



The Central Bank
of the Republic of Uzbekistan

Methodology for the Calculation of the Real Effective Exchange Rate of the Uzbek Soum

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METHODOLOGY FOR THE CALCULATION OF THE REAL EFFECTIVE EXCHANGE RATE OF THE UZBEK SOUM

1. Introduction

This methodology has been developed to establish the procedure for calculating the effective exchange rate indices of the soum and to ensure a unified approach to their assessment.

The real effective exchange rate is a macroeconomic indicator used to assess monetary conditions and reflect the relative price competitiveness of the national economy, accounting for the impact of inflation and exchange rate fluctuations in the economies of major trading partners.

2. Key Concepts

Nominal Exchange Rate – represents the value of one country's national currency in terms of another country's national currency. It indicates the exchange ratio between two currencies.

Nominal Effective Exchange Rate (NEER) – an index determined by calculating the value of the national currency relative to the currencies of major trading partners, weighted according to their shares in foreign trade. This measure does not account for differences in price levels between countries.

Real Exchange Rate – represents the value of one country's currency relative to another country's currency, adjusted for the difference in price levels between the two countries. It reflects the relative value between domestic and foreign goods, indicating the conditions of price competitiveness between economies.

Real Effective Exchange Rate (REER) – an index determined by calculating the value of the national currency relative to the currencies of major trading partners, adjusted for inflation differentials and weighted by their respective shares in foreign trade. REER reflects the relative price competitiveness of the national economy in international markets.

3. Calculation Procedure

Various methods for calculating effective exchange rates are used in international practice. The Central Bank calculates the effective exchange rate of the soum using the geometric averaging method. The weights are based on the shares of major trading partners in the country's total foreign trade turnover.

The Consumer Price Index (CPI) of the respective countries is applied to convert nominal exchange rates into real indicators.

3.1. Nominal Exchange Rate

The nominal exchange rate is determined either by the value of the national currency in terms of a foreign currency (E) or, conversely, by the value of a foreign currency in terms of the national currency (R):

$$E = \frac{1}{R} \quad (1)$$

where:

E = value of 1 soum in units of foreign currency;

R = value of 1 unit of foreign currency in soums.

3.2. Nominal Exchange Rate Index

To calculate the nominal exchange rate index, the exchange rate is converted into an index form (NER_{it}) relative to the base period:

$$NER_{it} = 100 \times E_{it}/E_{i0} \quad (2)$$

where:

t represents the current period and 0 denotes the base period;

E_{it} is the value of 1 sum in units of the currency of trading partner i for period t ;

E_{i0} is the value of 1 sum in units of the currency of trading partner i for the base period.

An increase in the nominal exchange rate index indicates a nominal appreciation of the sum against the compared currency, while a decrease signifies its depreciation.

3.3. Real Exchange Rate Index

The real exchange rate index (RER_{it}) is calculated using the following formula:

$$RER_{it} = NER_{it} \times \frac{CPI_{Dt}/CPI_{D0}}{CPI_{Fit}/CPI_{Fi0}} \quad (3)$$

where:

CPI_D is the consumer price index of Uzbekistan;

CPI_{Fi} is the consumer price index of the selected trading partner i .

3.4. Nominal Effective Exchange Rate

The Nominal Effective Exchange Rate is determined using the weighted geometric average of the nominal exchange rate indices of selected trading partners:

$$\begin{aligned} NEER_t &= 100 \times \prod_{i=1}^N (NER_{it}/100)^{w_i} \text{ OR} \\ NEER_t &= 100 \times (NER_{1t}/100)^{w_1} \times \dots \times (NER_{Nt}/100)^{w_N} \end{aligned} \quad (4)$$

where:

w_i is the weight of the selected trading partner i in the total foreign trade turnover;
 N is the number of selected trading partners.

3.5. Real Effective Exchange Rate

The Real Effective Exchange Rate is determined using the weighted geometric average of the real exchange rate indices of selected trading partners:

$$\begin{aligned} REER_t &= 100 \times \prod_{i=1}^N (REER_{it}/100)^{w_i} \text{ or} \\ REER_t &= 100 \times (REER_{1t}/100)^{w_1} \times \dots \times (REER_{Nt}/100)^{w_N}. \end{aligned} \quad (5)$$

4. Chain-Linked Index Method

In the first stage, the growth rates for nominal and real effective exchange rates are calculated for each period relative to the previous period $[t/(t-1)]$. In the second stage, a continuous time series is formed from the results using the chain-linked index method. Under this approach, the index for a selected period is calculated by multiplying the growth rates of all preceding periods, starting from the base value. This methodology allows for a more accurate reflection of long-term dynamics.

5. Procedure for Determining Weights

The composition of the currency basket is formed by selecting N countries with the highest shares in the total foreign trade turnover over the last three years. In this process, it is recommended that the combined share of the selected countries accounts for at least 85 percent of the total foreign trade turnover.

It is considered appropriate to include in the sample only those countries for which regular and comparable statistical data on nominal exchange rates and price indices are available. To account for shifts in the geography of foreign trade, it is recommended to review the composition of the sample and the weights of the countries at least once every three years.

The weight of each currency used in calculating the effective exchange rates is determined by the following formula:

$$w_i = \frac{X_i + I_i}{\sum_{k=1}^N (X_k + I_k)}; \quad \sum_{i=1}^N w_i = 1 \quad (6)$$

where:

X_i is the volume of exports from Uzbekistan to trading partner i ;

I_i – is the volume of imports to Uzbekistan from trading partner i .

6. Accounting for Gold Exports

To assess the impact of gold exports, the nominal and real effective exchange rate indices are calculated separately. Given that gold exports are not distributed to specific countries, a separate "Gold" variable is included as an additional row alongside the N countries. In the next stage, the weights are recalculated to account for gold exports. Since gold exports are conducted in US dollars, the US dollar is adopted as the currency for the "Gold" row. When calculating the real rate for the "Gold" row, changes in the price of gold are used as the price index.

7. Data Sources and Calculation Frequency

Base period — September 2019.

Note: *Within the framework of implementing measures for further liberalization of the foreign exchange market, commercial banks began the sale of cash foreign currency starting August 20, 2019. Consequently, September 2019 has been designated as the base period for calculating the real effective exchange rate index of the soum.*

Statistical Sources:

National Statistical Committee of the Republic of Uzbekistan (export and import volumes, consumer price index);

National statistical authorities of trading partners (consumer price index);

Central banks of trading partners (official exchange rates).

Exchange rate indicators are used as monthly averages.