

STATISTICAL ASSESSMENT AND ECONOMETRIC MODELLING OF POPULATION USE OF BANKING SERVICES IN UZBEKISTAN

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Abstract

This thesis develops a statistical framework for measuring the population's use of banking services in Uzbekistan, with particular attention to remote banking, payment cards and digital access. The study combines supply-side indicators published by the Central Bank of the Republic of Uzbekistan with demand-side evidence from the World Bank Global Findex 2025. The paper stresses an important measurement distinction: counts of remote-banking users reported by banks are account- or bank-level registrations and may contain the same person more than once, whereas Global Findex indicators are based on nationally representative household survey data. Therefore, penetration should not be inferred by simply dividing aggregated bank registrations by population. A multidimensional banking-use index and an econometric specification for explaining individual or regional variation are proposed. The analysis indicates rapid expansion of digital banking infrastructure alongside persistent inclusion gaps by age, education and income, which supports a shift from simple access statistics toward usage intensity, regularity and effective digital capability.

Keywords: financial inclusion, banking services, remote banking, digital payments, payment cards, Global Findex, statistical assessment, econometrics, Uzbekistan.

1. Introduction

Digital transformation has changed the statistical meaning of “access to banking services”. A bank branch, an account or a payment card no longer fully describes how people participate in the financial system. Individuals may have several cards but use only one; they may be registered in several

mobile applications; or they may own an account without making regular digital payments. Consequently, a modern statistical assessment must distinguish access, active use, intensity of transactions and the ability to use services independently.

Uzbekistan is a particularly relevant case because the banking and payment infrastructure has expanded rapidly. According to the Central Bank, as of 1 December 2025 commercial banks had issued about 66.8 million payment cards, installed 430.1 thousand POS terminals and 39.8 thousand ATMs and self-service kiosks. The number of registrations in remote bank-account management systems was reported at 79.3 million, including 77.6 million registrations of individuals (CBU, 2025a; CBU, 2025b). These figures demonstrate scale, but they should not be interpreted as unique persons because customers may use services of more than one bank.

Demand-side statistics provide a complementary picture. Global Findex 2025, based on surveys conducted in 2024, reports that 60.7% of women and 58.5% of men in Uzbekistan had an account. Among young adults aged 15–24 the corresponding account-ownership indicator was 35.4%, while for adults with primary education or less it was 39.3% (World Bank, 2025a; World Bank, 2025b). This reveals that rapid growth in digital infrastructure can coexist with significant differences in actual financial inclusion.

The objective of this thesis is to propose a statistically consistent methodology for assessing banking-service use and to formulate econometric models that can identify the determinants of active use. The contribution is aligned with specialty 08.00.06 because it focuses on indicator construction, comparability of administrative and survey statistics, and model-based explanation of variation across population groups and regions.

2. Literature and Measurement Framework

Financial inclusion is commonly described through three dimensions: access, usage and quality. Access captures the availability of accounts, service points and digital channels; usage reflects the frequency and range of services used; quality relates to affordability, reliability, safety and suitability. The Global Findex database is a key demand-side source because it measures account ownership, payments, savings, credit and digital

connectivity using comparable household surveys across economies (World Bank, 2025c).

Administrative banking statistics are indispensable for high-frequency monitoring, yet they measure a different statistical unit. A count of issued cards is a stock of instruments, not a count of cardholders. A count of remote-banking users may be a registration at a specific bank, not a unique resident. Failure to distinguish these units can generate a denominator problem and overstate penetration. The correct solution is not to discard administrative data, but to combine it with survey-based unique-person indicators.

For econometric analysis, the dependent variable can be defined at several levels. At the individual level, ActiveUse_i may equal one if a respondent has used a card or mobile phone to make payments or transfers during the last 12 months. At the regional level, an index may combine the number of active digital users per 1,000 adults, card transactions per capita, POS transactions per capita and the share of adults with an account. A panel dataset by region and year would enable fixed-effects estimation and trend decomposition.

3. Data and Descriptive Evidence

Indicator	Observation	Reference period	Statistical interpretation
Payment cards in circulation	66.785 million	1 Dec 2025	Number of instruments, not unique cardholders
POS terminals	430,089	1 Dec 2025	Acceptance infrastructure
ATMs and self-service kiosks	39,846	1 Dec 2025	Cash/self-service infrastructure
Remote-banking registrations – individuals	77.639 million	1 Dec 2025	Bank-level registrations; possible duplication
Remote-banking registrations – total	79.334 million	1 Dec 2025	Individuals + legal entities/entrepreneurs
Account ownership – women	60.7%	2024 survey	Demand-side population estimate
Account ownership – men	58.5%	2024 survey	Demand-side population estimate
Account ownership – age 15–24	35.4%	2024 survey	Youth inclusion indicator
Account ownership – primary education or less	39.3%	2024 survey	Education-related inclusion gap



Sources: Central Bank of the Republic of Uzbekistan (2025a, 2025b); World Bank Global Findex 2025. Values from administrative and survey sources are not directly interchangeable.

The infrastructure indicators confirm the deepening of cashless and remote channels. At the same time, the demand-side results show that ownership is not universal and that certain groups remain substantially below the national male/female rates. The gap is particularly visible among young adults and people with lower educational attainment. This suggests that policy should move beyond the number of cards or application registrations and monitor whether services are actually used for payments, savings and formal financial management.

A statistically robust dashboard should report both stock and flow measures. Stock variables include number of cards, registered users, terminals and accounts. Flow variables include the number and value of payments, transfers, merchant purchases and cash withdrawals during a specified period. Ratios such as digital transactions per active account and merchant payments per card are preferable for measuring intensity because they reduce the bias caused by multiple cards or multiple registrations.

3. Research Limitations

Robustness analysis should include alternative dependent variables, alternative definitions of an “active” user and subgroup estimation. For example, activity may be defined as at least one digital transaction within 30 days, 90 days or 12 months. Results should be compared for women and men, urban and rural residents, younger and older adults, and education groups. Standard errors should be clustered at the level at which shocks are likely to be correlated, such as region or bank. Model quality should be reported using pseudo- R^2 , classification metrics and out-of-sample validation rather than relying only on coefficient significance.

A credible econometric design must address selection and reverse causality. Individuals with higher income, education or digital literacy are both more likely to use banking services and more likely to live in locations with better infrastructure. Consequently, a simple correlation between POS-terminal density and digital usage may overstate the causal effect of infrastructure. Individual microdata models should control for observable characteristics,

while regional panel models should include fixed effects and time effects. If policy reforms or infrastructure roll-outs occurred at different times across regions, difference-in-differences or event-study designs could provide stronger identification, subject to a plausible parallel-trends assumption.

The index should also distinguish between extensive and intensive margins. The extensive margin asks whether a person uses formal banking at all; the intensive margin asks how frequently and for how many functions the person uses it. This distinction is important for Uzbekistan because rapid issuance of cards and app registrations can raise the extensive margin without guaranteeing regular merchant payments, savings or formal borrowing. A transition matrix can be used to classify households or regions as non-users, occasional users, active users and multi-service users, and then track movements between these states over time.

Weight selection is an important statistical decision. Equal weights are transparent but assume that all components contain the same amount of relevant information. Principal component analysis (PCA) offers a data-driven alternative. The first principal component can identify the linear combination that explains the largest part of common variance across access and usage indicators. However, PCA weights are sample-dependent and may change over time. For policy monitoring, it is therefore advisable to report both a PCA-based index and an equal-weight robustness index. A high correlation between the two would strengthen confidence that results are not driven by a particular weighting rule.

A composite index should be designed so that each component represents a distinct dimension of effective use rather than simply adding several measures of the same phenomenon. A practical structure consists of four sub-indices: access, activity, digital depth and inclusion quality. Access may include account ownership and service-point availability; activity may include the frequency of card and account transactions; digital depth may include the share of active users conducting remote payments and transfers; inclusion quality may capture continuity of use, complaint rates, failed transactions and the ability to use an account without assistance. Before aggregation, each indicator should be standardised, for example by z-scores or min-max normalisation, to eliminate differences in measurement scale.

4. Conclusion

Uzbekistan's banking infrastructure has expanded to a scale at which simple counts of cards and remote-banking registrations are no longer sufficient indicators of financial inclusion. Central Bank statistics show tens of millions of cards and digital registrations, while Global Findex 2025 shows that account ownership remains uneven across demographic groups. The methodological implication is clear: administrative supply-side statistics should measure scale and transaction intensity, while survey statistics should measure unique-person access, usage and capability. A multidimensional index combined with logit/probit or regional panel models would provide a stronger empirical basis for policy under specialty 08.00.06.

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