



National Bank  
of Ukraine

# Official/reference ER calculation methodology: *proposals for change*

Open Markets Department

Kyiv, 02 August, 2021



## Change in the methodology of the official/reference ER: *why did the question arise?*

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- ✓ **“The current methodology for excluding outliers should be changed and simplified to reduce loss of data”** (*international technical assistance “Exchange Rate Evaluation Mechanism” recommendation received by the NBU under the Bilateral Assistance and Capacity Building for Central Banks program funded by Swiss State Secretariat for Economic Affairs (SECO)*)
- ✓ **Replication considerations** (*see slide 4 for details*)
- ✓ **Need of reference ER calculation under special conditions mechanism** (*to reach the IOSCO compliance*)

# Official/reference UAH/USD ER calculation: AS IS

All \$ sale/purchase «tod», «tom», and «spot» bank-to-bank and bank-to-NBU FX deals in the Ukrainian FX market on the calculation day, based on the ETP data, provided to NBU through information channels:

- ✓ before 12 am – for the **reference** value of UAH/USD ER calculation
- ✓ before 3.30 pm – for the **official** value of UAH/USD ER calculation

## Step I

FX deals whose ER is more than 2% different from the simple arithmetic mean of ER of all FX deals

FX deals left after the cut off

## Step II:

FX deals whose ER/volume is more than 2 standard deviations different from the simple arithmetic mean of the ER/volume of the FX deals remaining after the Step I cut off

**Official/  
reference ER =  
weighted average  
of the FX deals  
remaining after  
the two-step cut  
off**

Getting FX deals data

Cut off

Averaging

# Replication considerations

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## What's the matter?

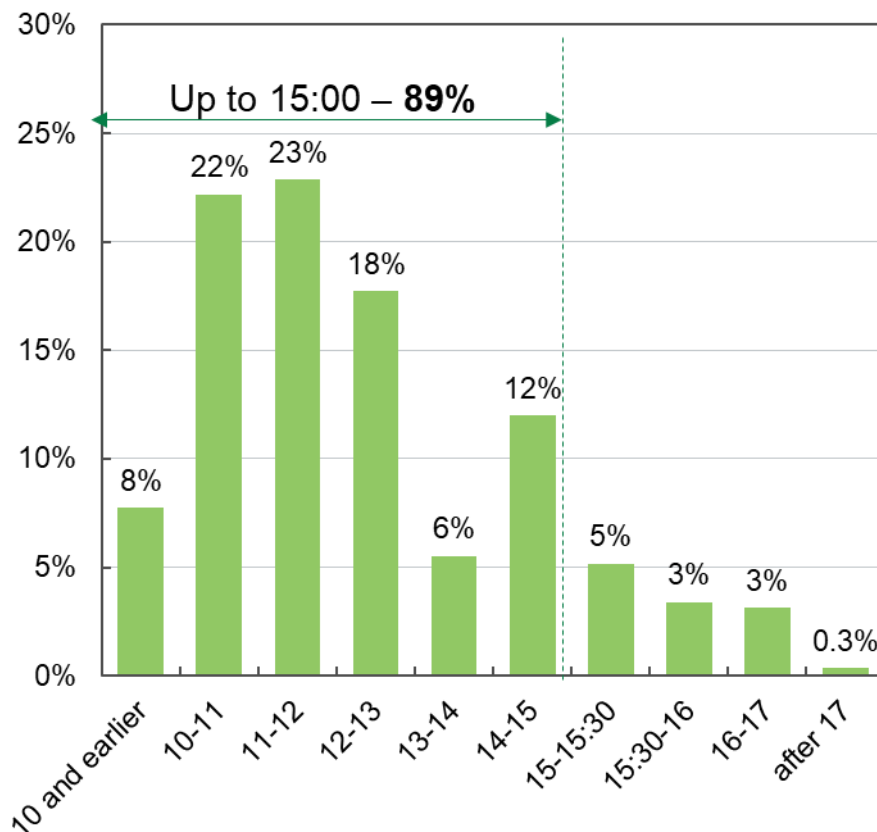
- ✓ EUR/UAH official ER is calculated as multiple of USD/UAH official ER and Bloomberg fixing for EUR/USD ER (BFIX) as of 15:30 Kyiv time. Recording (collection) of USD/UAH actual deals from trading systems for USD/UAH official ER calculation is also finished at 15:30 Kyiv time. Unfortunately, 15:30 Kyiv time (08:30 NY time) is also a time of important economic data release in USA. Thus, as we have found out on our own experience, sometimes it is difficult to replicate 08:30 NY time EUR/USD BFIX (EUR/USD rate starts to move very fast for short period around data release time)

## Possible solution:

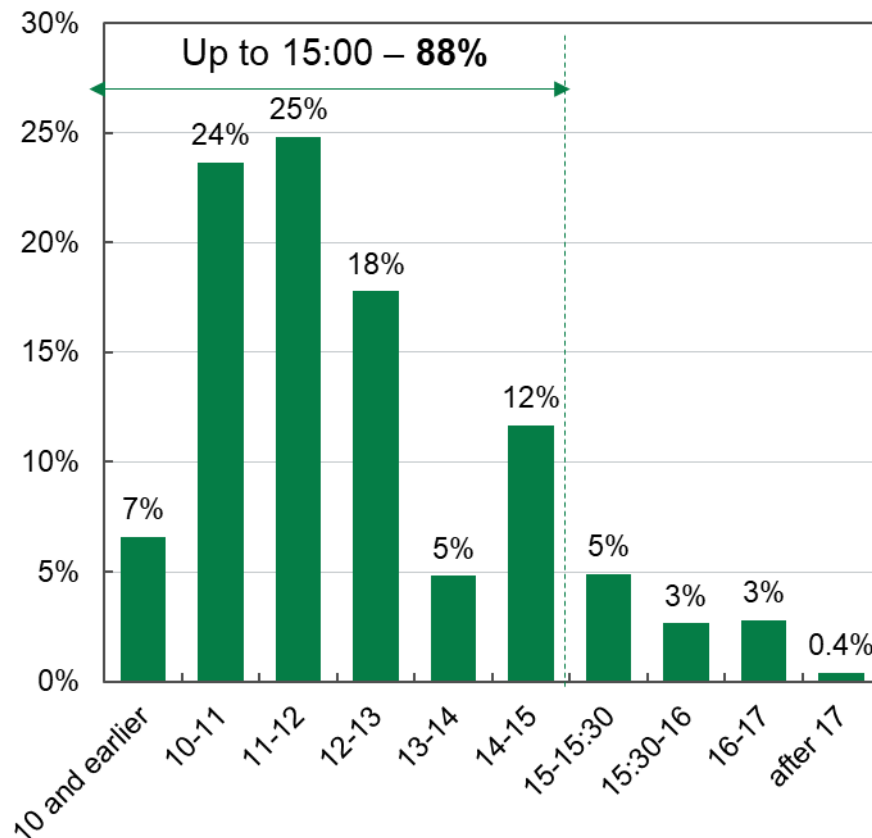
- we suggest to shift timing of the official ER data collection period (both for UAH/USD deals, and BFIX benchmarks) from 3:30 p.m. to 3.00 p.m. Kyiv time
- Thus, the official UAH/FX ERs will be published before 3.30 p.m. Kyiv time (now it is before 4.00 p.m.), which also will make this benchmark more convenient for calculations at the day of the benchmark publication.

# Daily distribution of deals with USD in the Ukrainian FX market in 2020-2021

By volume



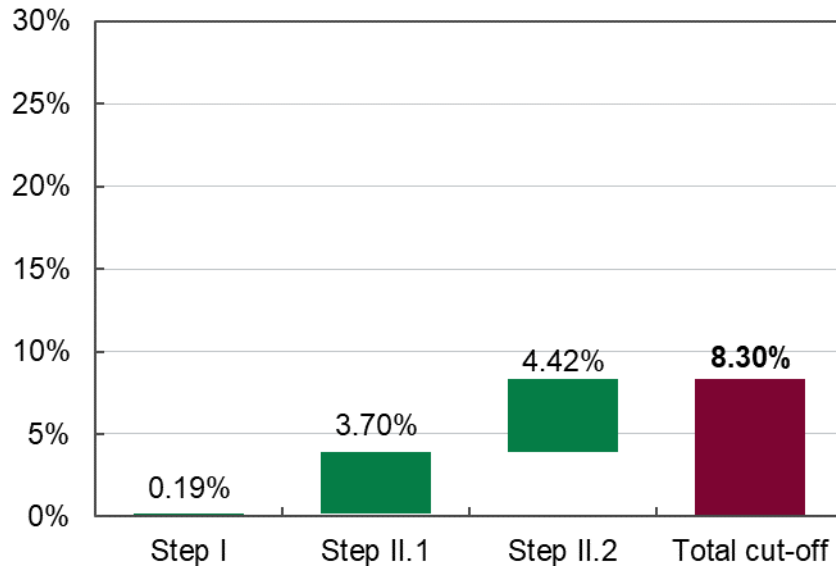
By amount



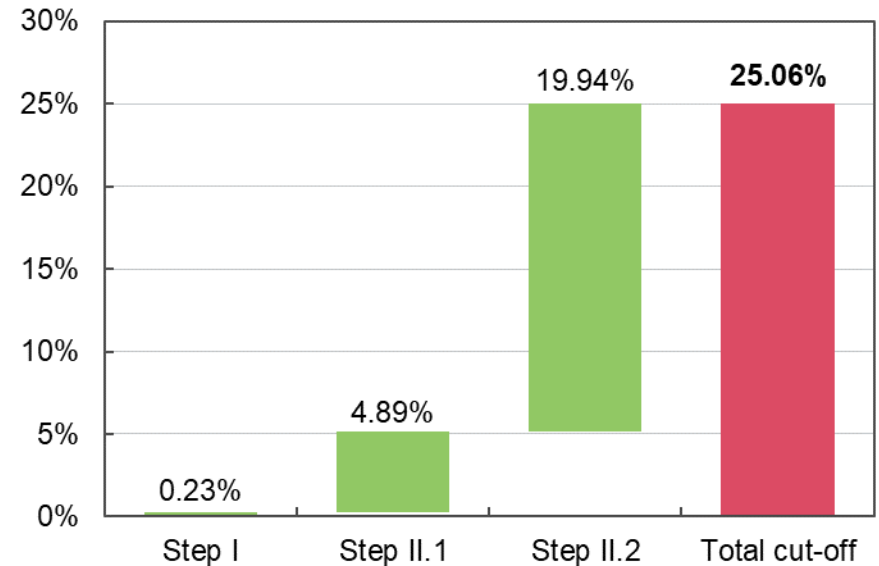
- Shifting data collection completion time from 15:30 to 15:00 for the official ER setting would result in **5%** deals “loss”, both in terms of amounts and volumes.
- Official ER calculation range would contain approx. **90%** of deals both in terms of amounts and volumes.

# Cut off factors decomposition in the official/reference ER calculation

Share of cut-off deals to the total amount



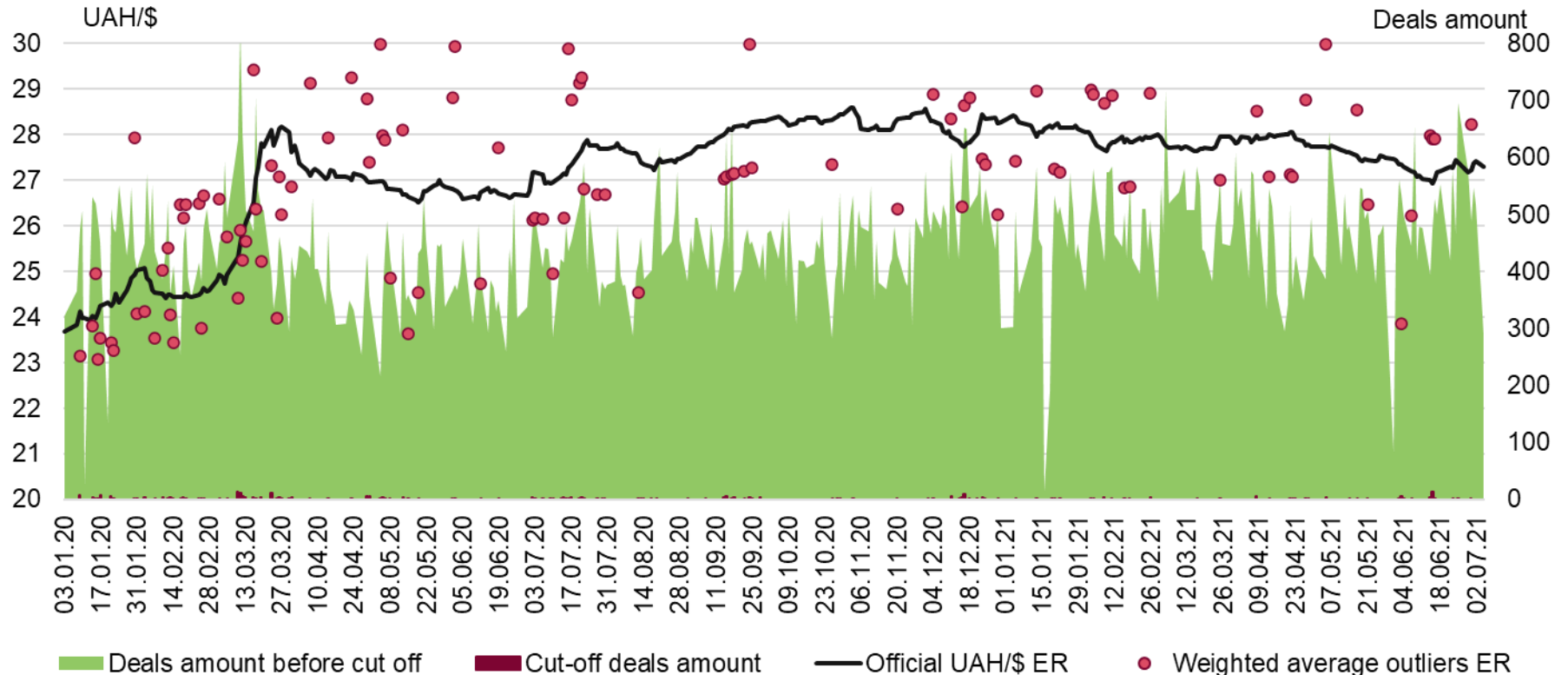
Share of cut-off deals to the total volume



- In 2020-2021, **8%** of deals amount, and **25%** of total deals volume on average was cut off from the primary deals range
- Step I of outliers cut off affects the calculation of official/reference ER the least significantly
- Sub-steps of the Step II are almost equal in terms of cut-off deals amount but are significantly different in terms of cut-off deals volumes

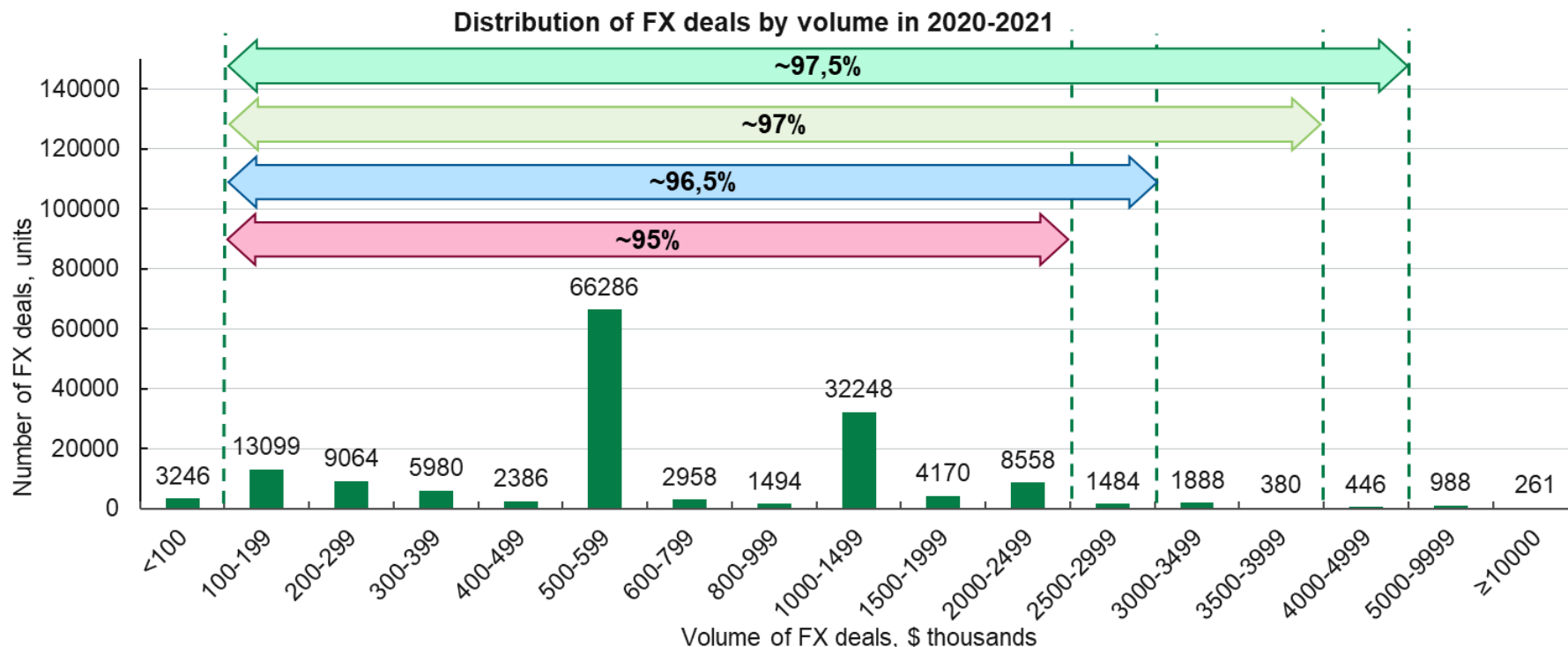
# Step I effectively cuts off obviously incorrect deals in official/reference ER calculation

ERs of cut-off outliers at the Step I of the official ER calculation in 2020-2021



- In 2020, in **99** of **249** working days deals were cut off at the Step I of the official ER calculation, in 2021, they were cut off in **35** of **124** days, respectively.
- The share of cut-off deals in the Step I to the whole amount is very low: **0.2%** in 2020, and **0.1%** in 2021
- The average deviation of cut-off deals ER in the Step I from the official ER in 2020 was **2.5** UAH, or 9%; in 2021 – **2.7** UAH, or 9%. Max deviation was 49 UAH, or 179%.

# Breakdown of bank-to-bank (BTB) and bank-to-NBU FX deals in the Ukrainian FX market by volume of transactions



- In 2020-2021, the distribution of FX BTB and bank-to-NBU deals by volume is as follows:
  - From **\$100** to **\$2500** thousands – 95.2%
  - From **\$100** to **\$3000** thousands – 96.5%
  - From **\$100** to **\$3500** thousands – 96.8%
  - From **\$100** to **\$4000** thousands – 97.0%
  - From **\$100** to **\$5000** thousands – 97.5%
  - From **\$100** to **\$10000** thousands – 97.8%
  - **\$100** thousands and more (max. **\$44000** thousands) – 97.9% (less than **\$100** thousands – 2.1%)



# Official/reference UAH/USD ER calculation: TO BE

All \$ sale/purchase «tod», «tom», and «spot» bank-to-bank and bank-to-NBU FX deals in the Ukrainian FX market on the calculation day **with the volume of \$0,1 - \$5 mln**, based on the ETP data, provided to NBU through information channels:

- ✓ before 12 am – for the **reference** value of UAH/USD ER calculation
- ✓ before 3.00 pm – for the **official** value of UAH/USD ER calculation

Step I

FX deals whose ER is more than 2% different from the median of ER of all FX deals

FX deals left after the cut off

Step II:

FX deals whose ER is more than 2 standard deviations different from the simple arithmetic mean of the ER of the FX deals remaining after the Step I cut off

**Official/  
reference ER =  
weighted  
average of the  
FX deals  
remaining after  
the two-step cut  
off**

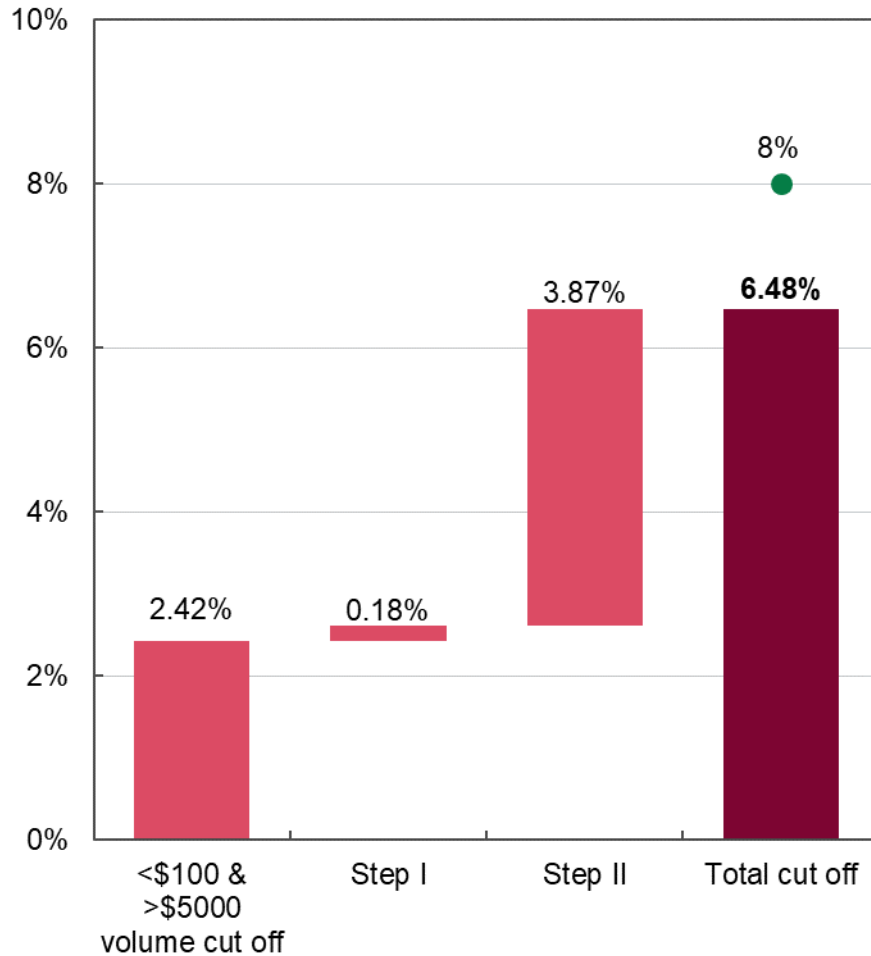
Getting FX deals data

Cut off

Averaging

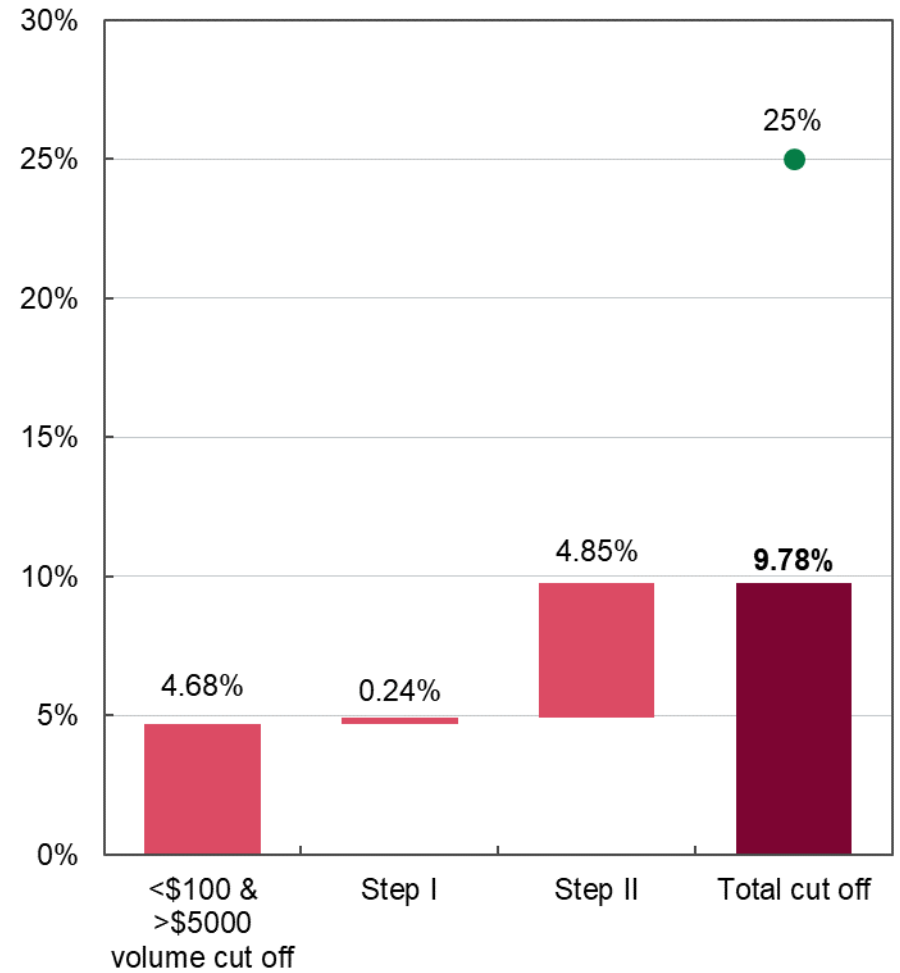
# Cut off factors decomposition by the **new methodology**

## By amount



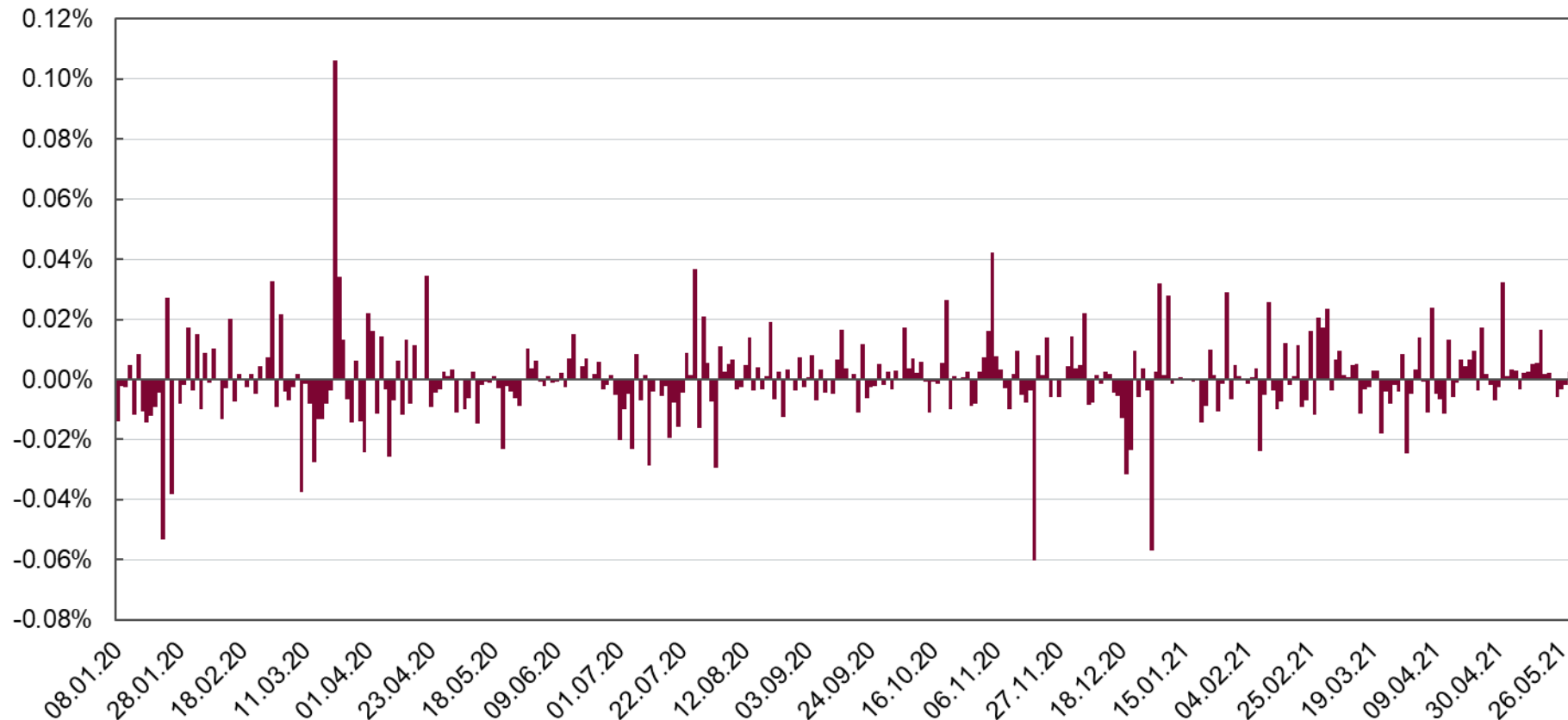
● Official ER amount cut off

## By volume



● Official ER volume cut off

# Deviations of the ER calculated by **new methodology** from the official ER



- In 2020-2021, the ER calculated by new method was **177 days (51% of deviation days) higher** than the official ER and **172 days (49% of deviation days) lower**
- The average absolute deviation is **0.005%**, or **0.15 cop.** (2020: 0.006%, 0.15 cop.; 2021: 0.005%, 0.14 cop.)
- The maximum absolute deviation is **0.09%**, or **2.36 cop.** (2020: 0.09%, 2.36 cop.; 2021: 0.06%, 1.67 cop.)

# Official/reference ER calculation under special conditions

**Low FX market bank activity\***

*and/or*

**Technical failure by getting information from ETP\***

*\*deals amount available for calculation at 12:00 p.m. is  $\leq$  10% of previous month daily average value*

Calculation methodology

Calculation under special conditions

Application basis

**з 12.15 p.m. до 1.00 p.m. (preparation)**

**Request to banks for 1 mln \$ sale/purchase quotes:**

- **by the ETP** (20 banks RFQ)
- **by telephone** (10 banks) if by RFQ **<5 quotes were provided**

**3.30 p.m. (calculation)**

**by standard methodology** (if market activity is recovered/technical failure is overcome\*\*)

**or**

**as received quotes simple arithmetic mean** (if  **$\geq 5$**  quotes)

**or**

**as the official ER on the calculation day** (if **<5** quotes)

*\*\* deals amount available for calculation at 3:30 p.m. is  $>$  10% of previous month daily average value*

**Suggestion:** to use the same calculation methodology under special conditions for the reference ER, shifting available deals amount control time to **11.30 a.m.**, in order to make RFQ at 12.00 p.m.

# Conclusions and suggestions

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## Conclusions

- ❑ Official/reference ER calculated according to the new methodology **practically do not differ from the actual official ER**
- ❑ At the same time, new methodology make it possible **to significantly reduce data loss**
- ❑ Money and Foreign Exchange Market Indicators Oversight Committee of the NBU, IMF Mission experts in Ukraine, and technical assistance “Exchange Rate Evaluation Mechanism” experts **have supported the new official/reference ER calculation methodology**

## Suggestions

- ✓ *Submit the new official/reference ER calculation methodology project (**slide 9**), and the calculation methodology under special conditions for the reference ER (**slide 12**) for the NBU Board consideration*