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Article

Improving the Efficiency of Commercial Banks Under Conditions of Transformation: International Experience and Analytical Lessons for Uzbekistan

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Abstract: This paper examines international experience in raising the operating and financial efficiency of commercial banks under conditions of systemic transformation, and derives analytical lessons applicable to the ongoing reform of Uzbekistan's banking sector. Using a comparative-institutional design combined with a qualitative meta-synthesis of empirical efficiency studies (DEA and SFA based) and descriptive cross-country statistical analysis for the period 2000–2025, the study compares four distinct transformation trajectories: (i) the privatisation-and-foreign-entry model of Central and Eastern Europe (Poland, the Czech Republic, Estonia, Hungary); (ii) the gradual, state-led recapitalisation-and-listing model of China; (iii) the crisis-driven restructuring model of the Republic of Korea and Türkiye; and (iv) the consolidation-and-partial-privatisation model of the Commonwealth of Independent States (Kazakhstan, Georgia, Armenia). The analysis shows that ownership transformation alone is a necessary but insufficient condition for efficiency gains: measurable improvement in cost efficiency, the cost-to-income ratio and returns on assets emerges only where privatisation is accompanied by (a) credible balance-sheet cleaning through a specialised asset-management mechanism, (b) hard budget constraints on directed lending, (c) genuine board-level corporate governance reform, and (d) a subsequent wave of technological transformation. Meta-synthesis of the reviewed literature indicates that foreign-owned and privatised domestic banks in transition economies operate, on average, 8–15 percentage points closer to the efficiency frontier than state-owned banks, but that this gap narrows substantially once governance quality is controlled for. The paper concludes that for Uzbekistan — where state-owned banks still held approximately 65 per cent of sector assets in 2025 — the binding constraint on efficiency is not the formal ownership share as such, but the persistence of policy-directed lending, weak non-performing asset recognition and an underdeveloped funding base. Six policy recommendations are formulated, including the sequencing of privatisation, the creation of a professional problem-asset resolution mechanism, and the shift from branch-based to platform-based operating models.

Keywords: Commercial Banks, Banking Transformation, Efficiency, Privatisation, Foreign Ownership, Data Envelopment Analysis, Stochastic Frontier Analysis, Non-Performing Loans, Digital Banking, Transition Economies, Uzbekistan.

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1. Introduction

The transformation of banking systems is one of the defining structural processes of the past three decades in emerging and transition economies. In its narrow sense, banking transformation denotes a change in the ownership structure, business model, and technological platform of credit institutions. In its broader, systemic sense — the sense

adopted in this paper — it denotes the transition of the entire intermediation mechanism from an administratively allocated to a market-allocated model of credit resources, together with the corresponding reconstruction of regulation, corporate governance and risk management [1].

The relevance of the topic for Uzbekistan is direct and immediate. Since 2017, the country has pursued a comprehensive reform of its financial sector, encompassing the liberalisation of foreign exchange operations, the transition to inflation targeting, the adoption of a bank privatisation strategy, the introduction of a bank resolution law, and the phased withdrawal of the state from bank capital. State-owned banks accounted for approximately 84 per cent of total financial system assets in 2019, and this share had declined to about 67 per cent by mid-2025. As of March 2025, thirty-six commercial banks operated in the country: nine were fully state-owned, fifteen partially state-owned and twelve private, including seven with foreign capital; state-owned banks held 61 per cent of sector capital and 65 per cent of sector assets. Under the updated national development strategy, the number of state-owned banks is to be reduced to four by 2030, with the state's share of banking assets falling to 55 per cent [2].

These quantitative targets, however, raise a fundamental analytical question that the present study addresses: does the reduction of state ownership by itself generate efficiency gains, and if not, which complementary conditions determine whether transformation translates into measurable improvements in bank performance? International experience provides an unusually rich empirical basis for answering this question, since more than forty economies have undergone comparable transformations since 1990 under widely differing institutional conditions and with widely differing outcomes.

The object of the research is the process of transformation of commercial banking systems in foreign countries. The subject is the set of organisational, institutional and technological mechanisms through which transformation affects the efficiency of commercial banks [3].

The aim of the study is to identify, on the basis of comparative analysis of international experience, the factors that determine the effectiveness of banking transformation, and to formulate scientifically grounded recommendations for improving the efficiency of commercial banks in Uzbekistan.

The following research tasks follow from this aim:

1) to systematise theoretical and empirical approaches to measuring bank efficiency under transformation;
2) to classify national transformation trajectories into analytically distinct models;
3) to compare the efficiency outcomes associated with each model using both parametric and non-parametric evidence;
4) to isolate the institutional preconditions that mediate the ownership–efficiency relationship [4];
5) to assess the applicability of the identified mechanisms to Uzbekistan's current reform stage.

The scientific novelty of the work consists in the integration of three analytical layers that are usually treated separately in the literature — ownership transformation, problem-asset resolution and digital transformation — into a single three-stage framework of efficiency formation, and in the application of this framework to the comparative assessment of Uzbekistan's reform sequence [5].

2. Materials and Methods

The study employs a mixed comparative design consisting of three complementary components:

1) Comparative-institutional analysis of national transformation trajectories, based on primary policy documents (central bank reports, financial sector assessment programmes, privatisation strategies) and secondary institutional sources.
2) Qualitative meta-synthesis of thirty-four empirical studies of bank efficiency in transition and emerging economies published between 1997 and 2025, from which reported efficiency scores, estimation methods, sample composition and directional findings were extracted into a structured matrix.
3) Descriptive comparative statistical analysis of banking-sector performance indicators for a purposive sample of ten countries, grouped by transformation model [6].

Table 1. Comparative sample comprises ten economies selected on the criterion of having undergone a documented systemic banking transformation with an identifiable ownership-change component: Poland, the Czech Republic, Estonia, Hungary, China, the Republic of Korea, Türkiye, Kazakhstan, Georgia and India. Uzbekistan is treated as the reference case. The observation period is 2000–2025, with analytical emphasis on 2015–2025.

Table 1. Five groups of indicators are used, as summarised below.

Group	Indicators
Structural	State share in sector assets; foreign share in sector assets; number of banks; CR-3 and CR-5 concentration; Herfindahl–Hirschman index
Profitability	Return on assets (ROA); return on equity (ROE); net interest margin (NIM)
Operational efficiency	Cost-to-income ratio (CIR); operating expenses to assets; assets per employee
Asset quality and stability	Non-performing loan ratio; provision coverage; capital adequacy ratio; loan-to-deposit ratio
Technological	Share of transactions through remote channels; number of active digital users per branch

Although the present paper does not itself estimate a frontier, the meta-synthesis component requires that the underlying estimators be specified, since comparability of the extracted scores depends on them [7].

Non-parametric estimation (DEA). For each decision-making unit o among n banks using m inputs to produce s outputs, the input-oriented variable-returns-to-scale model solves:

$$\min \theta$$

$$\text{s.t.} \quad \Sigma_j \lambda_j x_{ij} \le \theta\, x_{io} \qquad (i = 1, \ldots, m)$$

$$\Sigma_j \lambda_j y_{rj} \ge y_{ro} \qquad (r = 1, \ldots, s)$$

$$\Sigma_j \lambda_j = 1, \quad \lambda_j \ge 0$$

where $\theta \in (0, 1]$ is the technical efficiency score. Removal of the convexity constraint $\Sigma\lambda_j = 1$ yields the constant-returns CCR model; the ratio of the two scores gives scale efficiency.

Parametric estimation (SFA). The stochastic cost frontier in translog form is specified as:

$$\ln TC_{it} = \alpha_0 + \Sigma_k \beta_k \ln y_{kit} + \Sigma_j \gamma_j \ln w_{jit} + \tfrac{1}{2} \Sigma_k \Sigma_l \beta_{kl} \ln y_{kit} \ln y_{lit} + \tfrac{1}{2} \Sigma_j \Sigma_h \gamma_{jh} \ln w_{jit} \ln w_{hit} + \Sigma_k \Sigma_j \delta_{kj} \ln y_{kit} \ln w_{jit} + v_{it} + u_{it}$$

where TC is total cost, y are outputs, w are input prices, $v \sim N(0, \sigma^2_v)$ is symmetric noise and $u \geq 0$ is the inefficiency term, typically half-normal or truncated-normal, with the Battese–Coelli parameterisation allowing u to depend on environmental variables such as ownership, size and market structure.

The **intermediation approach** to input–output specification is adopted throughout, with deposits and borrowed funds, labour and physical capital as inputs, and loans, securities and non-interest income as outputs.

Three limitations should be noted. First, efficiency scores extracted from different studies are not strictly comparable across samples, since frontiers are sample-specific; the meta-synthesis therefore reports directional findings and rank orders rather than pooled point estimates. Second, cross-country accounting differences — particularly in non-performing loan definitions and provisioning practice — reduce the comparability of asset-quality indicators. Third, the descriptive statistics reported below are compiled from public sources of differing vintage and should be verified against the most recent releases of the World Bank Global Financial Development Database, the IMF Financial Soundness Indicators and national central bank statistics before use in formal econometric work [8].

3. Results and Discussion

Comparative analysis of the ten sample economies yields four analytically distinct transformation models, summarised in Table 2.

Table 2. Comparative characteristics of banking transformation models.

Parameter	Model I: Privatisation and foreign entry (Poland, Czechia, Estonia, Hungary)	Model II: State-led recapitalisation and listing (China)	Model III: Crisis-driven restructuring (Korea, Türkiye)	Model IV: Consolidation and partial privatisation (Kazakhstan, Georgia, India)
Principal driver	Accession-linked institutional convergence	Preparation for external competition after WTO accession	Systemic banking crisis	Post-crisis clean-up and fiscal consolidation
Speed	Rapid (5–8 years)	Gradual (10–15 years)	Very rapid (2–4 years)	Medium (5–10 years)
Ownership outcome	Foreign ownership above 60% of assets	State retains control; minority foreign and public listing	Mixed; temporary nationalisation then re-privatisation	State share reduced but retained in systemically important banks
Problem-asset mechanism	Carve-out at privatisation, state warranties	Centralised asset management companies	Public asset management agency with statutory powers	Dedicated problem-loan funds; direct write-offs
Fiscal cost	Low to moderate	High but deferred and opaque	Very high, immediate and disclosed	Moderate

Governance change	Imported from parent institutions	Board reform, external listing discipline	Regulatory overhaul, independent supervision	Partial; state representation persists
Principal efficiency outcome	Rapid convergence of CIR; strong technical efficiency gains	Substantial improvement from a very low base	Sharp improvement after restructuring; volatility remains	Improvement concentrated in privately owned segment
Principal weakness	Dependence on parent-bank funding cycles; credit concentration in retail	Persistence of policy lending; opaque provisioning	High social and fiscal cost; risk of re-concentration	Slow governance reform; related-party exposure

Model I — pursued by Poland, the Czech Republic, Estonia and Hungary — combined the sale of the largest state banks to foreign strategic investors with rapid adoption of the European regulatory acquis. Its distinguishing feature is that governance reform was imported rather than legislated: acquiring parent institutions transferred risk-management systems, credit-underwriting standards and internal audit functions directly. The measured efficiency gains were correspondingly rapid. Its distinguishing vulnerability, exposed after 2008, is the transmission of parent-bank deleveraging into the host economy, which prompted the partial reversal of foreign ownership in Poland and Hungary through domestically financed re-acquisitions [9].

Model II — China — proceeded in the opposite sequence. The state first removed the accumulated legacy losses through four asset management companies established in 1999, then recapitalised the major banks, then introduced minority foreign strategic investors, and only then listed the banks internationally, culminating in a series of very large initial public offerings from 2005 onwards. Control was never surrendered. The efficiency gains were substantial in relative terms but started from an exceptionally low base, and the mechanism of policy lending was reduced rather than eliminated.

Model III — the Republic of Korea after 1997 and Türkiye after 2001 — was involuntary. In both cases the state took over failed institutions, established a statutory resolution and asset-management agency, injected public funds on a scale of the order of a quarter to a third of annual GDP, imposed loss-sharing on existing shareholders, and rebuilt the supervisory architecture as an independent agency. The distinguishing feature is speed and disclosure: losses were recognised immediately rather than amortised. Post-crisis efficiency improvements were among the largest in the sample [10].

Model IV — Kazakhstan, Georgia and India — is characterised by consolidation as the primary instrument. Kazakhstan responded to the post-2014 deterioration in asset quality with a financial stability programme centred on a problem-loan fund and on the merger of two of its largest banks. India consolidated its public sector banks from twenty-seven to twelve between 2017 and 2020. Georgia reached a highly concentrated structure in which two banks account for the large majority of assets, combined with an unusually strict supervisory regime.

Table 3 presents indicative structural and performance indicators for the sample. These figures are drawn from public sources of varying vintage and are intended for comparative orientation; they must be verified and updated from the primary databases before econometric use [11].

Table 3. Indicative banking sector indicators, most recent available observations (per cent unless stated).

Country	State share in assets	Foreign share in assets	CIR	ROA	ROE	NPL	CAR
Estonia	negligible	~90	~35	~1.8	~13	~1	~24
Czech Republic	low	~85	~45	~1.3	~13	~2	~22
Poland	~45	~45	~48	~1.2	~12	~5	~21
Hungary	~25	~50	~50	~1.7	~16	~3	~19
China	dominant	low	~35	~0.7	~9	~1.6*	~15
Republic of Korea	low	moderate	~45	~0.6	~8	~0.4	~16
Türkiye	~35	~25	~40	~2.5	~30**	~2	~18
Kazakhstan	~15	~15	~40	~4	~30**	~3	~20
Georgia	negligible	~65	~40	~3	~22	~2	~20
India	~55	low	~45	~1.2	~13	~3	~17
Uzbekistan	~65	~15	~45	~1.5	~10	~4	~17

First, there is no monotonic relationship between the state's asset share and the cost-to-income ratio. China combines a dominant state share with one of the lowest cost-to-income ratios in the sample, while Poland and Hungary, with far lower state shares, report higher ratios. This is consistent with Micco, Panizza and Yañez and confirms that the ownership variable is a proxy for underlying governance and business-model variables rather than a causal driver in its own right.

Second, there is a strong and consistent relationship between the credibility of problem-asset recognition and the stability of returns. Jurisdictions that resolved legacy assets through statutory mechanisms with disclosed fiscal cost (Korea, Türkiye) show lower and less volatile non-performing loan ratios two decades later than jurisdictions where recognition was deferred.

Third, profitability and efficiency diverge systematically in high-inflation environments. Türkiye and Kazakhstan report high nominal returns on equity that reflect the inflationary re-pricing of assets rather than superior intermediation efficiency. This observation is directly relevant to the interpretation of Uzbek banking indicators, where nominal margins should be deflated before cross-country comparison [12].

Table 4 summarises the directional findings of the reviewed empirical studies with respect to the ownership–efficiency relationship.

Table 4. Directional findings of reviewed empirical efficiency studies.

Finding	Studies supporting	Studies qualifying or contradicting	Typical magnitude reported
Foreign-owned banks more cost-efficient than state-owned	21	5	8–15 pp higher efficiency score
Privatised domestic banks more efficient than never-privatised state banks	17	7	5–12 pp

Greenfield foreign entry more efficient than acquisition-based entry	9	3	6–10 pp
Efficiency declines in the initial reform phase before improving	11	2	J-curve, trough at years 2–4
State ownership penalty disappears in high-institutional-quality settings	8	2	statistically insignificant
Scale inefficiency exceeds pure technical inefficiency in small banks	14	4	scale efficiency 0.85–0.93

The single most important analytical result of the synthesis is the conditionality of the ownership effect. Once studies control for the quality of supervision, the presence of directed lending and the hardness of budget constraints, the direct effect of ownership on efficiency falls sharply, and in several specifications loses statistical significance. The policy implication is that privatisation transmits its effect through governance and budget-constraint channels; where those channels are blocked — for example, where a privatised bank remains subject to informal lending direction — the expected efficiency gain does not materialise.

Across all four models, the sequencing evidence is consistent: efficiency gains follow, rather than precede, credible balance-sheet cleaning. Three institutional designs were used.

The centralised asset management company (China, Korea's resolution agency; Türkiye's deposit insurance fund acting as resolution authority) transfers problem assets from bank balance sheets to a specialised vehicle at a determined transfer price, freeing management attention and capital. Its effectiveness depends critically on the transfer price: transfers at book value merely relocate the loss to the public balance sheet without imposing discipline, while transfers at market value crystallise capital shortfalls that must be met by recapitalisation.

The decentralised model with regulatory forbearance limits — used in Central Europe and, more recently, in the European Union's non-performing loan action plan — leaves the assets with the bank but imposes calendar-based provisioning that makes non-recognition progressively expensive.

The carve-out at privatisation model transfers legacy assets to the state immediately before sale, allowing the acquirer to purchase a clean balance sheet. This maximises sale proceeds and accelerates post-sale efficiency gains, but concentrates the fiscal cost at a single point in time.

For an economy at Uzbekistan's stage, the third design is the most directly applicable to banks scheduled for sale, and the second to banks that will remain in state ownership [13].

The comparative evidence identifies policy-directed lending as the single most persistent obstacle to efficiency improvement. Where banks retain an obligation, formal or informal, to fund state-owned enterprises or government programmes at non-market terms, three distortions follow: credit risk is priced incorrectly, the incentive to develop underwriting capability is weakened, and measured efficiency is contaminated by an implicit fiscal function performed by the bank.

The instruments used internationally to sever this link are well established: the transfer of subsidised lending programmes to a separate development institution with an explicit budget line; the compensation of banks for any residual policy mandate through transparent, on-budget subsidies rather than through directed funding; the introduction

of large-exposure and related-party limits with supervisory enforcement; and the requirement that any policy lending be booked in a separately reported segment. China's partial and India's partial success in this area, contrasted with the more complete separation achieved in Korea, largely explains the divergent efficiency trajectories of these systems.

In economies that completed ownership transformation, a second wave of efficiency gains has come from technological reconstruction. The comparative evidence points to four design principles [14].

First, the decisive variable is process decommissioning, not channel addition. Institutions that migrated transactions to digital channels while retaining the underlying branch and back-office structure experienced a temporary increase in the cost-to-income ratio; those that closed or repurposed branches and automated back-office processes in parallel achieved durable reductions.

Second, platform architecture — modular core systems with open application-programming interfaces — determines the marginal cost of introducing new products, and therefore the long-run rather than the short-run cost curve.

Third, data-based credit underwriting substantially lowers the cost of serving small enterprises and retail borrowers, the segments in which transformation economies typically have the largest unmet demand. Estonia and Georgia illustrate how small systems can achieve very high digital penetration; the Singaporean experience documented by Sia, Soh and Weill illustrates the reorganisation of the institution itself around the customer journey rather than the product line.

Fourth, the efficiency benefits are asymmetric by bank size: small banks capture proportionally larger gains from shared or outsourced infrastructure, which argues for sector-level utilities (shared payment rails, common identity infrastructure, credit bureau coverage) rather than duplicated individual investment.

Positioning Uzbekistan against the typology in Table 5. produces a mixed classification. The country's declared reform programme corresponds most closely to Model I — sale of major state banks to strategic investors, with international financial institutions acting as pre-privatisation shareholders. Its actual institutional configuration, however, corresponds more closely to Model IV: a dominant state share retained in systemically important banks, consolidation of the sector, and a gradual timetable.

Four observations follow.

First, the country is currently in the trough of the reform J-curve identified by Fries and Taci. The recognition of previously deferred credit losses, the transition to international financial reporting standards and the tightening of provisioning all raise measured costs before they raise measured efficiency. Interpreting a temporary deterioration in the cost-to-income ratio as reform failure would be an analytical error.

Second, the binding constraint is the funding structure rather than the ownership structure. Where state banks are funded predominantly by government deposits and external borrowing rather than by retail deposits, competition for depositors — the mechanism through which privatisation normally imposes discipline — operates weakly. Building the retail deposit base is therefore a precondition for privatisation to have its expected effect, not merely a parallel objective.

Third, asset-quality recognition remains the principal measurement risk. The World Bank and IMF financial sector assessment has pointed to shortcomings in the recognition of non-performing assets and to weak oversight of lending to state-owned enterprises. Until recognition practice converges on international standards, cross-country comparison of Uzbek non-performing loan ratios will understate the true position, and efficiency scores estimated from reported data will be biased upward.

Fourth, the sequence matters more than the pace. The international evidence indicates that privatisation preceded by balance-sheet cleaning, governance reform and the removal of directed-lending obligations produces sustained efficiency gains, whereas privatisation that precedes these measures typically produces a one-off ownership change with limited operational effect and, in several documented cases, subsequent re-nationalisation [15].

Table 5. Applicability matrix of international instruments to Uzbekistan.

Instrument	Source experience	Applicability	Priority
Pre-sale carve-out of legacy assets	Central Europe	High	Immediate
Statutory problem-asset resolution vehicle	Korea, China, Kazakhstan	High	Immediate
Transfer of subsidised programmes to a development institution	Korea, Poland	High	Immediate
Calendar-based provisioning requirements	European Union	High	Short term
Minority strategic investor before full sale	China, Kazakhstan	High	Short term
Independent board majority and committee structure	All models	High	Short term
Public listing of a minority stake	China, India, Georgia	Medium	Medium term
Sector-level shared digital infrastructure	Estonia, Georgia	High	Medium term
Full divestment of systemically important banks	Central Europe	Medium	Long term

4. Conclusions

The comparative analysis of international experience yields six principal conclusions. First, transformation of ownership is a necessary but not a sufficient condition for improving the efficiency of commercial banks. The empirical evidence from more than thirty studies indicates that the efficiency advantage of privatised and foreign-owned banks — typically 8 to 15 percentage points on frontier measures — is substantially mediated by governance quality, supervisory capacity and the hardness of budget constraints, and diminishes or disappears where these conditions are absent. Second, the sequence of reform measures is more consequential than their speed. The most successful trajectories in the sample cleaned balance sheets, removed directed-lending obligations and reconstructed governance before transferring ownership. Where privatisation preceded these measures, efficiency gains were limited and reversals were frequent. Third, credible recognition and resolution of problem assets is the precondition for any meaningful measurement of efficiency. Deferred recognition inflates reported efficiency, suppresses credit supply and postpones rather than avoids the fiscal cost. Fourth, efficiency typically declines before it improves. The J-curve pattern documented in transition economies means that policy evaluation must be conducted over a horizon of at least five to seven years, and that short-run deterioration in cost ratios during a period of

provisioning reform should not be interpreted as reform failure. Fifth, digital transformation constitutes a second, analytically distinct stage of efficiency formation, whose returns depend on the decommissioning of legacy processes rather than on the addition of digital channels. For small and medium-sized banks, sector-level shared infrastructure delivers larger gains than individual investment. Sixth, for Uzbekistan specifically, the analysis suggests that the priority order should be: (i) establishment of a professional problem-asset resolution mechanism with transparent transfer pricing; (ii) transfer of remaining subsidised lending programmes out of commercial bank balance sheets to an explicitly funded development institution; (iii) completion of governance reform, including genuinely independent board majorities and functioning risk and audit committees, in banks scheduled for both retention and sale; (iv) development of the retail deposit base as the mechanism through which competitive discipline operates; (v) staged privatisation beginning with medium-sized institutions, using minority strategic investors and international financial institutions as transitional shareholders; and (vi) investment in sector-level digital infrastructure to allow smaller banks to compete on cost. Directions for further research. The propositions developed here are testable. Priority extensions include: estimation of a stochastic cost frontier for Uzbek commercial banks over 2017–2025 with ownership, directed-lending intensity and digital-channel penetration as environmental variables in the Battese–Coelli inefficiency specification; Malmquist decomposition of productivity change to separate frontier shift from catch-up; and a matched-sample comparison of privatised and non-privatised Uzbek banks using a difference-in-differences design once the post-privatisation observation window is sufficiently long.

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