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THE RELATIVE ROLE OF THE INTEREST RATE AND BALANCE SHEET CHANNELS IN MONETARY TRANSMISSION: EVIDENCE FROM UZBEKISTAN

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Abstract. The paper assesses, within a single VECM system, the relationship of the policy rate as a conventional instrument and the total assets of the Central Bank of the Republic of Uzbekistan as a quantitative indicator of unconventional (balance sheet) measures with inflation, the exchange rate and economic growth, using monthly data for January 2020 – June 2025. The Johansen test identifies one cointegrating relationship. Variance decomposition and Toda–Yamamoto tests show that the policy rate carries the most consistent predictive information, explaining about 37% of the 12-month forecast error variance of the exchange rate, whereas the predictive content of the balance sheet indicator is confined to inflation and GDP and is sensitive to revaluation. The interest rate channel is the main channel of transmission, and balance sheet measures complement it.

Keywords: unconventional monetary policy, central bank balance sheet, policy rate, monetary transmission, VECM, variance decomposition, Toda–Yamamoto test, Uzbekistan.

Introduction

In the empirical literature, central bank total assets are regarded as the most comprehensive measure of the intensity and scale of unconventional monetary policy: Peersman (2011) and Gambacorta, Hofmann and Peersman (2014) identify unconventional policy shocks through exogenous changes in balance sheet size, while the composition of the balance sheet shows through which channel the measures were implemented (Borio and Zabai, 2018; Pattipeilohy, 2016).

The Central Bank of the Republic of Uzbekistan has not announced asset purchase programmes of the kind implemented in advanced economies. Nevertheless, its balance sheet operations – purchases of domestically produced gold, foreign exchange interventions, refinancing, liquidity sterilization and directed lending – directly shape the volume of liquidity in the banking system and monetary conditions. Between January 2020 and June 2025 total assets increased 3.4-fold, from 151 to 521 trillion soums, while the policy rate remained within 13.5–17%. This raises the question of the relative role of the price (interest rate) and quantity (balance sheet) channels of monetary transmission, which the paper addresses by estimating both instruments within a single system. Since total assets reflect the cumulative outcome of several operations rather than a policy shock as such, the estimates are interpreted as conditional associations rather than causal effects.

Data and methodology

The study uses monthly data of the Central Bank and the Statistics Agency under the President of the Republic of Uzbekistan for January 2020 – June 2025 (66 observations), a period matching the inflation targeting regime. The system includes the logarithm of central bank total assets (LnCB_TA: net foreign assets, claims on other depository corporations, net claims on the central government and claims on other sectors, taken at the beginning of the month), the policy rate (PR, monthly average), year-on-year CPI inflation, the logarithm of the UZS/USD exchange rate (LnER, monthly average) and cumulative real GDP growth (quarterly values held constant within each quarter). Taking CB_TA at the beginning of the month and PR and ER as monthly averages mitigates simultaneity. ADF and PP tests classify all variables as I(1), and a VAR(4) is selected on the basis of the AIC, FPE and LR criteria.

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Following the Johansen (1991) test with Osterwald-Lenum (1992) critical values, a VECM is estimated. Its dynamics are examined with impulse responses and forecast error variance decomposition (FEVD) based on the Cholesky ordering LnCB_TA, PR, CPI, LnER, GDP over a 12-month horizon, and predictive (Granger) causality is tested with joint Wald tests in the short-run part of the VECM and with the Toda and Yamamoto (1995) procedure in a lag-augmented VAR in levels ($k = 4$, $d_{max} = 1$). The LM test does not reject the absence of residual autocorrelation at the first two lags and the stability condition holds (the largest remaining modulus is 0.845), while the Jarque–Bera test indicates non-normal residuals, mainly in the inflation equation, which calls for cautious interpretation.

Results

The trace statistic rejects the null of no cointegration (83.31 > 68.52) but not the null of at most one cointegrating vector (44.26 < 47.21), indicating a single long-run relationship among the five variables (Wald $\chi^2(4) = 134.06$, $p < 0.001$). In the cointegrating vector normalized on LnCB_TA and written as $\beta' y_t = 0$, the coefficients on CPI (−0.131), LnER (−4.886) and GDP (0.058) are significant at the 1% level, whereas the policy rate coefficient is not (0.031; $p = 0.554$). Hence, in long-run equilibrium a 1% larger balance sheet coincides with inflation higher by about 0.076 percentage points, a soum weaker by about 0.205% and growth lower by about 0.173 percentage points, while the policy rate does not enter the relationship independently. The exchange rate coefficient reflects the direct dependence of a balance sheet dominated by net foreign assets on exchange rate dynamics (the correlation between LnCB_TA and LnER is 0.945). Adjustment to equilibrium occurs mainly through the policy rate ($\alpha = 0.853$; $p = 0.003$) and GDP ($\alpha = -1.964$; $p < 0.001$) equations.

The joint Wald tests (Table 1, Panel A) show that the lagged policy rate block is significant in the exchange rate equation and, at the 10% level, in the GDP equation, but not in the inflation equation, whereas the balance sheet block is not jointly significant in any equation, so its short-run effect cannot be identified statistically. The Toda–Yamamoto tests (Panel B), which capture the cumulative effect of four lags in levels, indicate that the policy rate has predictive content for all three variables, while the balance sheet indicator is predictive for inflation and GDP but not for the exchange rate.

Table 1

Predictive content of the policy variables: χ^2 statistics [p-values]

Dependent variable	Policy rate (PR)	Central bank total assets (LnCB_TA)
Panel A. Joint Wald tests on lagged differences in the short-run part of the VECM, $\chi^2(3)$		
ΔCPI	5.39 [0.1455]	5.53 [0.1368]
ΔLnER	10.77** [0.0130]	5.12 [0.1630]
ΔGDP	6.83* [0.0775]	4.87 [0.1818]
Panel B. Toda–Yamamoto tests in the lag-augmented VAR in levels, $\chi^2(4)$		
CPI	12.97** [0.0114]	11.12** [0.0252]
LnER	13.73*** [0.0082]	6.52 [0.1636]
GDP	11.08** [0.0257]	17.67*** [0.0014]

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Source: author's calculations (Stata) based on data of the Central Bank of the Republic of Uzbekistan and the Statistics Agency under the President of the Republic of Uzbekistan.

The FEVD confirms the leading role of the policy rate for the exchange rate: at the 12-month horizon policy rate shocks explain about 37% of the forecast error variance of LnER (own shocks about 45%, inflation about 12%), whereas balance sheet shocks account for no more than 2%. Policy

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rate shocks also explain about 22% of the variance of inflation, which is otherwise dominated by its own shocks, reflecting strong inertia. The variance of GDP is explained by balance sheet shocks (about 35%), its own shocks (31%) and inflation (27%), while about 80% of the balance sheet variance is due to its own shocks and only about 1% to the policy rate. In the impulse responses inflation rises after a policy rate shock – a price puzzle that reflects policy endogeneity, since the rate was raised in response to inflationary pressure, rather than a failure of transmission (Sims, 1992). After a positive balance sheet shock inflation first declines slightly but turns positive from the third period, in line with the long-run relationship, while the negative response of GDP points to the endogeneity of the balance sheet indicator: the balance sheet expands in periods of slowing growth (for example, in 2020), and its largest component, net foreign assets, grows through reserve and gold operations not directly linked to domestic demand.

The balance sheet results are sensitive to measurement. Since 87.8% of the 2020–2025 growth of CB_TA reflects revaluation driven by changes in the gold price and the exchange rate, the indicator was also adjusted for revaluation in line with the IMF (2016) standard: after the adjustment its predictive content for inflation and GDP is not confirmed at the 5% level, whereas the predictive content of the policy rate for the exchange rate holds in all specifications.

Conclusions

First, the interest rate channel is the main channel of monetary transmission in Uzbekistan: the policy rate provides the most consistent predictive information across specifications and affects inflation not directly but through bank rates and the exchange rate. Its dominance is explained by the inflation targeting regime and the practice of signalling through the policy rate. Second, the balance sheet channel plays a complementary role, which is explained by shallow capital markets, directed lending and the fact that balance sheet expansion occurs mainly through external assets. Third, balance sheet measures do not substitute for the policy rate but complement it, and their assessment should rely on the revaluation-adjusted indicator.

It is advisable for the Central Bank to publish balance sheet data monthly, broken down into transactions and revaluation components, and to monitor revaluation-adjusted total assets together with the net liquidity position. Commercial banks are advised to link their funds transfer pricing systems to the policy rate and the overnight market rate and to include in stress tests a scenario combining exchange rate depreciation, accelerating inflation and its high inertia.

The results are subject to limitations: CB_TA aggregates operations of different nature, only part of which reflects deliberate policy changes; the monthly GDP series obtained by holding quarterly values constant introduces artificial inertia; and remittances, world commodity prices, the fiscal stance and dollarization are not included in the model. As the observation period lengthens, promising directions for further research are quarterly estimation, structural break tests, generalized impulse responses, bootstrap confidence intervals and disaggregation of the balance sheet indicator into refinancing and credit support components.

References

1. Borio C., Zabai A. (2018). Unconventional monetary policies: a re-appraisal // Research Handbook on Central Banking / Ed. by Peter Conti-Brown, Rosa M. Lastra. – Chapter 20. – P. 398–444. – Edward Elgar Publishing.
2. Gambacorta L., Hofmann B., Peersman G. (2014). The effectiveness of unconventional monetary policy at the zero lower bound: A cross-country analysis // Journal of Money, Credit and Banking. – Vol. 46(4). – P. 637.
3. IMF (2016). Monetary and Financial Statistics Manual and Compilation Guide. – Washington, DC: International Monetary Fund.

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4. Johansen S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models // Econometrica. – Vol. 59(6). – P. 1551–1580.
5. Osterwald-Lenum M. (1992). A note with quantiles of the asymptotic distribution of the maximum likelihood cointegration rank test statistics // Oxford Bulletin of Economics and Statistics. – Vol. 54(3). – P. 461–472.
6. Pattipeilohy C. (2016). A comparative analysis of developments in central bank balance sheet composition // BIS Working Paper No. 559.
7. Peersman G. (2011). Macroeconomic effects of unconventional monetary policy in the euro area // ECB Working Paper Series 1397.
8. Sims C.A. (1992). Interpreting the macroeconomic time series facts: The effects of monetary policy // European Economic Review. – Vol. 36(5). – P. 975–1000.
9. Toda H.Y., Yamamoto T. (1995). Statistical inference in vector autoregressions with possibly integrated processes // Journal of Econometrics. – Vol. 66(1–2). – P. 225–250.