6%
Net non-interest result reported by CBU	8,785	15,012	+70.9%
Non-interest income / (interest + non-interest income)	33.0%	36.4%	+3.4 pp



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Source: Central Bank of the Republic of Uzbekistan, Profitability indicators of banking sector, 21 January 2026. Percentage changes are author calculations from the published aggregates.

The most visible feature is that non-interest income grew considerably faster than the interest margin. Its approximate share in gross interest plus non-interest income increased by 3.4 percentage points. This is consistent with increasing importance of payments, transactions and other services. Nevertheless, an aggregate sector table cannot identify whether the change is broad-based across banks or concentrated in several large or digital banks.

A second limitation is compositional. “Non-interest income” may include fees, commissions, foreign-exchange income, trading results and other items with different risk properties. A bank whose non-interest income consists mainly of stable payments and account-service fees may have a different risk profile from a bank relying on volatile market income. Therefore, econometric research should use the most disaggregated income categories available.

4. Econometric Model

A baseline panel specification is: $\text{Performance}_{it} = \alpha + \beta_1 \text{NIIShare}_{it} + \beta_2 \text{Diversification}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{CAR}_{it} + \beta_5 \text{NPL}_{it} + \beta_6 \text{LCR}_{it} + \mu_i + \lambda_t + \varepsilon_{it}$. Performance may be ROA, ROE, cost-to-income ratio or bank Z-score. NIIShare is non-interest income divided by operating income; Diversification may be measured using a Herfindahl-type revenue diversification index.

One simple diversification measure is $\text{DIV}_{it} = 1 - [(\text{InterestIncomeShare}_{it})^2 + (\text{NonInterestIncomeShare}_{it})^2]$. The index is low when income is concentrated in one source and higher when the two sources are more balanced. If more detailed revenue categories are available, the Herfindahl structure should



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include fees, trading income, foreign-exchange income and other operating income separately.

The coefficient β_1 should not be assumed positive. A quadratic model, $\text{Performance}_{it} = \dots + \beta_1 \text{NIIShare}_{it} + \beta_2 \text{NIIShare}_{it}^2 + \dots$, tests whether diversification is beneficial only up to a threshold. A negative β_2 with positive β_1 would be consistent with diminishing or reversing benefits at high reliance on non-interest revenue. Bank fixed effects help control for management culture and business model; time effects capture economy-wide conditions. Endogeneity can be addressed with lagged explanatory variables or System GMM if a sufficiently long bank panel is available.

5. Statistical Indicators for Service Quality and Diversification

Dimension	Suggested indicator	Interpretation
Revenue diversification	Non-interest income share	Importance of fee/other services in revenue
Revenue concentration	HHI of income categories	Lower concentration generally implies more diversification
Efficiency	Cost-to-income ratio	Operating cost required to generate income
Profitability	ROA, ROE	Return generated on assets/equity
Stability	Z-score	Distance from insolvency based on profitability and capital
Service intensity	Fee income per active customer	Monetisation of transaction/service relationship
Digital service use	Transactions per digital active user	Depth of digital intermediation
Quality	Complaints per 10,000 clients; failed-payment rate	Operational and consumer-service quality



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6. Implications for Uzbekistan

- Disaggregate non-interest income into fee/commission, FX/trading and other recurring/non-recurring components for analytical purposes.
- Link service-quality indicators with profitability data to test whether higher fees are associated with better service rather than only higher extraction from customers.
- Estimate separate models for state-owned, private, foreign-owned and digital banks because the economics of non-interest services differ across business models.
- Control for capital adequacy, NPL, liquidity and bank size to avoid attributing general balance-sheet strength to diversification.
- Use rolling or quarterly panel estimation to capture structural change as digital banks and fintech partnerships expand.
- Report both statistical significance and economic magnitude, including threshold levels when nonlinear effects are detected.

The aggregate Central Bank figures used in this thesis establish a reliable descriptive trend but cannot identify bank-level causality. The reported 32.6% increase in non-interest income and the 3.4 percentage-point rise in its approximate share of gross interest plus non-interest income are author calculations from official sector aggregates. They should not be interpreted as the average effect for an individual bank. Estimating the proposed panel models requires consistent bank-level quarterly observations and harmonised accounting definitions. Until such a dataset is assembled, presenting invented regression coefficients would be methodologically inappropriate. The thesis therefore separates observed statistical facts from proposed econometric tests.



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6.4. Research Limitations and Reproducibility

Threshold panel models provide another useful extension. Instead of imposing a quadratic functional form, the model can estimate whether the relationship changes when the non-interest-income share crosses an endogenously estimated threshold. This can identify a range in which diversification improves performance and a range in which additional diversification creates complexity or risk. Such results would be more useful for bank strategy and supervision than a single average coefficient.

The effect of diversification is unlikely to be identical across banks. Large universal banks may have the technology and customer base needed to exploit economies of scope, while smaller banks may face higher fixed costs when entering new service lines. Digital banks may generate a high share of fee and transaction income with a very different cost structure from branch-intensive banks. Accordingly, interaction terms can be introduced between non-interest-income share and bank size, ownership type or digital-bank status. Quantile regressions can also test whether diversification affects low-performing and high-performing banks differently.

6.3. Heterogeneity and Threshold Effects

A bank-level productivity analysis can complement profitability regressions. Data Envelopment Analysis (DEA) or stochastic frontier analysis (SFA) can estimate relative efficiency using inputs such as operating expenses, employees or fixed assets and outputs such as loans, deposits, payment transactions and fee income. The resulting efficiency score can then be related to the share of intermediation services. This two-stage framework is especially relevant to specialty 08.00.06 because it combines statistical efficiency measurement with panel econometrics.



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An increase in non-interest revenue is not necessarily a welfare or efficiency improvement. Higher fee income can result from a larger customer base, greater transaction volumes, improved digital services or simply higher tariffs. Econometric assessment should therefore include service-quality variables and volume measures. A useful specification augments the performance equation with digital transaction growth, active customers, complaint rates, failed-payment ratios and cost-to-income measures. If fee income rises together with transaction volumes and lower unit costs, this is more consistent with productive scale and service deepening than with pure price effects.

6.2. Efficiency, Service Quality and Customer Value

Persistence can be measured statistically using autoregressive coefficients for each income component. If fee income has a high AR(1) coefficient and low conditional volatility relative to trading income, then the same one-percentage-point increase in the revenue share of these two components should not be interpreted identically. A bank may improve diversification by expanding stable payment fees, while an increase in volatile trading income could raise measured diversification but worsen the risk-adjusted return. This decomposition directly addresses the mixed findings in the international literature.

For empirical work, treating all non-interest income as a single homogeneous variable can conceal important differences in risk and persistence. Fee and commission income from payments, transfers, cards, guarantees and account services is often linked to customer activity and may be relatively recurrent. Foreign-exchange gains, securities trading results and valuation changes can be more sensitive to market conditions. Other operating income may include one-off items. A professional statistical dataset should therefore separate at least three categories: recurring fee/commission income, market-related income and other



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income. The diversification effect should then be estimated both for total non-interest income and for its individual components.

7. Conclusion

Central Bank data confirm a marked increase in non-interest income in Uzbekistan's banking sector during 2025, with growth substantially exceeding the increase in the interest margin. This supports the hypothesis that intermediation and service activities are becoming more important in the revenue model. However, aggregate growth cannot be treated as evidence that diversification automatically raises efficiency or stability. International research is mixed, and the composition of non-interest income matters. A bank-level panel framework with ROA/ROE, cost efficiency and Z-score outcomes, combined with a disaggregated diversification index and risk controls, provides a rigorous methodology for evaluating the role of intermediation services in bank performance.

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