

Real Effective Exchange Rate for Moldova: Which deflator should be used?

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Berlin/Chişinău, June 2018

Structure

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1. Introduction

- A country's real effective exchange rate (REER) is a trade-weighted index of its bilateral exchange rates vis-à-vis its trading partners, adjusted for differences in inflation
- REER: indicator for the development of a country's competitiveness
- Construction of REER in two basic steps:
 - Weighting bilateral exchange rates by trade partners
 - Adjustment for inflation using a price index
- **Goal here:** discussion of different approaches for REER calculation and recommendation on which price index to use in the case of Moldova
- **Method:** Literature review and calculation of the REER using different price indices
- **Why important?** Price indices may diverge over time, leading to dissimilar calculations of REER and different policy implications

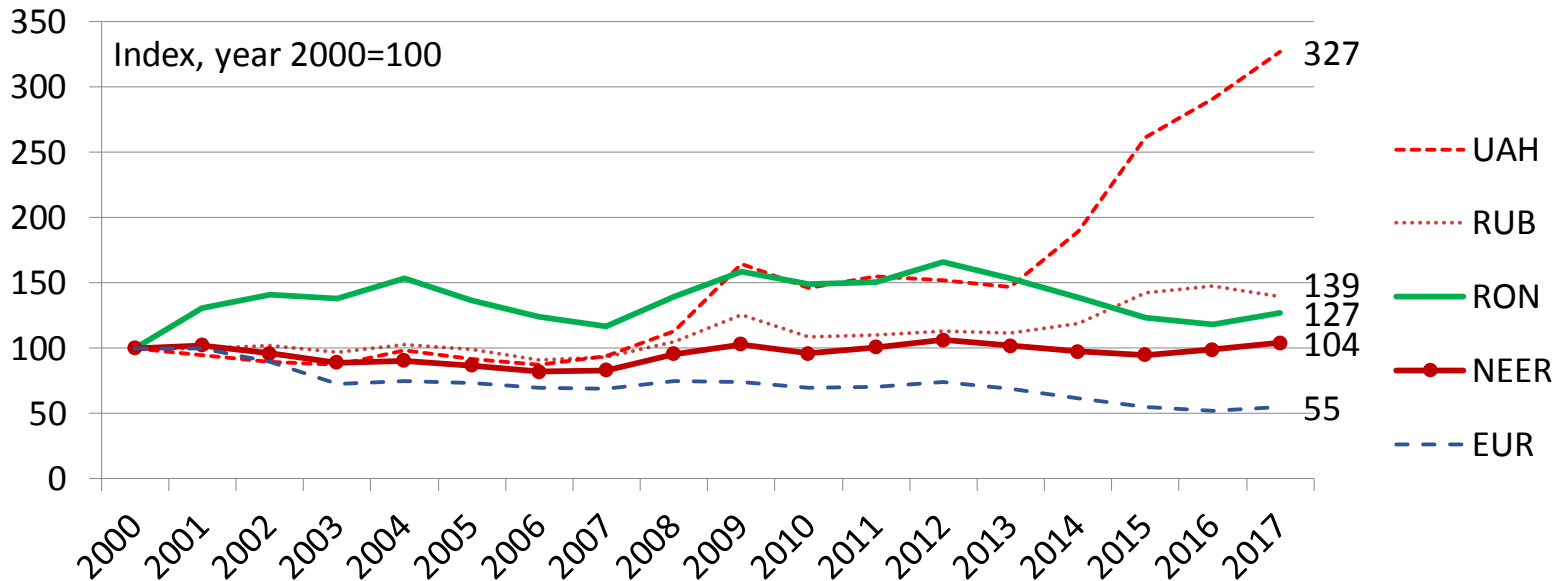
2. Calculation of the nominal effective exchange rate

- First step: Calculation of the nominal effective exchange rate (NEER)
- Methodological questions need to be answered
- Question 1: What currencies to include in the calculation?
 - In principle, all economies which compete with domestic producers directly or indirectly through third markets should be included
 - In practice, restrictions by data availability and quality
 - Eurostat uses currencies of 42 economies (EU28 + 14 others)
 - Bank for International Settlements (BIS) has a narrow indicator (26 economies) and a broad index (61 economies)
 - NBM uses 17 economies for REER calculation
 - For our calculation we use four currencies, the Euro (19 economies), the Romanian Leu, the Ukrainian Hryvnia and the Russian Ruble
 - Chosen partners account for around 2/3 of Moldova's trade
 - USD is not included as USA accounts only for small share of trade

Currency weighting methodology

- Question 2: What structure of weights to assign to the currencies?
 - Different possibilities; for analysis of competitiveness mostly actual trade data of manufactured goods are used
 - Most institutions use an approach suggested by the Bank for International Settlements:
 - Imports weighted by share of trade partner in imports
 - For exports so called “double weights” approach: The weight of trade partner X is measured by exports to X (compared to X’s domestic production), plus X’s exports to Y, weighted by the share of own exports to Y
 - We use simple export and import weights mainly because it is much easier to calculate
 - Weights are calculated on annual manufacturing exports and imports separately for each year starting in 2000

Nominal bilateral exchange rates and NEER



Source: NBM, UN Comtrade, own calculations

- Bilateral nominal exchange rates (indirect quotation) show strong devaluation of MDL vs. the EUR since 2000
- Appreciation of MDL against other relevant currencies, especially against UAH
- NEER in 2006 below base year, now slightly above the value of base year
- No significant change of NEER

3. From NEER to REER: choice of deflator

- Second step: Adjustment for price development of NEER to get the REER
- Question 3: What price index to use to deflate the NEER?
 - Different indices used by institutions and literature
 - Consumer price index (CPI)
 - Producer Price Index (PPI)
 - Unit labour cost index
 - GDP deflator etc.
 - All have their advantages and disadvantages
 - Choice should depend on the goal of the analysis, e.g. competitiveness or purchasing power

CPI as deflator

Consumer Price Index (CPI)

- Advantages
 - fairly comparable across countries
 - reasonably accurate, much statistical effort is going in its accuracy
 - rapidly available
 - published frequently, available monthly for most developing countries
- Disadvantages
 - Includes goods that are non-tradable, problematic if tradable and non-tradable prices diverge over time due to different sector productivity growth
 - Exclude important tradable goods such as capital goods
 - Affected by taxes, subsidies & price controls
 - Bad proxy for tradable goods

PPI as deflator

Producer Price Index (PPI)

■ Advantages

- Covers more of tradable goods sector, better for measuring competitiveness compared to CPI, excludes retail sales
- Reasonable proxy for tradable goods prices

■ Disadvantages

- Coverage, method of construction, and weighting vary substantially from country to country
- In some cases, dubious statistical quality
- Prices are frequently based on turnover and tend to overweight raw commodities and semi-manufactured goods, for which price competitiveness is of limited importance
- May include a large component of imported intermediate goods, in this case resulting REER not a good measure for competitiveness of domestic production

ULC and GDP deflators

Unit labour costs

- Advantages
 - Provides broad indication of domestic costs of production
 - REER this way reflects incentives to reallocate non-labor factors internationally and domestically
 - Very good competitiveness indicator
- Disadvantages
 - Does not include costs of capital and material inputs
 - Change of capital to labour ratio can be interpreted wrongly
 - Large errors of measurement and long publication lags

GDP deflator

- Advantages: Comparable across countries
- Disadvantages: Includes prices of non-traded goods and services like construction and government sector (same problems as with CPI)

Exports price index as deflator and results

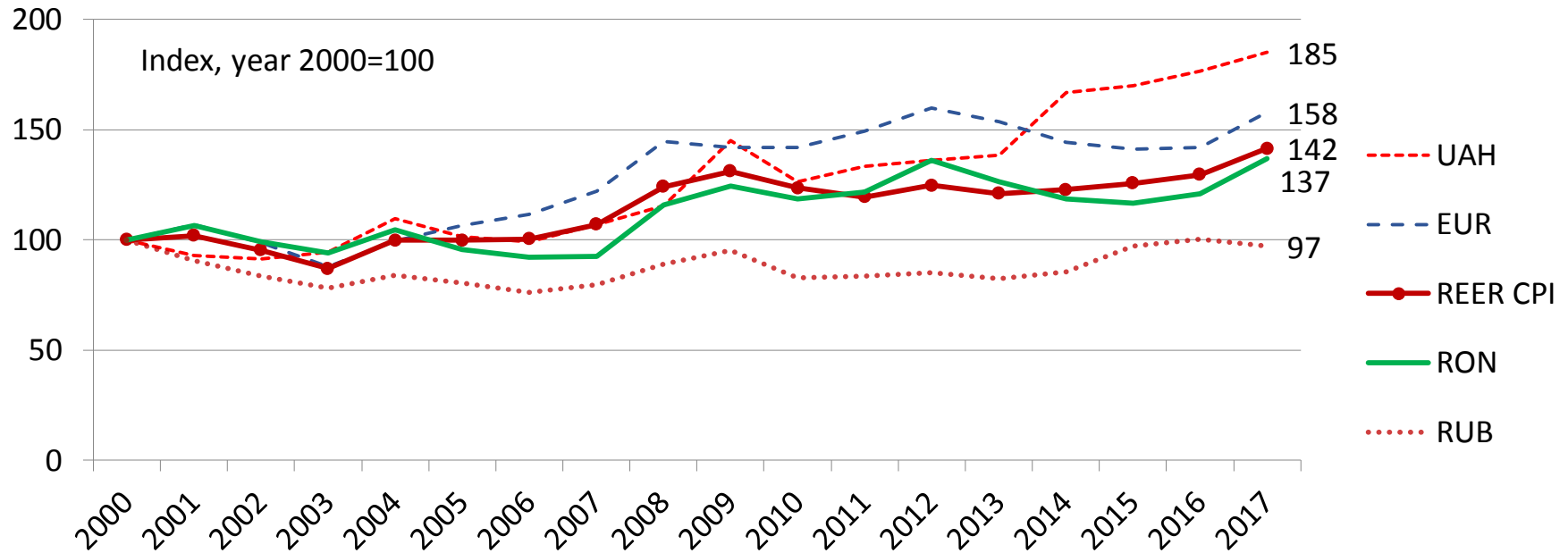
Export prices index

- Advantages: Most direct measure of traded goods, useful indicator for competitiveness
- Disadvantages
 - suffers from sampling bias, types of goods include may differ substantially between countries
 - includes only goods that are traded under current regime, tend to be a function of the exchange rate itself
 - may include primary products, that are determined by world markets and do not reflect competitiveness

Results

- Especially interesting are the CPI (internationally comparable), the unit labor costs index and PPI (good measure of competitiveness)
- Calculation of different indices for comparison

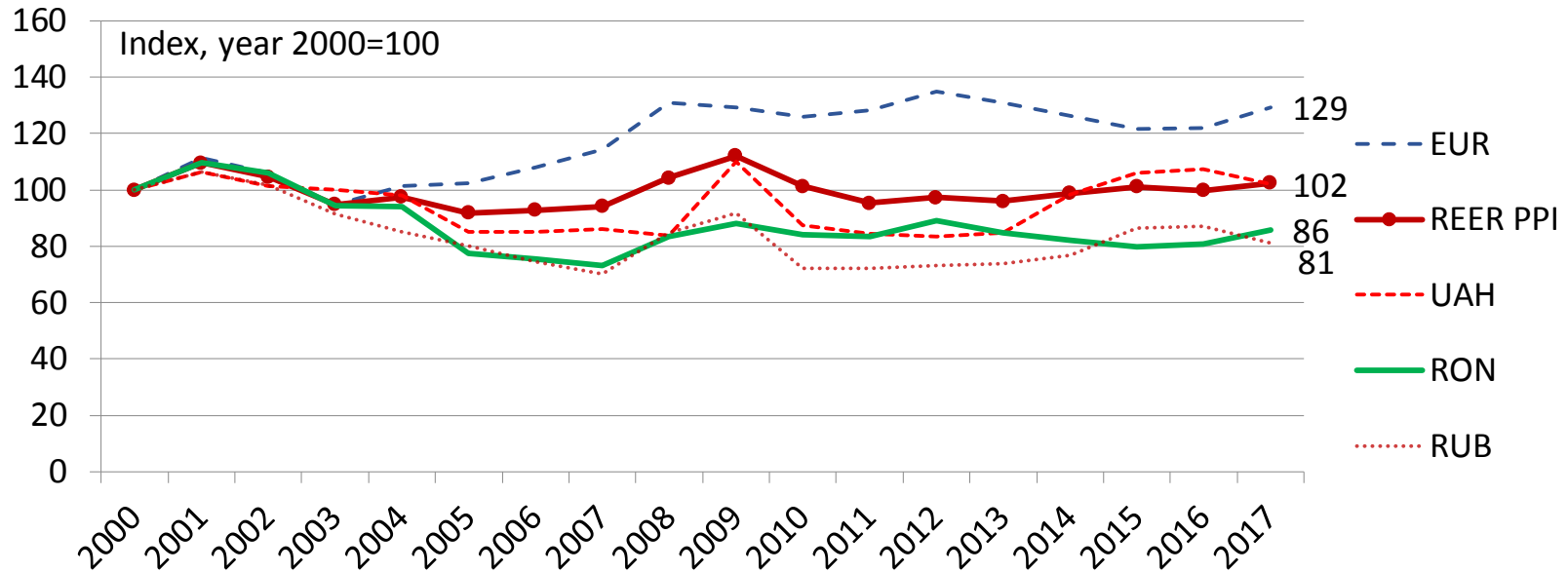
CPI-based real bilateral real exchange rates and REER



Source: NBM, UN Comtrade, own calculations

- CPI-deflated bilateral exchanges rates show appreciation of MDL against all currencies except of RUB
- REER in 2017: 42% above the base year in 2000
- CPI based REER shows a real appreciation of the MDL and therefore a loss in competitiveness

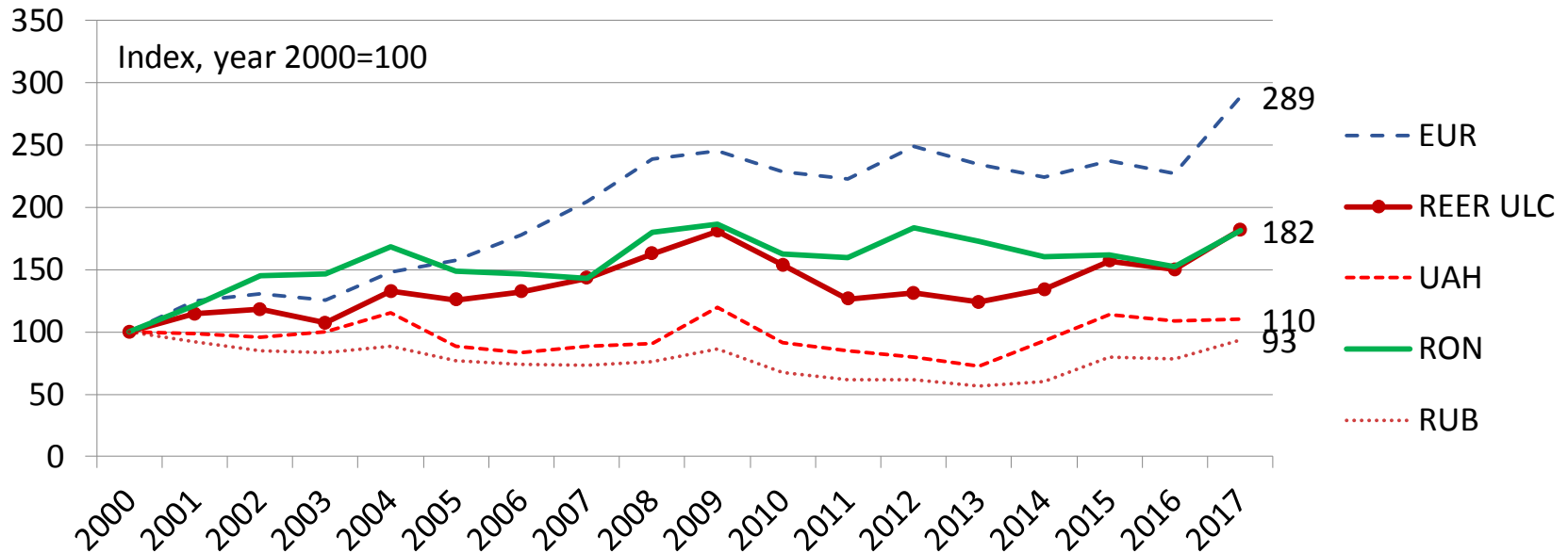
PPI-based real bilateral real exchange rates and REER



Source: NBM, UN Comtrade, own calculations

- PPI-deflated bilateral exchanges rates show appreciation of MDL against the EUR but a depreciation against the RON and RUB
- REER in 2017: almost equal to base year
- PPI based REER shows no change in competitiveness
- Big difference between CPI and PPI deflated REER

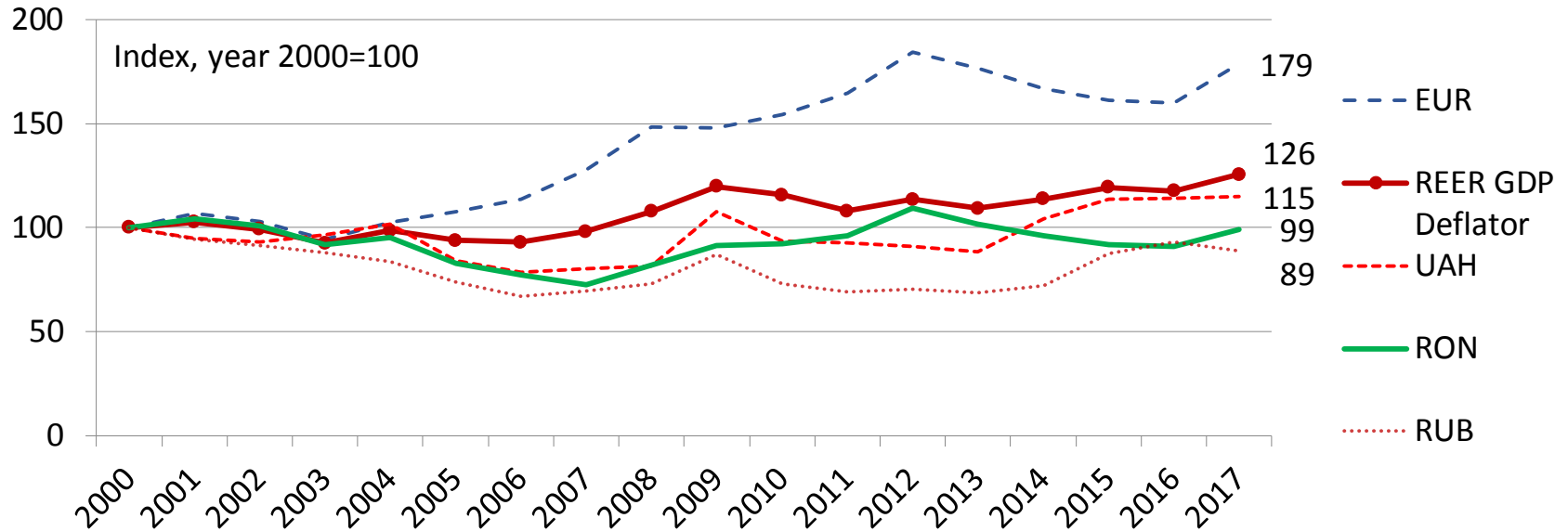
ULC-based real bilateral real exchange rates and REER



Source: NBM, UN Comtrade, own calculations

- ULC not calculated by MDA authorities, therefore own calculation (see annex)
- Real bilateral exchanges rates show appreciation of MDL against the EUR, RON and UAH, depreciation against the RUB
- Strong increase of REER of 82% in 2017 compared to 2000
- ULC-based REER shows strong decline in competitiveness
- However, result should be treated with caution as data in part of doubtful quality, e.g. data shows strong decline of productivity in MDA in 2017

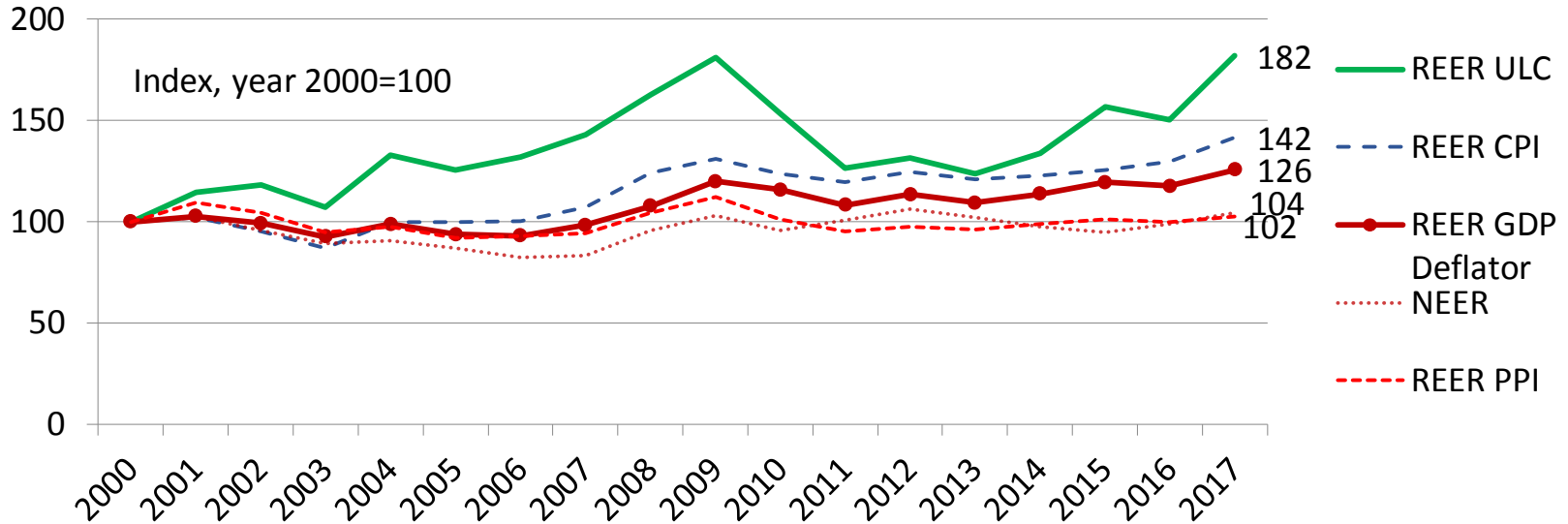
GDP deflator based real bilateral real exchange rates and REER



Source: NBM, UN Comtrade, own calculations

- GDP deflator-based REER show a MDL appreciation against the EUR and UAH and a depreciation against the RUB
- Increase of REER of 26% in 2017 compared to 2000
- GDP deflator-based REER shows moderate decline in competitiveness compared to the base year

4. Comparison of results



Source: NBM, UN Comtrade, own calculations

- Appreciation of all REERs, but for Moldova it makes a big difference what is used
 - REER based on the ULC and CPI shows high a real appreciation of the MDL
 - PPI based REER shows almost no change in value compared to base year
 - GDP deflator based REER lies in between
- Literature shows that differences are typical, CPI often above PPI
- However high difference of ULC REER compared to others hints to possible methodological problems
- **Question: What deflator should be used?**

Recommendations

- We recommend to use two indicators for REER calculation: CPI and PPI
 - CPI is internationally comparable and accurate and is used by most other institutions, it should no be replaced by another index
 - The PPI is theoretically better suited to calculate changes of competitiveness, however further research necessary to analyse whether a comparable methodology for PPI calculation is used
 - Another advantage of having both indicators is that their difference can be used as indicator for terms of trade (PPI is proxy for the export price, CPI for the import price)
- The ULC-deflated REER can also be useful for competitiveness analysis, but measurement seems to be an issue
- The GDP deflator has no obvious advantages vs. the CPI deflator

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Annex: Calculation of NEER and REER

For NEER the following formula is used:

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

- n – number of countries (currencies) from the basket;
- s_i – exchange rate of the national currency against the currency of the country i ;
- s_i^* – exchange rate of the national currency against the currency of the country i during the base period;
- w_i – country's weight (of the currency).

For REER we use the following formula:

$$REER = \prod_{i=1}^n \left(\frac{S_i}{S_i^*} * \frac{P_i}{P_{MD}} \right)^{w_i}$$

- n – number of countries (currencies) from the basket;
- s_i – exchange rate of the national currency against the currency of the country i ;
- s_i^* – exchange rate of the national currency against the currency of the country i during the base period;
- w_i – country's weight (of the currency) in the basket;
- p_i – inflation rate in country i ;
- p_{MD} – inflation rate in the Republic of Moldova.

Annex: Calculation of unit labor costs

Nominal unit labor costs are defined as follows:

$$\text{Nominal unit labour cost} = \frac{\frac{\text{employees' compensations}}{\text{number of employees}}}{\frac{\text{real GDP}}{\text{employed persons total}}}$$

- The upper ratio is the gross average wage
- The lower ratio is the real productivity of an economy
- For MD, RU, UA and RO data for both ratios were taken from the ILO database
 - The average wage is based on national statistics reporting
 - For the real productivity the ILO provides estimates
- For the Euro Area all data was taken from Eurostat

Literature

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