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LIQUIDITY AND MARKET EFFICIENCY OF BANK SHARES ON THE TASHKENT STOCK EXCHANGE

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Abstract

Bank shares are the most actively traded equities in Uzbekistan and the main channel through which the state is expected to sell its stakes in banks. This paper tests the weak form of the efficient market hypothesis for the ordinary shares of four listed banks – Uzpromstroybank (SQB), Hamkorbank, Ipak Yuli Bank and Aloqabank – and for the UCI index, using 950 daily closing prices from January 2023 to September 2026. Autocorrelation tests, Lo–MacKinlay variance ratios with robust statistics and the Chow–Denning multiple test are applied separately to 2023–2025 and to January–September 2026. In 2023–2025 three of the four bank stocks show strong next-day reversals (first-order autocorrelation from −0.29 to −0.35; ten-day variance ratios of 0.26–0.40), and the random walk is rejected at the 1% level. In 2026, when the monthly trading value of the two most traded bank stocks rose more than tenfold, no series rejects the random walk: Hamkorbank's returns become close to white noise, while SQB switches from reversal to short-run momentum. Thin trading appears to be the main source of inefficiency, and single-day quotes are a poor benchmark for pricing sales of state-owned bank shares.

Keywords: weak-form efficiency; random walk; variance ratio; bank shares; thin trading; price limits; Tashkent Stock Exchange; Uzbekistan

JEL classification: G14, G12, G21



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1. Introduction

A market is efficient in the weak form when past prices carry no information that could be used to predict future returns (Fama, 1970). The proposition is never exactly true, since nobody would be paid for gathering information if prices were fully informative (Grossman & Stiglitz, 1980), but the degree to which it holds summarises how well a market aggregates orders. In frontier markets the answer depends heavily on liquidity: when few orders arrive, a single trade can move the price away from its fundamental value, and the move is undone once the next order arrives. A large body of evidence shows that efficiency in emerging markets is not a fixed attribute but changes with market development and trading conditions (Jefferis & Smith, 2005; Kim & Shamsuddin, 2008; Lim & Brooks, 2011), in line with the adaptive markets view of Lo (2004).

Uzbekistan is a case where the question has direct practical weight. Bank shares dominate trading on the Republican Stock Exchange «Tashkent»: in 2025 six of the ten securities with the largest number of trades on the Main Board were bank shares, and 98.8% of the investors who traded listed securities were individuals (Republican Stock Exchange «Tashkent», 2026). At the same time, the state is preparing to reduce the number of banks it controls to four by 2030 (President of the Republic of Uzbekistan, 2026). In May 2026 the National Investment Fund, to which 40% of the shares of SQB had been transferred, sold 31% of its capital on the London and Tashkent exchanges for USD 603.6 million (Kun.uz, 2026; Uzpromstroybank, 2026). The prices at which the state sells further stakes, and the prices at which retail investors trade, are only as good as the market that produces them.

To our knowledge, the random-walk behaviour of individual Uzbek bank shares has not been tested on recent daily data. This paper fills that gap and makes two further points. First, it compares a thin-market period (2023–2025) with 2026, a

year of much heavier trading, to see whether efficiency improves with liquidity. Second, it translates the serial dependence of returns into an implicit cost of trading using the estimator of Roll (1984), which gives the statistical results an economic scale.

2. Data and methodology

The sample consists of daily closing prices of the ordinary shares of Uzpromstroybank (ticker SQBN), Hamkorbank (HMKB), Ipak Yuli Bank (IPKY) and Aloqabank (ALKB) taken from the daily trading results of the Republican Stock Exchange «Tashkent» and adjusted for corporate actions, together with the UCI index from the Refinitiv (LSEG) database. The four banks differ in ownership: SQB and Aloqabank are controlled by the state, whereas Hamkorbank and Ipak Yuli are private. The sample runs from 4 January 2023 to 30 September 2026 (950 trading days) and is split into 2023–2025 (765 returns) and January–September 2026 (184 returns). Monthly trading values come from the same exchange source. Returns are continuously compounded:

$$r_t = \ln P_t - \ln P_{t-1} \qquad (1)$$

where P_t is the closing price on day t.

Serial dependence is first examined with sample autocorrelations ρ_k and the Ljung–Box statistic for ten lags (Ljung & Box, 1978). The main test is the variance ratio of Lo and MacKinlay (1988). If prices follow a random walk, the variance of q-day returns grows in proportion to q, and the ratio

$$VR(q) = \frac{\sigma_c^2(q)}{\sigma_a^2}, \quad \sigma_a^2 = \frac{1}{n-1}\sum_{t=1}^{n}(r_t - \hat{\mu})^2, \quad \sigma_c^2(q) = \frac{1}{m}\sum_{t=q}^{n}(r_t + \cdots + r_{t-q+1} - q\hat{\mu})^2 \qquad (2)$$

with $m = q(n - q + 1)(1 - q/n)$, equals one. A ratio below one means that part of each price change is reversed later (negative serial correlation); a ratio above

one means that price changes tend to continue. Because daily returns in thin markets are strongly heteroskedastic, inference uses the robust statistic

$$z^*(q) = \frac{VR(q)-1}{\sqrt{\hat{\theta}(q)/n}}, \quad \hat{\theta}(q) = \sum_{j=1}^{q-1}\left(\frac{2(q-j)}{q}\right)^2 \hat{\delta}(j), \quad \hat{\delta}(j) = \frac{n\sum_{t=j+1}^{n}(r_t-\hat{\mu})^2(r_{t-j}-\hat{\mu})^2}{\left(\sum_{t=1}^{n}(r_t-\hat{\mu})^2\right)^2} \tag{3}$$

which is asymptotically standard normal under the null hypothesis. Horizons of $q = 2, 5, 10$ and 20 trading days cover one day to roughly one month. Since testing several horizons separately inflates the probability of a false rejection, the joint test of Chow and Denning (1993) is also reported: the statistic $CD = \max |z^*(q)|$ is compared with the studentized maximum modulus distribution, whose critical values for four horizons are 2.23, 2.49 and 3.02 at the 10%, 5% and 1% levels (Charles & Darné, 2009).

Two liquidity indicators accompany the tests: the share of days with an unchanged price, a simple proxy for trading costs (Lesmond et al., 1999), and the median monthly trading value. Finally, when the first-order autocovariance of returns is negative, Roll (1984) shows that it reflects the bounce of prices between bid and ask quotes, and the implied round-trip cost is

$$S = 2\sqrt{-\mathrm{cov}(r_t, r_{t-1})} \tag{4}$$

To trace how serial dependence evolves, ρ_1 is also estimated over a rolling window of 120 trading days. All statistics were computed in Python and replicated with spreadsheet formulas.



3. Results

3.1. Return distribution and trading activity

Table 1. Daily log returns and trading activity

	Mean, %	SD, %	Skewness	Excess kurtosis	Zero-return days, %	Trading value, UZS bn per month
Panel A. 2023–2025 (n = 765)						
Uzpromstroybank (SQB)	0.006	3.03	0.08	10.36	16.2	0.06
Hamkorbank	0.139	3.79	0.07	3.60	10.2	0.22
Ipak Yuli Bank	0.156	5.97	0.13	2.83	14.9	0.04
Aloqabank	0.016	5.54	1.05	13.74	28.5	0.02
UCI index	0.080	2.44	2.02	98.61	10.5	–
Panel B. January–September 2026 (n = 184)						
Uzpromstroybank (SQB)	0.720	4.39	1.84	6.86	9.8	1.55
Hamkorbank	0.436	2.54	0.47	0.80	2.2	2.97
Ipak Yuli Bank	0.414	3.53	1.50	6.08	15.8	0.09
Aloqabank	0.389	3.52	0.89	5.44	32.6	0.15
UCI index	0.554	4.10	−0.86	8.61	4.3	–

Note: trading value is the median of monthly values. Source: daily trading results of the Republican Stock Exchange «Tashkent»; Refinitiv (UCI index); author's calculations.

Table 1 shows that daily volatility of the bank shares was high in 2023–2025, from 3.0% for SQB to 6.0% for Ipak Yuli, and that returns were fat-tailed. The price did not change on 10.2–28.5% of trading days, and the median month saw trading of only UZS 0.02–0.22 billion per bank. The picture changed in 2026. The median monthly trading value rose 26-fold for SQB and 14-fold for Hamkorbank, and the share of zero-return days for Hamkorbank fell to 2.2%. The two other banks gained much less: Ipak Yuli and Aloqabank remained below UZS 0.2 billion per month, and Aloqabank's price stood still on 32.6% of days.

3.2. Serial correlation and implied trading costs

Table 2. Autocorrelation, Ljung–Box test and Roll implied spread

	ρ_1	ρ_2	ρ_3	Q(10)	p-value	Roll spread, %
Panel A. 2023–2025						
Uzpromstroybank (SQB)	−0.317	−0.074	−0.033	118.6***	<0.001	3.41
Hamkorbank	−0.292	−0.066	0.006	77.5***	<0.001	4.09
Ipak Yuli Bank	−0.042	−0.011	−0.029	15.8	0.105	2.45
Aloqabank	−0.347	−0.061	−0.007	101.6***	<0.001	6.52
UCI index	−0.032	−0.066	−0.193	64.7***	<0.001	0.87
Panel B. January–September 2026						
Uzpromstroybank (SQB)	0.272	0.213	0.015	54.6***	<0.001	n.d.
Hamkorbank	−0.044	−0.033	0.056	13.0	0.223	1.07
Ipak Yuli Bank	−0.154	−0.155	0.084	15.0	0.131	2.76
Aloqabank	0.038	0.135	0.065	13.5	0.197	n.d.
UCI index	0.195	0.037	0.056	27.5***	0.002	n.d.

Note: the approximate 95% band for a single autocorrelation is ±0.071 in Panel A and ±0.144 in Panel B. ***, **, * – rejection of no autocorrelation at the 1%, 5% and 10% levels. n.d. – not defined (positive autocovariance). Source: author's calculations.

In 2023–2025 the first-order autocorrelation of SQB, Hamkorbank and Aloqabank lies between −0.29 and −0.35, roughly four to five times the bound of the 95% band, and the Ljung–Box test rejects independence with $p < 0.001$ (Table 2). A rise in price on one day was thus followed, on average, by a partial fall on the next – the pattern that Avramov et al. (2006) find to be concentrated in illiquid stocks. Read through the Roll estimator, these reversals correspond to an implicit round-trip cost of 3.4% for SQB, 4.1% for Hamkorbank and 6.5% for Aloqabank. Ipak Yuli is the exception: its first-order autocorrelation is close to zero and the Ljung–Box test does not reject ($p = 0.105$).

In 2026 Hamkorbank's returns are practically uncorrelated ($\rho_1 = -0.044$, p = 0.223), and its implied spread drops to 1.1%. SQB moves to the opposite side: the first two autocorrelations become positive (0.27 and 0.21), so that price changes were followed by changes in the same direction. The UCI index also shows positive first-order autocorrelation (0.20), a pattern typical of indices whose components do not trade simultaneously (Lo & MacKinlay, 1990).

3.3. Variance ratios

Table 3. Lo–MacKinlay variance ratios and Chow–Denning test

	VR(2)	VR(5)	VR(10)	VR(20)	CD = max|z*|
Panel A. 2023–2025					
Uzpromstroybank (SQB)	0.68*** (−3.29)	0.36*** (−3.32)	0.26*** (−2.87)	0.17*** (−2.61)	3.32***
Hamkorbank	0.71*** (−5.63)	0.46*** (−5.29)	0.40*** (−4.14)	0.36*** (−3.10)	5.63***
Ipak Yuli Bank	0.96 (−0.62)	0.88 (−0.91)	0.67* (−1.82)	0.42** (−2.36)	2.36*
Aloqabank	0.65*** (−6.21)	0.39*** (−5.48)	0.35*** (−3.84)	0.34*** (−2.85)	6.21***
UCI index	0.97 (−0.44)	0.58* (−1.72)	0.41 (−1.44)	0.39 (−1.13)	1.72
Panel B. January–September 2026					
Uzpromstroybank (SQB)	1.24 (1.30)	1.39 (1.17)	1.74* (1.72)	1.31 (0.51)	1.72
Hamkorbank	0.94 (−0.62)	0.93 (−0.35)	1.05 (0.16)	1.18 (0.46)	0.62
Ipak Yuli Bank	0.85 (−0.95)	0.64 (−1.16)	0.67 (−0.79)	0.42 (−1.13)	1.16
Aloqabank	1.05 (0.37)	1.39 (1.61)	1.70* (1.95)	1.29 (0.61)	1.95
UCI index	1.21* (1.77)	1.51* (1.67)	1.55 (1.11)	1.59 (0.86)	1.77

Note: heteroskedasticity-robust z*(q) in parentheses. For VR(q), ***, **, * – rejection of the random walk at the 1%, 5% and 10% levels (two-sided normal critical values); for CD, the critical values are 3.02, 2.49 and 2.23. Source: author's calculations.

The variance ratios in Table 3 confirm and extend these results. For SQB, Hamkorbank and Aloqabank in 2023–2025 the ratio is well below one at every horizon and keeps falling as the horizon lengthens: for SQB from 0.68 at two days to 0.17 at twenty days.

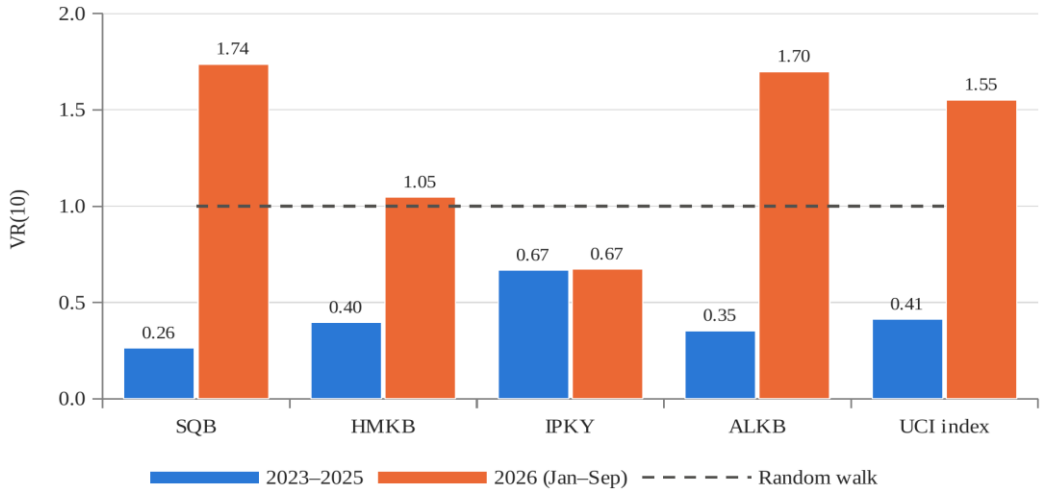


Figure 1. Ten-day variance ratio VR(10) by series and sub-period

Note: VR = 1 under a random walk. Source: author's calculations.

The variance of monthly returns was therefore only a fraction of what daily volatility would imply, i.e. much of the daily price noise disappears over a month. All twelve individual statistics are significant at the 1% level, and the Chow–Denning statistics (3.32, 5.63 and 6.21) reject the random walk at 1%. For Ipak

Yuli the ratio also drops below one at longer horizons (0.42 at twenty days), but the joint test rejects only at the 10% level; for the UCI index it does not reject.

In 2026 none of the Chow–Denning statistics exceeds the 5% critical value. Figure 1 shows how far the point estimates moved: the ten-day ratio rose from 0.26 to 1.74 for SQB, from 0.35 to 1.70 for Aloqabank and from 0.40 to 1.05 for Hamkorbank, whose ratios at all four horizons lie between 0.93 and 1.18. With 184 observations the tests have less power, so the absence of rejection should be read together with the size of the estimates: for Hamkorbank they are close to one, for SQB and Aloqabank they point to positive dependence rather than to a random walk.

3.4. Time variation

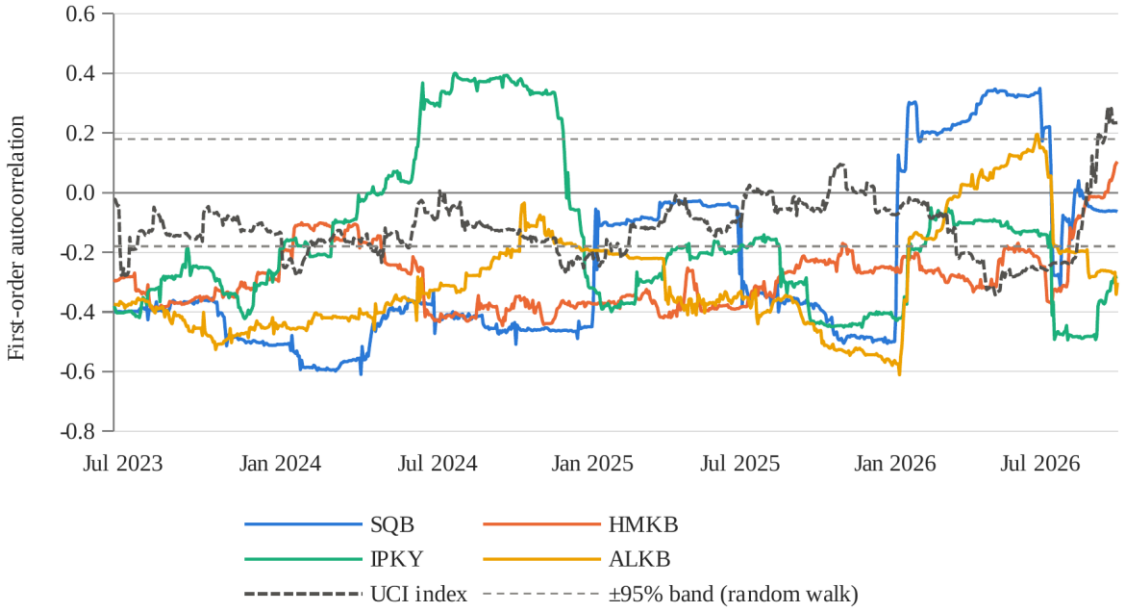


Figure 2. Rolling first-order autocorrelation of daily returns, 120-day window, June 2023 – September 2026

Note: dashed lines mark the approximate 95% band under a random walk (±1.96/√119). Source: author's calculations.

The rolling estimates in Figure 2 show that the reversals were persistent rather than produced by a few episodes. The autocorrelation of SQB, Hamkorbank and Aloqabank stayed below the lower band for most of 2023–2025, whereas that of Ipak Yuli was unstable and even turned positive in mid-2024. The switch of SQB at the beginning of 2026 is abrupt: on six of the first eleven sessions of the year the share rose by 17–20% a day. In 2023–2025 the largest daily gain of SQB, Hamkorbank and Ipak Yuli was exactly 20%, which suggests that a daily price band was binding; sequences of limit moves spread the adjustment to news over several sessions and mechanically create positive autocorrelation (Kim & Rhee, 1997). By the end of September 2026 the rolling coefficient was −0.06 for SQB and 0.10 for Hamkorbank, inside the band, but −0.28 for Ipak Yuli and −0.30 for Aloqabank, whose shares remain thinly traded.

4. Conclusions

Between 2023 and 2025 the prices of Uzbek bank shares did not follow a random walk. A sizeable part of each daily price change was temporary and was reversed in the following days, which is what one expects when orders are few and each of them moves the price. The implied cost of a round trip was 2.5–6.5% of the price. In 2026, when trading in the two most liquid bank shares grew by more than an order of magnitude, the reversals disappeared: Hamkorbank's returns became indistinguishable from a random walk, while SQB went through a phase of short-run momentum associated with its rapid revaluation and repeated limit moves. The evidence is consistent with the view that efficiency depends on liquidity and changes over time (Lo, 2004; Chordia et al., 2008).

Three implications follow. First, since closing prices in thin periods contain a transitory component, the reference price for sales of state-owned bank shares should be based on volume-weighted averages over several weeks rather than on the quote of a single session. Second, measures that increase order flow in bank shares – a larger free float and market makers with quoting obligations – are likely to improve price efficiency, as the contrast between Hamkorbank and Aloqabank in 2026 suggests. Third, the design of the daily price band deserves review: when a band binds on consecutive days, it delays price discovery instead of preventing it. The main limitation of the study is the short 2026 sample; intraday data and a longer post-reform period would allow these findings to be tested with more power.

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