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ALIGNING EXCHANGE RATE POLICY WITH ECONOMIC DEVELOPMENT IN A DIGITALIZING ECONOMY EVIDENCE FROM UZBEKISTAN

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Abstract. This article assesses how exchange-rate policy can be coordinated with development objectives in a small open economy, using evidence reported in Norbaeva's dissertation abstract for Uzbekistan. The article proposes linked monitoring of external flows, borrower currency risk, bank funding, and digital payments. Since the available source is an abstract and the estimation sample is small, results are exploratory rather than causal or independently validated.

Keywords: exchange rate policy; economic development; real exchange rate; financial dollarization; international reserves; digital payments; Uzbekistan.

1. Introduction

Emerging economies use exchange-rate policy to support price stability, external adjustment, reserve adequacy, and financing access. These aims can conflict: flexibility absorbs shocks, but depreciation may raise prices and worsen foreign-currency borrowers' balance sheets; resisting adjustment can deplete reserves. The monetary-policy trilemma shows that exchange-rate stability, monetary autonomy, and financial openness cannot all be maximized simultaneously [1]. Officially flexible regimes may also involve substantial intervention in practice [2].

Development effects are context dependent. A competitive real exchange rate may support tradable-sector growth where institutional weaknesses constrain structural change [3], but repeated depreciation is not a reliable growth strategy: inflation, productivity, import dependence, and the composition of receipts condition real adjustment. Regime comparisons similarly show that no arrangement performs best on every outcome [4, 5]. Policy assessment should therefore link instruments to outcomes rather than treat the exchange rate as the sole target.

Since the 2017 liberalization, Uzbekistan has changed its currency regime and monetary framework. The dissertation reports that its real exchange-rate index (2017=100) rose to 137.9 in 2018 and declined to 106.0 by 2025. It also reports weaker relative reserve coverage and persistent foreign-currency lending despite a lower portfolio dollarization ratio. This case raises two questions: how should exchange-rate policy be assessed across external and financial dimensions, and how can digital infrastructure improve policy monitoring?

This article contributes a synthesis of a dissertation-based indicator system and its applied results. Its central proposition is that policy assessment should combine four dimensions—exchange-rate conditions, foreign-currency receipts, reserve adequacy, and capital flows—and connect them to operational rules for banks and public authorities. The contribution is applied and diagnostic. It does not claim that the reported index or scenario model has established causal effects. Instead, it clarifies how the proposed framework may support more transparent monitoring, and identifies the validation required before the results can guide binding policy.

2. Materials and Methods

The analysis uses the evidence reported in the dissertation abstract, including national time-series indicators for 2017–2025, a bank-level implementation case, an econometric table, and

projections through 2030. The abstract attributes underlying observations to official national statistics, the Central Bank of Uzbekistan, and a commercial bank. Since the underlying data files, full variable definitions, and complete estimation diagnostics are not available in the abstract, the present article treats reported values as source-reported calculations and does not independently reproduce them. This limitation is especially important for figures described as 2025 outcomes and 2026 baseline estimates, which should be checked against the final official releases and consistent data vintages.

The proposed assessment framework contains 17 indicators in four groups. The exchange-rate group includes the real effective exchange rate, exchange-rate volatility, flexibility, and an exchange-market-pressure measure. The receipts group covers foreign-currency receipts relative to GDP, remittance dependence, concentration, and receipt stability. The reserve group includes import cover, short-term-debt cover, an IMF-style reserve-adequacy ratio, broad-money cover, and reserve diversification. The capital-flow group includes net flows relative to GDP, flow volatility, capital-account openness, and a sudden-stop indicator. Indicators are oriented according to whether a higher value is considered favorable, then min–max normalized to the interval [0,1]. The composite index is calculated as a weighted sum of group averages. Equal weights and expert weights are reported as a sensitivity check.

3. Analysis and Results

The composite index suggests an overall improvement in measured policy conditions, but its components reveal a more qualified picture. Under equal weights, the index rises from 0.448 in 2017 to 0.724 in 2025; under the exchange-rate-weighted variant, it rises from 0.458 to 0.761. The two series move in the same direction, indicating that the broad trend is not driven solely by the choice between these two weighting schemes. Nevertheless, the index is a relative score over the selected observation window, not an absolute measure of welfare or policy optimality. Min–max normalization also makes the values sensitive to sample endpoints and extreme observations.

The real exchange-rate index shows a substantial reversal after the initial adjustment. It falls from 137.9 in 2018 to 106.0 in 2025. The dissertation attributes this pattern to cumulative domestic prices rising faster than the nominal exchange rate over much of the period. This is consistent with the general point that nominal depreciation cannot guarantee persistent real competitiveness if domestic inflation offsets it [3]. The policy implication is not that the exchange rate should be held fixed; rather, competitiveness gains depend on productivity, export diversification, and nominal stability alongside exchange-rate flexibility.

The model calculates twenty-nine indicators, each with a defined symbol, unit of measurement, and complete calculation formula. The principal forecasting formulas, organised by block, are presented in Table 1.

Table 1
Principal Forecasting Formulas of the Macroeconomic Equilibrium Model

Block	Symbol	Calculation formula
Prices and exchange rate	INF(t)	$INF(t) = (a_0 + a_1 \cdot INF(t-1) + 100 \cdot a_2 \cdot (\rho - 1)) \div (1 - a_2 \cdot \rho)$
	DEP(t)	$DEP(t) = ((1 + INF(t) \div 100) \cdot \rho - 1) \cdot 100$
	ER(t)	$ER(t) = ER(t-1) \cdot (1 + DEP(t) \div 100)$
	RER_I(t)	$RER_I(t) = (ER(t) \div ER(2017)) \div (P(t) \div P(2017)) \cdot 100$; $\rho = (1 +$

Block	Symbol	Calculation formula
		DEP(t) ÷ 100) ÷ (1 + INF(t) ÷ 100)
Real sector	GDP(t)	GDP(t) = GDP(t−1) · (1 + GR(t) ÷ 100) · k ÷ ρ
	IMP(t)	m(t) = b_0 + b_1 · Inv(t); IMP(t) = m(t) · GDP(t) ÷ 100
Foreign-currency receipts	EXP(t)	NonGoldEXP(t) = (u(t) + d_2(t)) · GDP(t) ÷ 100; GoldEXP(t) = o(t) · GDP(t) ÷ 100; EXP(t) = NonGoldEXP(t) + GoldEXP(t)
	REM(t)	REM(t) = (p(t) + d_1(t)) · GDP(t) ÷ 100
	FXREC(t)	FIC(t) = x(t) · GDP(t) ÷ 100; FXREC(t) = EXP(t) + REM(t) + FIC(t)
External balance	TB(t)	TB(t) = EXP(t) − IMP(t); TB_GDP(t) = TB(t) ÷ GDP(t) · 100
Debt and reserves	EXTD(t)	EXTD(t) = EXTD(t−1) · (1 + q(t) ÷ 100); EXTD_GDP(t) = EXTD(t) ÷ GDP(t) · 100
	RES(t)	RES(t) = RES(t−1) + z(t) · GDP(t) ÷ 100; RES_EXTD(t) = RES(t) ÷ EXTD(t) · 100; IMP_COVER(t) = RES(t) ÷ (IMP(t) ÷ 12)
Financial block	DOL(t)	DOL(t) = (c_0 − d_3(t)) + c_1 · DOL(t−1)
	POLICY_RATE(t)	POLICY_RATE(t) = INF(t) + r* + φ · (INF(t) − INF*); REAL_RATE(t) = POLICY_RATE(t) − INF(t)

The formulas in Table 11 have three characteristics. First, they are recursive: each year's value is calculated from the preceding year's value, so the calculations begin in 2026 and proceed sequentially through 2030. Second, they are unidirectional: the prices-and-exchange-rate block feeds into the real sector, the real sector supplies inputs to foreign-currency receipts, and receipts feed into external balances and reserves. Reverse linkages operate only through the annual feedback rule. Third, each formula includes a separately identified control parameter, expressed as an independent term rather than embedded in a bracket. This makes it possible to change a parameter and directly observe the resulting change in the model output.

The calculation rules are specified as follows. First, the real exchange-rate path parameter ρ is held constant across all years because it represents the joint direction of price and exchange-rate policy; its value is derived in reverse from the target set for gross domestic product. Second, the autonomous inflation term a_0 is determined from the inflation criterion. According to the estimated equation, an intercept of 4.256 stabilises inflation at 7–8 percent, whereas reducing inflation to 5 percent by 2030 requires lowering the term to 2.777. Third, the national-currency digital-settlement channel d_3 is derived from the dollarisation criterion: reaching 33.0 percent in 2030 requires a value of 3.960 points. Fourth, real GDP growth is specified as an external assumption and taken from the international baseline trajectory: 6.9 percent in 2027, 7.1 percent in 2028, 7.4 percent in 2029, and 7.6 percent in 2030.

The annual values of the control parameters are presented in Table 2.

Table 2

Control Parameters and Their Values

Symbol	Control parameter	2026	2027 / 2028 / 2029 / 2030	Meaning
ρ	Annual real exchange-rate index path	–	0.97299 (all years)	Joint direction of price and exchange-rate policy
a_0	Autonomous inflation term	–	2.777 (all years)	Fiscal and credit discipline
Inv(t)	Investment share, %	30.0	29.2 / 28.5 / 27.8 / 27.0	Management of import demand
u(t)	Non-gold exports, %	15.5	16.4 / 17.2 / 18.1 / 19.0	Change in export composition
x(t)	Foreign capital share, %	20.5	19.1 / 17.8 / 16.4 / 15.0	Stabilisation of receipt composition
q(t)	Annual external debt growth, %	–	11.0 / 10.0 / 9.0 / 8.0	Borrowing limit
z(t)	Reserve accumulation rate, %	–	4.8 / 5.2 / 5.6 / 6.0	Pace of reserve replenishment
$d_1(t)$	Digital channel for remittances, points	0.00	0.10 / 0.20 / 0.30 / 0.40	Digital payment infrastructure
$d_2(t)$	Digital services exports, points	0.00	0.10 / 0.20 / 0.30 / 0.40	Remote services exports
$d_3(t)$	Digital settlements in national currency, points	0.50	1.365 / 2.230 / 3.095 / 3.960	Reduction in transactional demand for foreign currency

The central point of Table 3 is that the parameter values are not arbitrary: each is derived in reverse either from a criterion or from a target set in a government document. The table shows three main directions. The investment share is gradually reduced from 30.0 to 27.0 percent to manage import demand; the non-gold export share rises from 15.5 to 19.0 percent to change the composition of exports; and the foreign-capital share falls from 20.5 to 15.0 percent to stabilise the composition of foreign-currency receipts. Digital channels d_1, d_2, and d_3 start from zero and increase year by year, representing the modelled effect of digitalisation on foreign-currency indicators.

Table 3

Model-Calculated Indicators, 2026–2030

Source: 2026 estimate based on current official data; 2027–2030 figures are model calculations.

Indicator	2026	2027	2028	2029	2030
Inflation rate, %	6.30	5.54	5.21	5.06	5.00
Nominal depreciation rate, %	-3.20	2.69	2.37	2.23	2.16
Nominal exchange rate, UZS per USD	12,173	12,500	12,796	13,081	13,364
Real exchange-rate index (2017 = 100)	96.53	93.92	91.38	88.91	86.51
Annual decline in the real exchange-rate index, points	9.47	2.61	2.54	2.47	2.40
Real GDP growth, %	8.1	6.9	7.1	7.4	7.6
Gross domestic product, USD billion	180.0	203.9	231.3	263.2	300.0
Imports as a share of GDP, %	32.21	31.33	30.45	29.57	28.69
Imports, USD billion	58.0	63.9	70.4	77.8	86.1
Non-gold exports, USD billion	27.9	33.6	40.4	48.5	58.2
Gold exports, USD billion	12.1	13.7	15.5	17.6	20.1
Total exports, USD billion	40.0	47.2	55.9	66.1	78.3
Non-gold exports as a share of GDP, %	15.50	16.48	17.45	18.43	19.40
Remittances, USD billion	20.9	23.9	27.3	31.3	36.0
Foreign investment and loans, USD billion	36.9	39.0	41.1	43.1	45.0
Foreign-currency receipts, USD billion	97.7	110.1	124.2	140.5	159.3
Trade balance, USD billion	-18.0	-16.6	-14.6	-11.7	-7.8
Trade balance / GDP, %	-10.01	-8.15	-6.30	-4.44	-2.59
Exports as a share of receipts, %	40.88	42.92	44.97	47.05	49.15
Gross external debt, USD billion	90.0	99.9	109.9	119.8	129.4
External debt / GDP, %	50.00	49.01	47.51	45.51	43.12
International reserves, USD billion	75.0	84.8	96.8	111.6	129.6

Indicator	2026	2027	2028	2029	2030
Reserves / external debt, %	83.33	84.87	88.10	93.13	100.15
Import cover, months	15.52	15.93	16.50	17.20	18.06
Dollarisation rate, %	39.24	38.40	36.96	35.10	32.96
Policy rate, %	8.95	7.81	7.31	7.10	7.00
Real interest rate, percentage points	2.65	2.27	2.10	2.03	2.00

The full set of model-calculated results is presented in Table 13. The forecast indicates that, if the control parameters are adjusted in the specified directions, the target values for the reserve-to-external-debt ratio, the foreign-currency receipt stability index, and the dollarisation rate can be reached by 2030. A second key finding concerns the interaction among parameters: a sharp change in one parameter may worsen the result for another criterion. The parameters should therefore be adjusted jointly and in small increments. The model's practical value lies in its feedback rule: if an indicator deviates from its criterion in a given year, the relevant parameter is adjusted for the following year by the specified correction coefficient and the calculation is repeated. In this way, the model functions as an annual management loop rather than a one-off forecast.

4. Discussion

The framework integrates indicators that can otherwise send conflicting signals: volatility may decline as external imbalances deepen; reserves may rise in dollars but fall relative to debt; dollarization may decline because local-currency lending grows faster while foreign-currency exposure remains large. A composite index helps expose these differences, but depends on transparent definitions and weights. Replication requires publication of the series and robustness tests across normalization methods, weights, and sample windows.

The design aligns with the IMF Integrated Policy Framework, which treats exchange-rate flexibility, intervention, macroprudential measures, and capital-flow tools as context-dependent complements [8]. The four channels can operationalize this coordination. Proposed currency-mismatch thresholds may work as warning bands, but require calibration to loss data, bank heterogeneity, and stress tests before becoming prudential minima.

Digitalization can improve information and reduce payment frictions, but is not itself an exchange-rate stabilization tool. Fast payment systems may improve domestic transfers, while cross-border links require governance, interoperability, liquidity, settlement, and compliance [9, 10]. Formal digital remittances remain dependent on migrant employment and external conditions. Digital-services exports may diversify receipts, but their contribution must be measured in balance-of-payments data, not inferred from transaction volumes.

Three extensions are needed. The data should be released with metadata and consistent definitions. Growth regressions require a longer or higher-frequency sample, tests for non-stationarity and structural breaks, robust errors, and specifications addressing reverse causality. The scenario should be back-tested on holdout periods and include sensitivity bands for gold prices, remittances, export growth, financing costs, and borrowing. These steps would distinguish accounting identities from behavioral assumptions.

5. Conclusions

This study presents a multidimensional approach to aligning exchange-rate policy with economic development in a digitalizing emerging economy. The dissertation evidence for Uzbekistan indicates that an aggregate policy index improved between 2017 and 2025, while important vulnerabilities persisted in real-exchange-rate competitiveness, relative reserve adequacy, and foreign-currency lending. The reported regressions associate inflation negatively and investment growth positively with real GDP growth, whereas annual exchange-rate changes are not statistically significant in the preferred specification. A 2030 scenario shows how coordinated assumptions could improve selected external indicators, but it is not a validated forecast.

The practical implication is to monitor exchange-rate conditions together with the stability and use of foreign-currency receipts, reserve adequacy, capital flows, and bank-level currency mismatches. Digital payment infrastructure can improve timeliness and traceability, especially for remittances and cross-border settlement, but should complement rather than replace macroeconomic and prudential policy. Further work should publish reproducible data, test the index under alternative specifications, and validate the scenario model out of sample. With these safeguards, the framework can provide a transparent basis for policy discussion without overstating the causal reach of the current evidence.

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