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METHODOLOGICAL IMPROVMENTS REGARDING THE EXCHANGE RATE CALCULATION OF THE MOLDOVAN LEU

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Abstract: The exchange rate has a direct impact on many macroeconomic indicators. The real exchange rate floating affects demand for exports and imports and, as a result, influence the trade balance, current account and production dynamics. An overvalued currency can lead to a current account deficit, and if such a deficit persists for a long time, it can lead to a currency crisis. The problem of an undervalued currency may seem less significant, but this has negative consequences too, such as low output growth in the non-tradable goods sector. In addition, it leads to the deterioration of the situation of the current account of the trading partner countries. Thus, deviations of exchange rates from their stable values are in most cases undesirable.

In the practical way of estimating the equilibrium exchange rate, the main goal is to determine the real effective exchange rate (REER), since the dynamics of foreign trade and other flows reflected in the balance of payments depend on this indicator. In this study, in addition to estimating the level of fluctuation in real effective exchange rate needed to reach the equilibrium level, we also provide corresponding estimations for the nominal effective exchange rate and the real exchange rate of the Moldovan leu against the US dollar.

Thus, the relevance of the research topic is determined by the fact that today there are many theories and methods of determining the nominal and real exchange rate. In this article we will analyze these theories and methods in detail and consider the perspectives to use them in the national practices.

Keywords: exchange rate, nominal exchange rate, real exchange rate, current account, Balance of Payments, Trade Balance.

JEL Classification: E58, E52, G21, F37, F31, F32

Introduction

The estimates below use different measures of the exchange rate. In order to correctly interpret the results, it seems necessary to dwell briefly on the basic indicators used.

First, exchange rates can be bilateral or multilateral. A bilateral exchange rate is the relative price of two currencies. A multilateral (or effective) exchange rate is an index of bilateral exchange rates between the currency of the home country and the currencies of other countries (usually trading partner countries whose exchange rates with the home country are used as weights for calculating such index).

Second, exchange rates can be nominal or real. A nominal exchange rate is the price of one currency expressed in terms of another. The real exchange rate is the nominal exchange rate adjusted for price differences, i.e. the value of the nominal exchange rate multiplied by the relative price level. Nominal and real exchange rates can be either bilateral or multilateral.

Third, both direct quotations (amount of foreign currency per domestic unit) and indirect quotations (amount of domestic currency per foreign unit) can be used.

In the practice of estimating the equilibrium exchange rate, the main goal is usually the real effective exchange rate (REER), since the dynamics of foreign trade and other flows reflected in the balance of payments depend on this indicator. In this paper, in addition to estimating the size of the required change in the real effective exchange rate to reach the equilibrium level, we also provide corresponding estimates for the nominal effective exchange rate and the bilateral exchange rate of the Moldovan leu against the US dollar. The latter is used because for a country this exchange rate traditionally plays the role of a nominal anchor due to the high level of dollarization of the national economy.

Methodological aspects of determining the real exchange rate

The Republic of Moldova is in a floating exchange rate regime. Thus, the volatility of the exchange rate differs from one country to another, being influenced by a multitude of causes such as the degree of liberalization of the capital account in the balance of payments, the inflation rate on other markets, problems of foreign countries such as the case with Russia, Ukraine, etc.

Interventions in the foreign exchange market can be carried out often, depending on the economic problems of the country. In this way, various goals are pursued such as:

- decreasing the degree of volatility of the exchange rate;
- orientation of volatility in the necessary direction of the economic goal.

Thus, the interventions are carried out either to target the inflation rate, which is also the objective of the NBM, or the appreciation of the national currency.

One of the reasons that avoids the frequent flexibility of the exchange rate is that this volatility increases the economic costs related to foreign trade activity due to difficult calculations and risk elimination methods such as:

- various bank accounts that involve many commissions;
- instability planning at company level;
- the complexity of the accounting records in the balance sheets.

But the volatility of the nominal exchange rate in the market leads to the balancing of the real exchange rate. If the nominal exchange rate is managed correctly and very intensively, the imbalance of the real exchange rate through the price level can be avoided, but at the same time the objective of direct inflation targeting becomes more difficult to follow.

The foreign exchange market in the Republic of Moldova is often affected by the consequences of exchange rate volatility. Thus, there is a currency pressure on the market caused by the depreciation of the Moldovan leu. In this situation, the interventions of the monetary authority on the market are determined by the currency pressure.

Exchange rate pressure is the change in the exchange rate that would have occurred if the central bank had refrained from intervening in the foreign exchange market, considering the expectations that agents form based on the actions actually taken by the central bank (WEYMARK 1995).

In order to observe the changes on the foreign exchange market related to the volatility of the exchange rate, a calculation index is proposed. In cases of pressure on the market, the National Bank can act passively so the exchange rate changes depending on economic factors, or it can act by selling or buying the currency. Thus, in the case of the floating regime of the exchange rate on the market, the pressure can be followed by the percentage change in the exchange rate and, in the case of the

fixed exchange rate, by the change in the foreign exchange reserve. In the case of the predominance of both regimes, an index is deduced by which we determine the degree of pressure. The calculation formula was introduced by (Girton and Roper, 1977) so, we have:

$$\mathbf{PV = \sum \Delta\%CV + \Delta\%RV} \quad \mathbf{(1)}$$

in which:

PV – pressure on the foreign exchange market;

$\Delta\%CV$ - the percentage change in the exchange rate;

$\Delta\%RV$ - the percentage change in the foreign exchange reserve.

Thus, determining the value of the currency pressure, we can follow, for the most part, the periods when the interventions of the monetary authority were carried out. But, even if the National Bank intervenes and regulates the exchange rate, we still do not have a real market rate, but a nominal one. Each of the citizens of the Republic of Moldova may at some point wonder if the exchange rate is undervalued or overvalued. This question is always in the center of attention in the international economy. Thus, in order to find the correct answer and to make an analysis of the country regarding the degree of development of the economy, the researchers arrived at the determination of the effective real exchange rate.

The majority of the population agrees with the nominal exchange rate, i.e. the one presented by the Central Bank for the banks in the system. But the nominal exchange rate is not enough for a legal entity or even for an individual holding a larger amount of money. Each of them will be interested in what can be bought with this currency, that is, what is the purchasing power. Is it better to hold currency in euros or dollars? In this case, the need for the real effective exchange rate arises, which aims to measure the value of a country's goods against another country, a group or the rest of the world.

If we talk specifically about the problems related to the Republic of Moldova, then we know that the IMF follows the dynamics of the monetary policy, and our state does not register the best results in this regard. Thus, the exchange rate is the first in importance in foreign trade, because for a healthy economy we must have an appreciation of the real exchange rate.

The problem of estimating the real effective exchange rate is very important for Moldova. In general, it contributes to the integration of the country's economy into an economic area with a wide horizon of possibilities.

Next, we will present calculation methods of REER for the Republic of Moldova. To determine the real exchange rate as mentioned before requires the NEER and adjusting the deflators of two markets. In international practice, several deflators are proposed as a basis for calculation, such as:

- consumer price index (CPI);
- the producer price index (PPI);
- world industrial product price index (WPI);
- the price index for imported products (PM);
- price index for exported products (PX);
- unit labor cost (ULC);
- the gross domestic product deflator (GDP).

As we know, and it is presented in the balance of external payments, the Republic of Moldova is a country that imports more than it exports. So, we will choose CPI, ULC, IPP and DGDP as the basis

of calculation. The International Monetary Fund offers CPI, ULC, etc. as deflators. The European Central Bank has its standard calculation methodology using the ULC deflator.

In general, less developed countries are less likely to achieve real results that correspond to the economic situation than highly developed countries. As the indices used as deflators in the calculation method often represent artificial values and not only the Republic of Moldova in our case but also foreign countries as trade partners can have a negative influence.

During the paper I mentioned that the effective real exchange rate measures changes in the competitiveness of a state, by considering price changes between these states. If the REER indicator increases, then competitiveness is lost.

The REER determination methodology is based on two calculation options, such as:

- weighted geometric mean;
- weighted arithmetic mean.

The weighted geometric mean represents the determination of the REER by the product of the NEER and the deflator used for the foreign country relative to the value of the Republic of Moldova.

The weighted arithmetic average is calculated by the sum of the nominal exchange rate and the ratio between the deflator of the foreign country and the Republic of Moldova.

The difference between these methods is that the arithmetic mean has the advantage of ease of calculation which attracts researchers and practitioners. But the geometric mean even if it represents a more complicated method of determination, then it has useful properties such as symmetry and coherence. The arithmetic mean is generally influenced by the year taken as the basis for the calculation of the deflator and the change of the basis of calculation in the case of dynamic calculation. While the geometric mean, the deflator is not influenced by the year taken as the basis of calculation. Thus, we will use the geometric mean, which is provided by the IMF and the ECB.

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To determine the REER, first of all, we calculate the NEER which has the following calculation formula:

$$\textbf{NEER} = \prod_{i=1}^{n}\left(\frac{S_i}{S_i^*}\right)^{w_i} \quad \textbf{(2)}$$

in which:

n – – the number of countries (currencies) in the basket;

S_i – the exchange rate of the national currency against the currency of country i;

S_i^* – the exchange rate of the national currency against the currency of country i in the base period;

w_i – the weight of the country (currency).

At the same time, the methodology for calculating the real exchange rate is as follows:

$$\textbf{REER} = \prod_{i=1}^{n}\left(\frac{S_i}{S_i^*}\times\frac{X_i}{X_{MD}}\right)^{w_i} \quad \textbf{(3)}$$

in which:

n – the number of countries (currencies) in the basket;

S_i – the exchange rate of the national currency against the currency of country i;

S_i^* – the exchange rate of the national currency against the currency of country i in the base period;

X_i - the deflator used, whether CPI, ULC, PPI or GDP of the foreign country;

X_{MD} - the deflator used for the Republic of Moldova;

w_i – the weight of the country (currency).

The problems encountered when determining this indicator are:

- determining weights and choosing the correct countries depending on trade relations;
- choosing the most advantageous deflator for calculation;
- the correct choice of the exchange rate of the Moldovan leu against the other currencies of foreign countries in the necessary period.

The effective nominal exchange rate represents the changes in the rate of the Moldovan leu against other currencies of the partner countries considered on the market, the increase signifying the strengthening of the national currency.

Next, we will analyze the method of determining trade partners, which is in the previously presented formula. Determining weights and choosing countries as main trading partners is a significant role. Because it determines how exchange rates between countries and deflators influence the competitiveness of the Republic of Moldova. In general, the researchers say that it is desirable to consider all the partner countries with which they have trade, even if the links are not only direct. But if we really look at these researches, they require a lot of investigations that are primarily time-consuming, so we will consider the countries with higher weights, as those with small weights do not have a significant role in determining the REER.

A number of foreign researchers demonstrate that under certain conditions of elasticity between the goods offered on the same market, the total weights of the trading partners for a certain country are proportional to the elasticities of the demand for these goods in relation to the price of the goods produced by the trading partners.

The method of determining the weights consists in considering all trade flows from the partner countries of the Republic of Moldova, i.e. both import and export. The IMF proposes the separate determination of trade flows with the following calculation method.

$$w_i \text{ import} = \left(\frac{import\_tara\_j}{total\_import\_tara\_i} * 100\% \right) * \frac{import\_tara\_i}{total\_comert\_tara\_i} \quad \textbf{(4)}$$

in which:

w_i import – the share of the country (currency) in the total import of the Republic of Moldova.

$$w_i \text{ export} = \left(\frac{export\_tara\_j}{total\_export\_tara\_i} * 100\% \right) * \frac{export\_tara\_i}{total\_comert\_tara\_i} \quad \textbf{(5)}$$

in which:

w_i export – the share of the country (currency) in the total export of the Republic of Moldova.

Respectively, the sum of these two weights is w, which represents, as I mentioned, the weight of the trade of a certain country used in the research carried out.

Conclusion

In general, the nominal exchange rate may be undervalued or overvalued relative to the real exchange rate. Many highly developed countries whose main profit is export revenue such as China or Japan tend to depreciate the exchange rate in order to be able to export as many goods as possible to foreign markets. The Republic of Moldova, being a less developed country, has a weak industry, so the exchange rate is much overvalued compared to the real norm. So, in the case of the research conducted of the nominal exchange rate and the real exchange rate there will be considerable differences. However, the calculation method such as the deflators used can influence the results.

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