

## THE IMPACT OF CAPITAL FLOWS ON THE MONETARY POLICY OF THE REPUBLIC OF UZBEKISTAN AND ITS ANALYSIS

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### Abstract

This article econometrically analyses the impact of capital flows — foreign direct investment (FDI), remittances, portfolio investments, and external debt — on the monetary policy of the Central Bank of Uzbekistan, based on quarterly panel data for 2016–2024. Using an OLS multiple regression model, quantitative relationships are estimated between monetary indicators — inflation, policy rate, M2 money supply growth, credit-to-GDP ratio, and exchange rate — and capital flows. The results show that remittances have a significant positive effect on lending volume ( $\beta = 0.475$ ,  $p < 0.001$ ) and money supply expansion; FDI inflows demonstrate a negative relationship with inflation ( $\beta = -0.312$ ,  $p < 0.05$ ); and external debt is identified as a risk factor for monetary stability ( $\beta = -0.210$ ,  $p < 0.05$ ). The model explains 89.1% of the variance ( $R^2 = 0.891$ ). The study concludes with practical recommendations on transitioning the Central Bank of Uzbekistan to an inflation targeting regime, regulating capital flows, and ensuring exchange rate stability.

### Keywords

monetary policy, capital flows, foreign direct investment, remittances, inflation targeting, exchange rate, Central Bank of Uzbekistan, M2 money supply, external debt.

## 1. Introduction

### 1.1 Capital Flows and Monetary Policy: A Theoretical Problem

Globalisation of capital flows is creating an increasingly complex environment for the conduct of monetary policy in modern economies. As established by Tobin (1978) and the Mundell–Fleming model, in an open economy, the effectiveness of monetary policy is closely linked to factors such as capital mobility, the exchange rate regime, and the level of development of domestic financial markets. The free international movement of capital gives rise to the well-known trilemma problem (Obstfeld, 2015), which limits the ability of a country's central bank to simultaneously control inflation and the exchange rate.

Over the past decade, the volume and structural complexity of capital flows to developing and transition economies has increased significantly. According to IMF data, between 2010 and 2023, FDI flows to emerging market economies tripled, portfolio investments grew even faster, and migrant remittances exceeded official development assistance in at least 30 low- and middle-income countries (IMF, 2024). These flows bring new opportunities for central banks — expansion of the capital base, accumulation of foreign exchange reserves, financial deepening — along with new risks: exchange rate pressure, imported inflation, and financial instability.

In the context of Uzbekistan, this problem is of particular relevance. The 2017 currency reform — the transition to free convertibility of the national currency and the elimination of the gap between official and black market exchange rates — made the country significantly more open to international capital flows. At the same time, as a result of economic reforms, there was a sharp increase in FDI inflows, migrant remittances, and external debt. In this environment, the Central Bank of Uzbekistan (CBU) needs a deeper understanding of the impact of capital flows

on monetary conditions in order to maintain the balance between curbing inflation and supporting economic growth.

## 1.2 The Current State of Monetary Policy in Uzbekistan

The Central Bank of Uzbekistan has, since 2019, pursued a gradual transition to inflation targeting (IT). The new CBU law adopted in 2021 formally established price stability as the central bank's primary objective. The medium-term inflation target was set at 5% in 2024, and after raising the policy rate to 17% in 2022, the CBU subsequently reduced it step by step to 13.5% (CBU, 2024). However, under conditions of increasing capital flows, the effectiveness of monetary transmission mechanisms and the channels through which capital flows affect monetary conditions require empirical analysis.

Recent assessments by rating agencies and international financial organisations noted that Uzbekistan's economy grew by 5.4% of GDP in 2024, while inflation fell to 9.6% (IMF, 2024; World Bank, 2024). At the same time, external debt reaching USD 30 billion and remittances exceeding 18% of GDP are creating new structural challenges for monetary policy. In this macroeconomic environment, an econometric assessment of the impact of capital flows on monetary indicators is of both theoretical and practical policy significance.

## 1.3 Research Objectives and Hypotheses

This study pursues four main objectives: (1) to identify quantitative relationships between capital flows and monetary indicators in Uzbekistan over 2016–2024; (2) to analyse the transmission channels through which different types of capital flows — FDI, remittances, external debt — affect inflation, lending, and exchange rate dynamics; (3) to assess the effectiveness of the CBU's monetary policy measures under conditions of capital flows; and (4) to develop recommendations for Uzbekistan's full transition to an inflation targeting regime and capital flow management policy.

The study puts forward the following hypotheses: (H1) An increase in remittances statistically significantly expands lending volume and the M2 money supply. (H2) An intensification of FDI inflows reduces inflationary pressure in the long run by expanding production capacity and thus broadening the supply of goods. (H3) An increase in external debt exerts pressure on the national currency, amplifying inflation risk. (H4) Rapid growth of the M2 money supply serves as a significant positive predictor of inflation.

## 2. Literature Review

### 2.1 Capital Flows and Monetary Policy: Theoretical Foundations

The primary theoretical framework for analysing the relationship between capital flows and monetary policy is the Mundell–Fleming open economy model (Fleming, 1962; Mundell, 1963). This model shows that the effectiveness of monetary policy under conditions of capital mobility depends on the exchange rate regime: under a floating rate, monetary policy can influence domestic economic variables, while under a hard peg this effect is neutralised. Modern 'Neo-Wicksellian' and 'New Keynesian' models show how capital flows are transmitted to monetary conditions through the real interest rate, credit expansion, and housing price channels (Bernanke and Gertler, 1995; Clarida, Gali and Gertler, 1999).

In the inflation targeting literature, Svensson (1997) and Bernanke et al. (1999) argue that an IT regime may allow central banks to carry out capital flow adjustments in a more transparent

manner, oriented towards a declared inflation target. However, for developing markets, Calvo and Reinhart (2002) found that most central banks exhibit 'fear of floating' — that is, even within an inflation targeting framework, they actively intervene to stabilise the exchange rate. This situation is particularly relevant for countries such as Uzbekistan.

The relationship between capital flows and credit expansion is also widely discussed in the financial instability literature. Mendoza and Terrones (2012) empirically confirmed that sharp surges in capital flows often lead to credit booms, which subsequently increase the risk of financial crises. Kaminsky and Reinhart (1999) showed that rapid intensification of capital flows serves as an early warning signal for 'twin crises' — the simultaneous occurrence of currency and banking crises.

## 2.2 Experience of Emerging Markets

Empirical studies analysing the relationship between capital flows and monetary policy in developing economies yield varied results. Lim et al. (2011), within the IMF analytical framework for 49 countries, showed that capital flow control measures are partially effective in reducing capital inflows and limiting currency depreciation in the short run, but lose their precision and effectiveness over the long run. Forbes and Warnock (2012) identified a strong correlation between sudden stop episodes in capital flows and global liquidity conditions and risk appetite.

Regarding the relationship between remittances and monetary conditions, Barajas et al. (2009), in a panel study of 84 middle-income countries, found that the accumulation of unbanked cash in countries where remittances constitute a high share of GDP can amplify inflationary pressure in the financial sector. Chami et al. (2008) demonstrated a positive correlation between increasing remittance volumes and financial sector deepening.

The number of specific studies on Central Asia and the CIS countries remains limited. Kim and Yang (2011) found that, in Asian developing economies, the sensitivity of capital inflows to policy rate fluctuations decreases under a flexible exchange rate regime. Dabrowska-Gruszczynska (2023) noted that CIS central banks have not yet achieved full institutional maturity in harmonising regulatory approaches and market mechanisms for capital flow management.

## 2.3 Research Gap

While the existing literature provides a rich theoretical and empirical foundation on the relationship between capital flows and monetary policy, specific econometric analysis in the Uzbekistan context has not been conducted to a sufficient degree. Existing local studies such as Iskandarov (2022) and Normatov (2023) are primarily based on qualitative description and do not include the regression analysis required for quantitatively assessing the impact of capital flows on monetary indicators. This article addresses this gap using an OLS multiple panel regression model and quarterly data for 2016–2024.

## 3. Methodology

### 3.1 Research Approach

This study adopts a quantitative econometric approach. The analytical strategy consists of collecting secondary data from official databases and using an OLS multiple regression model to identify statistical relationships between capital flows and monetary indicators. The study period

covers 2016–2024: 2016 serves as the pre-reform baseline, while the transition to a market exchange rate in 2017 is designated as the structural break in Uzbekistan's economic history. Quarterly data yields  $n = 36$  usable observations. Three alternative model specifications (Model I, II, III) are estimated to test robustness.

### 3.2 Data Sources

Data were collected from five main sources. First, the statistical bulletins of the Central Bank of Uzbekistan provided data on the policy rate, monetary aggregates (M0, M1, M2), credit portfolio, and foreign exchange reserves (CBU, 2024). Second, the Statistics Committee of Uzbekistan (Goskomstat) supplied GDP growth, consumer price index, and demographic indicators. Third, FDI inflows, external debt, and credit-to-GDP ratios were obtained from the World Bank's WDI database. Fourth, the IMF Balance of Payments Statistics (BPS) database was used for capital account transactions and foreign exchange reserves. Fifth, the Migration Agency of Uzbekistan and the World Bank provided migrant remittance data. All nominal monetary indicators were deflated to constant 2017 base-year prices.

### 3.3 Variable Specification

The dependent variable (Y) is the Monetary Stability Index (MSI), comprising three normalised sub-indicators: (i) deviation from the inflation target (lower is better); (ii) nominal exchange rate stability; and (iii) deviation of the credit-to-GDP ratio from its trend. This composite index was constructed in accordance with the IMF monetary stability assessment methodology (IMF, 2023).

Six independent variables were specified: (X<sub>1</sub>) FDI inflow — net FDI inflow, USD bn; (X<sub>2</sub>) Remittances — total incoming remittances, USD bn; (X<sub>3</sub>) Credit volume — credit to the economy/GDP (%); (X<sub>4</sub>) M2 growth — broad money supply annual growth (%); (X<sub>5</sub>) External debt — total external debt, USD bn; (X<sub>6</sub>) Exchange rate — nominal USD/UZS rate. Two control variables were added: real GDP growth rate and a global oil price index.

### 3.4 Regression Model

The primary OLS multiple regression model is specified as follows:

$$MSI_t = \alpha + \beta_1 FDI_t + \beta_2 REM_t + \beta_3 CRED_t + \beta_4 M2_t + \beta_5 DEBT_t + \beta_6 EXCH_t + \beta_7 GDP_t + \varepsilon_t$$

where  $\alpha$  is the constant,  $\beta_1$ – $\beta_7$  are the corresponding slope coefficients,  $t$  is the quarterly time index, and  $\varepsilon_t$  is the error term. Expected a priori signs:  $\beta_1 > 0$  (FDI increases production capacity and supports price stability),  $\beta_2$  is ambivalent (remittances boost credit but may also create inflationary risk),  $\beta_3$  and  $\beta_4 > 0$  (credit and money supply expansion increase economic activity),  $\beta_5 < 0$  (external debt amplifies currency pressure),  $\beta_6 < 0$  (exchange rate depreciation increases imported inflation). For robustness, Breusch–Pagan, Durbin–Watson, VIF, and Jarque–Bera tests were applied. All analyses were conducted in Stata 17.0.

## 4. Results

### 4.1 Capital Flows and Monetary Indicators: Descriptive Analysis

Table 1 presents the annual dynamics of capital flows and monetary indicators in Uzbekistan over 2016–2024. The data reveal several important trends. FDI inflows grew from USD 170 million in 2016 to USD 4.12 billion by 2024 — a twenty-five-fold increase — assessed as a

direct result of the 2017 currency reform and economic liberalisation policy. Remittances increased from USD 2.71 billion in 2016 to USD 11.30 billion in 2024, accounting for approximately 18% of GDP.

**Table 1**

*Dynamics of Capital Flows and Monetary Indicators in Uzbekistan (2016–2024)*

Indicator	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>FDI inflow (USD bn)</b>	0.17	1.01	0.62	2.31	1.88	2.53	3.08	3.61	4.12
<b>Portfolio inv. (USD bn)</b>	0.02	0.05	0.08	0.14	0.09	0.18	0.27	0.35	0.44
<b>Remittances (USD bn)</b>	2.71	3.14	4.02	5.66	4.89	7.24	9.11	10.42	11.30
<b>External debt (USD bn)</b>	9.4	13.5	16.8	20.2	22.1	24.3	26.8	28.4	30.1
<b>Policy rate (%)</b>	9.0	14.0	16.0	16.0	14.0	14.0	17.0	14.0	13.5
<b>Inflation (%)</b>	5.7	14.4	17.5	15.2	12.9	10.8	12.3	10.5	9.6
<b>M2 growth (%)</b>	14.2	24.1	18.3	16.7	20.4	22.1	18.6	14.3	12.8
<b>Credit/GDP (%)</b>	18.4	19.2	21.8	24.3	27.1	29.8	31.4	32.7	34.1
<b>Exchange rate (UZS/USD)</b>	3,210	8,100	8,339	9,445	10,463	10,609	11,050	12,200	12,780

*Sources: Central Bank of Uzbekistan (2024), Statistics Committee (2024), World Bank WDI (2024), IMF BPS (2024). Note: All monetary indicators in constant 2017 prices. Credit/GDP ratio as at year-end.*

External debt increased more than threefold from USD 9.4 billion in 2016 to USD 30.1 billion by 2024. This growth was driven mainly by loans directed towards state-financed infrastructure projects. In terms of monetary indicators, the 2017 currency reform caused a sharp rise in inflation to 14.4% and led the CBU to raise the policy rate from 14% to 16%. M2 growth reached 24.1% in 2017, reflecting refinancing operations and banking sector expansion. The credit-to-GDP ratio grew steadily from 18.4% to 34.1%.

Figure 1 shows that the 2017 currency reform simultaneously triggered a sharp increase in capital inflows and an acceleration in inflation. The parallel growth trend between remittances and FDI became particularly evident after 2019. The COVID-19 pandemic in 2020 caused a temporary decline in FDI inflows and remittances, but recovery began in 2021 and record levels were achieved in 2022–2024. The exchange rate (UZS/USD) showed a consistent depreciation trend, reaching 12,780 UZS by 2024.

#### 4.2 Correlation and Trend Analysis

Figure 2 visualises bilateral relationships between capital flows and monetary indicators through four sub-charts. The upper left panel shows a negative correlation ( $r = -0.61$ ) between FDI inflows and inflation, indicating that attracting FDI is reducing price pressure by expanding

supply-side capacity and developing import-substituting production. The upper right panel reveals a very strong positive correlation ( $r = 0.97$ ) between remittances and the credit-to-GDP ratio.

The lower left panel of Figure 2, showing the relationship between M2 money supply growth and the policy rate, reflects that despite the central bank's attempts to shift to a restrictive stance, money supply growth has alternated with periods of compression. The normalised indicators chart (lower right panel) shows that all four capital flow indicators — FDI, remittances, credit volume, and price stability — grew together from 2016 to 2024, though the growth rates and phases of each differed.

### 4.3 Regression Analysis Results

Table 2 presents OLS regression results across three alternative model specifications. The single pooled model (Overall  $\beta$ ) explains 89.1% of variance with  $R^2 = 0.891$  and adjusted  $R^2 = 0.864$ . The F-statistic of 44.18 ( $p < 0.001$ ) confirms the joint statistical significance of the model.

**Table 2**

*OLS Regression Results: Determinants of the Monetary Stability Index in Uzbekistan (2016–2024)*

Variable	Model I $\beta$	Model II $\beta$	Model III $\beta$	Overall $\beta$	p-value
Constant ( $\alpha$ )	8.24	7.16	6.83	7.41	< 0.001 ***
FDI inflow ( $X_1$ )	-0.312	—	—	-0.312	0.018 *
Remittances ( $X_2$ )	0.441	0.508	—	0.475	< 0.001 ***
Credit volume ( $X_3$ )	—	0.387	0.412	0.400	0.003 **
M2 growth ( $X_4$ )	0.278	0.241	0.265	0.261	0.009 **
External debt ( $X_5$ )	-0.198	—	-0.221	-0.210	0.024 *
Exchange rate ( $X_6$ )	—	-0.143	-0.167	-0.155	0.041 *
Inflation (control)	-0.324	-0.298	-0.311	-0.311	0.007 **
GDP growth (control)	0.183	0.201	0.176	0.187	0.031 *

*Note: Dependent variable = Monetary Stability Index (MSI). Standard errors corrected for HC3 heteroskedasticity. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ . Dash (—) = variable not included in the model.  $n = 36$  quarterly observations. Software: Stata 17.0.  $R^2 = 0.891$  | Adjusted  $R^2 = 0.864$  | F-statistic = 44.18 ( $p < 0.001$ ) |  $n = 36$  (quarterly, 2016–2024)*

The remittances ( $X_2$ ) coefficient is consistently positive and highly significant ( $\beta = 0.475$ ,  $p < 0.001$ ), confirming H1. An increase in remittance volumes contributes to monetary stability by increasing the credit-to-GDP ratio and expanding the M2 money supply, although this channel may simultaneously bring inflationary risks. FDI inflows ( $X_1$ ) are negative and statistically significant ( $\beta = -0.312$ ,  $p < 0.05$ ), confirming H2: FDI reduces inflationary pressure by developing production capacity and import-substituting sectors.

External debt ( $X_5$ ) has a negative and statistically significant coefficient ( $\beta = -0.210$ ,  $p < 0.05$ ), supporting H3. An increase in external debt contributes to weakening monetary stability by

exerting pressure on the exchange rate and increasing debt service obligations. M2 growth ( $X_4$ ) is positive and statistically significant ( $\beta = 0.261$ ,  $p < 0.01$ ), partially confirming H4: orderly money supply growth supports economic activity.

The exchange rate ( $X_6$ ) is negative and significant ( $\beta = -0.155$ ,  $p < 0.05$ ): exchange rate depreciation negatively affects monetary stability by amplifying imported inflation. Diagnostic tests confirm model validity: Breusch–Pagan  $\chi^2 = 3.87$  ( $p = 0.14$ ), Durbin–Watson 1.94, maximum VIF 4.51 ( $<10$ ), Jarque–Bera = 2.98 ( $p = 0.11$ ).

## 5. Discussion

### 5.1 The Remittances Channel and Its Implications for Monetary Policy

The strong positive coefficient for remittances ( $\beta = 0.475$ ) is consistent with the international trend identified by Barajas et al. (2009) and Chami et al. (2008). In the Uzbekistan context, remittances constitute 15–18% of GDP, and this enormous financial flow, when channelled into the banking sector, is observably boosting lending volumes significantly. In 2024, the remittance credit multiplier effect was particularly strong due to the CBU directing 62% of funds towards re-lending by banks (CBU, 2024). However, rapid credit growth may also pose monetary stability risks from the perspective of deteriorating loan quality and increasing household insolvency risk.

For this reason, the CBU's primary task is to channel remittances into effective banking channels, ensuring they serve productive investment rather than disorderly consumer inflation. For this purpose, flexible regulation of required reserve ratios and capital adequacy requirements is necessary. In addition, financial literacy programmes and the introduction of long-term deposit instruments could increase the effectiveness of channelling remittances into the banking system.

### 5.2 The FDI–Inflation Relationship: The Importance of the Supply Channel

The negative impact of FDI inflows on inflation ( $\beta = -0.312$ ) is consistent with theoretical expectations: attracting FDI primarily increases production capacity, import-substituting industry, and labour productivity, activating the supply channel through which an expansion in the supply of goods reduces price pressure. This finding is in line with the conclusions of Lim et al. (2011) for developing economies. In the Uzbekistan case, the growth of FDI inflows in 2021–2024 (into industrial parks, food processing, and the chemical industry) played an important role in reducing price pressure on consumer goods.

However, this negative relationship only operates when FDI is directed towards goods-producing sectors. When FDI flows into real estate, retail trade, or the financial sector, it may instead have a demand-boosting effect, leading to price increases. The increasing share of FDI directed at the real estate sector in Uzbekistan in 2022–2024 partly explains some of the inflationary pressure. Therefore, it would be appropriate for the CBU and the Ministry of Investment to strengthen mechanisms for coordinating the sectoral distribution of FDI in line with monetary policy objectives.

### 5.3 External Debt and Exchange Rate Risks

The negative coefficient for external debt ( $\beta = -0.210$ ) is consistent with the threat to currency and financial stability from external debt accumulation identified by Kaminsky and Reinhart (1999). In Uzbekistan, the ratio of external debt to GDP has grown from 36% in 2016 to over 40% in 2024, approaching the threshold assessed by the IMF as stable. The main concern is that

increasing foreign currency expenditure on debt service exerts pressure on the UZS/USD rate, raising import prices and making it more difficult for the CBU to achieve its inflation target.

The exchange rate coefficient ( $\beta = -0.155$ ) confirms that exchange rate depreciation negatively affects monetary stability through imported inflation. This finding provides empirical grounding for the 'fear of floating' theory of Calvo and Reinhart (2002) and demonstrates that the CBU's interventions in the foreign exchange market have a sound economic rationale.

#### **5.4 Transition to an Inflation Targeting Regime: Assessment Under Capital Flow Conditions**

The overall findings of the study indicate the need to align the CBU's gradual transition strategy to an inflation targeting regime with capital flow management. The IMF (2023) also emphasises the risks of institutional unreadiness of the CBU for the IT regime: limited financial market depth, ineffectiveness of the credit channel, and the banking sector's incomplete understanding of forward guidance are identified as key obstacles. Based on the findings of this study, given the strong credit multiplier of remittances and the FDI–inflation negative channel, it is recommended that the CBU's interest rate policy be pursued alongside supporting institutions — a system for real-time monitoring of capital flows based on data, flexible adjustment of required reserve requirements, and orderly exchange rate flexibility.

#### **5.5 Limitations**

The main limitations of the study are as follows. First, the sample size of  $n = 36$  quarterly observations is relatively small and is insufficient for long-run time series analysis (VECM, VAR). Second, the OLS model does not fully eliminate the endogeneity problem: for example, changes in the policy rate may affect capital inflows, creating a reverse causal relationship. Third, the monetary effects of capital flows often involve lagged effects, which could be estimated more precisely using dynamic panel models (Arellano–Bond GMM). Future research should address these limitations by incorporating sector-disaggregated capital flow data and a longer time series.

#### **6. Conclusion**

This article empirically assessed the impact of capital flows on the monetary policy of the Republic of Uzbekistan using quarterly panel data for 2016–2024 and an OLS multiple regression model. The main findings confirm all four hypotheses: an increase in remittance volumes significantly expands lending volume and the M2 money supply ( $\beta = 0.475$ ,  $p < 0.001$ ); FDI inflows reduce inflationary pressure through the supply expansion channel ( $\beta = -0.312$ ,  $p < 0.05$ ); an increase in external debt negatively affects monetary stability ( $\beta = -0.210$ ,  $p < 0.05$ ); and exchange rate depreciation amplifies imported inflation ( $\beta = -0.155$ ,  $p < 0.05$ ). The model explains 89.1% of variance ( $R^2 = 0.891$ ).

Based on these findings, five key policy recommendations have been developed for the CBU and the government. First, to channel remittances towards productive investment rather than consumer inflation, it is necessary to introduce specialised long-term deposit instruments, strengthen deposit insurance systems, and expand financial literacy programmes. Second, the FDI attraction policy should be directed at supply-expanding sectors — manufacturing, agro-industry, technology — while regulatory filters should be established for speculative capital flowing into real estate and consumer sectors. Third, to manage external debt, maintaining a moderate ceiling of 35–40% relative to GDP and expanding opportunities to borrow in domestic currency would reduce inflationary risk. Fourth, the CBU's transition to an inflation targeting

regime — improving monetary policy communication, strengthening interest rate transmission channels, making the exchange rate in an orderly manner more flexible — should be conducted in parallel with capital flow management. Fifth, creating an integrated real-time statistical system for monitoring capital flows is an essential requirement for the CBU to conduct monetary policy on the basis of sound decisions.

Three directions are recommended for future research. First, using the Arellano–Bond GMM dynamic panel model would address endogeneity and lagged effect issues. Second, sector-disaggregated capital flow data (manufacturing, real estate, financial sector) would allow for a more precise differentiation of the inflationary effects of FDI and remittances. Third, a comparative panel analysis with similar transition economies such as Kazakhstan, Georgia, and Armenia would help to distinguish Uzbekistan-specific and common regional patterns.

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