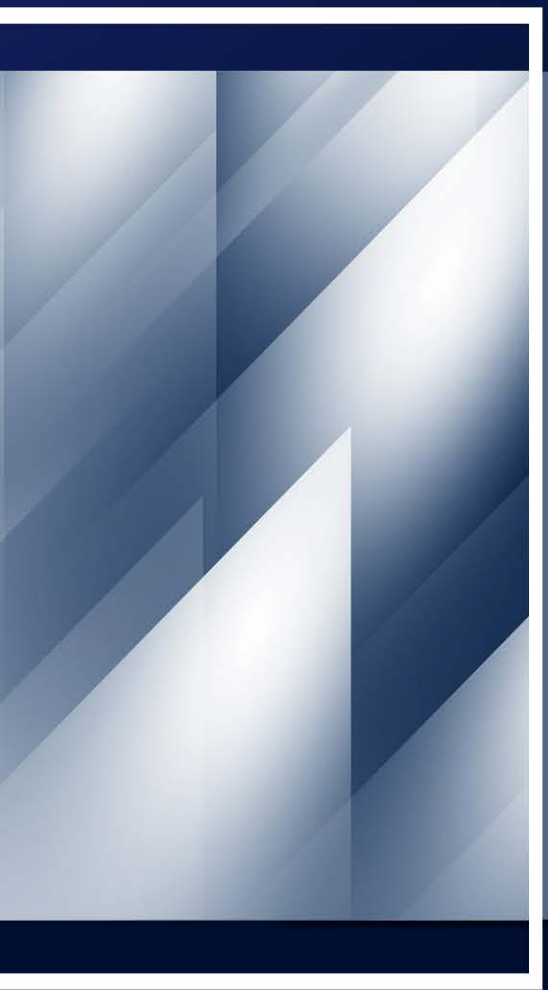


Consultation Paper on the Review and Assessment of Alternative Interest Rate Indices

Additional round of consultations

Document of the National Working Group for benchmark reform

I. Table of contents

1. Introduction – substantiation and presentation of the scope of additions in the consultation paper

This consultation paper includes an extended scope of analyses concerning the index proposals present to discussion in the current round of public consultations.

The Steering Committee of the National Working Group (NWG SC), in accordance with the communique[1], decided to put for further discussion in the second round of public consultations four index proposals based on O/N transactions of unsecured deposits of the largest Polish Credit Institutions, i.e. contributors of transaction data made by Credit Institutions (including transactions between contributors themselves and between contributors and other Credit Institutions), Financial Institutions, Other Financial Institutions and the , so-called public institutions, i.e. with the Social Insurance Institution, the Social Insurance Fund, the Demographic Reserve Fund and the Bridging Pension Fund. The consultation paper presents four types of WIRF index:

- **WIRF** based on unsecured deposits made by the largest domestic Credit Institutions with Credit Institutions and Financial Institutions and Other Financial Institutions,

- **WIRF+** based on unsecured deposits made by the largest domestic Credit Institutions with Credit Institutions and Financial Institutions and Other Financial Institutions as well as so-called public institutions,

- **WIRF-** based on unsecured deposits made by the largest domestic Credit Institutions with Credit Institutions and Financial Institutions,

- **WIRF+/-** based on unsecured deposits made by the largest domestic Credit Institutions with Credit Institutions and Financial Institutions and so-called public institutions,

In order to ensure the transparency of the principles of the indices determination, this document represents some issues discussed in the previous consultations paper, with the wording and definitions written in capital letters having the same meaning as in the previous round of consultations[2]. The analyses presented in the document were prepared by GPW Benchmark S.A. (hereinafter: "Administrator").

The information presented in this document is the result of a newly performed sensitivity analysis of certain descriptive statistics aimed at ensuring optimal selection of the other elements of the index proposals' method (e.g. the Minimum Volume Threshold of a Single Transaction, hereinafter referred to as the "Minimum Volume Threshold") in accordance with the principles presented in the previous consultation document[3] and the re-calibration of index proposals on the principles applied by Administrator following the analyses, being a part of the procedure adopted by the Administrator (for information on the results of the sensitivity analysis - see appendix 2). The index proposal calibration algorithm is described in the previous consultation document in chapter 2.2. and, among others, the consultation paper regarding the change of WIRON method[4] and was the subject to approval by the

[1] Link to Information on the launch of the additional round of public consultations on the review and assessment of alternative interest rate indices

[2] The document includes explanations and descriptions regarding the method of index proposals presented in the document as well as a glossary of key terms.

[3] NEWS - Komisja Nadzoru Finansowego (knf.gov.pl)

[4] Consultation_paper_regarding_WIRON_03.2024.pdf (gpwbenchmark.pl) page 3, paragraph 3

Interest Rate Benchmark Oversight Committee (hereinafter referred to as the "OC") due to its supervision over WIRON.

Administrator assesses the adopted principles for the validation of WIRON as objective and thus possible to be in case of other index proposals, and the purpose of which is, among others, to determine such a maximum accepted level of the Minimum Volume Threshold basing on the historical behavior of the average daily transaction volume of the index proposal in such a way as to prevent a radical decrease in the average volume of the Eligible Transaction Pool of the index proposal. Then, it is assumed that such a Minimum Volume Threshold (up to acceptable level) and the Main Adjustment rules are designed in order to minimize the level of volatility of the index proposal expressed by the adopted descriptive statistics presented in the document. At the same time, the Administrator indicated that in under conditions when increasing of the Minimum Volume Threshold does not provide a significant improvement (i.e. reduction) of the index' proposal volatility (e.g. one of the volatility measures decreases by 0.1 bp), Administrator does not increase this threshold in order to maintain the highest possible Eligible Transaction Pool of a given index proposal.

Importantly, the second round of public consultations presents a modified Minimum Volume Threshold for WIRF+, due to the change of a working assumption, that the comparison of WIRF+ and WIRON+ should be made assuming similar method parameters, what was specified in the consultation paper. In the case of WIRF+, Administrator took advantage of the fact, that the algorithm for determination of the maximum acceptable level of the Minimum Volume Threshold allowed for an increase of this threshold, allowing for an improvement of statistics referring to the volatility of this index proposal.

Following the decision of the NWG SC, new versions of some index proposals presented in the previous round of consultation were added to the group of index proposals subject to further consultation, with a modification in the form of exclusion of the segment of deposits of Other Financial Institutions in the Eligible Transaction Pool. Suggestions regarding the removal of this transaction group from the categories taken into account in the construction of index proposals were presented by some consultation participants.

In the previous version of the consultation paper, it was noted that Other Financial Institutions are not taken into account while determining the WRR, due to the nature of their activity they rather do not undertake activities related to professional asset management. In connection with the above, the WIRF- proposal - from the structure broken down by the categories of counterparties is now a reflection of the structure of the WRR, which is presented in this document only for comparative purposes.

In order to provide additional information supporting the decision-making process of the consultation participants, an additional analysis was prepared regarding the relationship between individual index proposals from the WIRF group and the WRR index, which can be a valuable reference point and an incentive to conduct own analyses of a given index proposal, taking into account the similarity of the index proposals' behavior in relation to the WRR, which was highly rated in the previous round of consultations primarily in terms of its stability. The NWG SC took into account the conclusions and comments regarding the significance of the predictability of the scale of volatility of the future benchmark, hence the consultation paper was expanded by the Administrator with additional studies of this aspect presented in Chapter 7 of the document.

In the case of index proposals not taking into account deposits of Other Financial Institutions or taking into account deposits of so-called public institutions (PPD group 3.1.9), the Administrator verified some elements of the method, in order to ensure an increased level of resilience of index proposals, especially with the theoretical assumption of the materialization of extreme risks of market situations where the risk of the possibility of using a possibly dominant role of a data contributor (the bank that is providing data) could hypothetically increase. Taking the latter under consideration, currently presented simulations were conducted under an extended scope of application of so called volume scaling-down procedure, which, in accordance with the information provided in Chapter 2, is triggered in the case of a concentration in a given transaction set, assuming the verification of the existence of a dominant data contributor in this specific transactions sets. Currently, in WIRON method, the volume scalling-down[5] procedure applies to two sets referred to as Super-segments:

- Set S1: segment of deposits of Financial Institutions (PPD group 3.1.5) and Other Financial Institutions (3.1.10)
- Set S2: segment of deposits of Large Enterprises (subsegment within PPD group 3.1.14)

For the avoidance of doubt, Administrator has adjusted the scope of transaction sets for which the volume scaling-down procedure is applied, in accordance with the PPD groups currently qualified into the scope of a given index proposal, and, in relation to the previous round of consultations, in order to ensure equal treatment of segments that are not segments of the interbank market, this procedure was also applied to the set of deposits of so-called public institutions (PPD group 3.1.9). Detailed information on the principles of this procedure can be found in Chapter 2.

Where possible, the consultation paper includes information extended with data or analysis results prepared for H1 2024, and in the table presenting main descriptive statistics for the index proposals regarding the information on the Eligible Transaction Pool and statistics regarding their volatility, information on some statistics regarding the Reference rate “POLONIA” and some NBP interest rates are included.

[5] See below in chapter 2.1

2. Presentation of basic information on the method of determining the proposed indices subject to consultations

2.1. Presentation of the elements of the method of developing interest rate index proposals

As a reminder, the set of elements of the method of developing interest rate indices for the maturity of the diesel oil prepared and used by the Administrator includes:

1. Identification of market segments and verification of categories of entities;
2. Minimum Volume Threshold for a Single Transaction[6], i.e. the determination of the level of a single transaction volume, below which transactions are not eligible for further index calculation process;
3. Matching procedure assuming a certain rounding precision for the interest rate ensuring that those transactions are matched which are reported as independent records by the two data contributors involved in that transaction;
4. Maximum Volume Threshold for a Single Transaction (hereinafter: "Maximum Volume Threshold") assuming *that "high volumes" are overwritten* by the threshold value[7];
5. Outlier Filter – assuming the removal of transactions with interest rates outside the range: < Daily median of O/N rates – (| Daily median of O/N rates | + 8 pp.); Daily median of O/N rates + (| Daily median of O/N rates | + 8 pp.) >;
6. Minimum required number of data contributors, which triggers the fallback procedure;
7. Minimum required level of total transaction volume, which triggers the fallback procedure;

[6] Hereinafter referred to as "Minimum Volume Threshold" - the Administrator distinguishes with a capital letter those terms that are a key element of the WIRON determination method and which are referred to in this document as important elements of shaping the calibration of a given index proposal - the most important definitions are presented in the dictionary.

[7] Information on the rules for determining the Maximum Volume Threshold, which is determined by the Administrator on the basis of a cyclically executed algorithm, is included in the previous version of the consultation document in point 2.4. The threshold levels are also presented in the table below, which is an update of Table 3 in point 2.4 of the previous consultation document, taking into account the change in the scope of index proposals submitted for consultation:

	WIRF	WIRF+	WIRF-	WIRF+/-
2019	1400	1400	1450	1450
2020	1750	1750	1750	1750
2021	2000	2000	1800	1800
2022	1950	1950	1700	1700
2023	1900	1900	1400	1400
2024	1150	1150	1150	1150

8. Maximum threshold for the share of a single data contributor in the Eligible Transaction Pool, which triggers the fallback procedure;

9. Volume scaling-down procedure used in the case of concentration in a given transaction set, assuming the verification of the existence of a dominant data contributor in this specific transactions sets. The volume scaling-down procedure is initiated when all transactions of one of the selected sets (so-called supersegments) exceed the presumed threshold[8] for the share in the total volume of transactions qualified for the Eligible Transactions Pool, i.e. the set of transactions after applying procedures related to the phase of a preparation of input data. If the above condition is met (and such a transaction set is identified), the procedure assumes verification of transactions of individual contributors in order to identify such an contributor whose transaction volume is dominant, i.e. exceeds the threshold of 50% of the volume value of this set. In the event of identification of such an contributor, the volumes of its transactions are subject to "trimming" by multiplying them by a set proportion, where this proportion is equal to 50% of the volume value of the set divided by the total volume of transactions of this dominant contributor in a given transaction set[9];

10. Main Adjustment and WIRON index determination method, defining the level of symmetric cut-off (removing the upper and lower tails of the interest rate

[8] The differentiation of the threshold levels used in the volume scaling-down procedure is carried out by the Administrator taking into account the number of supersegments included in the Eligible Transactions Pool of a given index proposal. When the Eligible Transactions Pool of an index proposal is divided into 3 relatively homogeneous subsets (where two of them are supersegments and the third is the segment of interbank deposits which does not constitute a supersegment - see: WIRF+ and WIRF+/-), assuming equal division each of them should theoretically have approx. 33% of the Eligible Transactions Pool volume (the so-called „equal share"). In such cases the subset the share of which in the Eligible Transactions Pool volume exceeds 50% is considered as dominant by the Administrator. In other words, the share of the examined subset of the Eligible Transactions Pool must exceed the "equal share" by more than 17 pp. for this subset to be considered dominant. When the Eligible Transactions Pool of an index proposal is divided into 2 relatively homogeneous subsets (where one of them is a supersegment and the other is the segment of interbank deposits which does not constitute a supersegment – see: WIRF and WIRF-), assuming equal division each of them should theoretically have approx. 50% of the Eligible Transactions Pool volume ("equal share"). In this situation, the threshold inficating dominance of a subset at 50% (see above) is not adequate, because slight exceeding of this threshold by one of the two subsets is a phenomenon very close to equal division and should not be considered as dominance. The Administrator decided to include a buffer of an analogous size (see above) above the "equal share" in the case of distinguishing 2 subsets of the Eligible Transactions Pool, which translates into a theoretical level of the dominance threshold for a supersegment at 67% (50% + 17 pp. = 67%). However, the dominance threshold determined in such a way is clearly exceeded more often by the supersegment 3.1.5 & 3.1.10 within the WIRF index proposal than by the supersegment 3.1.5 within the WIRF- index proposal, as indicated by empirical transaction data provided by data contributors. In order to approximately equalize the frequency of exceeding the supersegment dominance threshold in the case of both of the above index proposals with one supersegment (i.e. 3.1.5 & 3.1.10 or 3.1.5), for the WIRF index proposal the Administrator set its value at a level slightly higher than 67% (i.e. 70%), which reduced the frequency of its exceedance, while for the WIRF- index proposal it was set at a level slightly lower than 67% (i.e. 65%), which, in turn, increased the frequency of its exceedance.

[9] Frequency of volume scaling-down procedure in 2021-2023 for the index proposals in the current round of public consultations

Frequency of volume scaling-down procedure in 2021-2023	**WIRF PLN 30 mn 20%**	**WIRF- PLN 40 mn 25%**	**WIRF+ PLN 55 mn 25%**	**WIRF+/- PLN 25 mn 25%**
Supersegment 3.1.5	-	17	-	7
Supersegment 3.1.5 & 3.1.10	11	-	10	-
Supersegment 3.1.9	-	-	9	17

distribution) of volume aggregates ordered by interest rate of transactions, so as to define the set of aggregates on the basis of which the volume-weighted average interest rate rounded to 3 decimal places is determined;

11. SC adjustment (left-hand side adjustment) imposing a cut-off of the left tail of the volume-weighted interest rate distribution in order to remove the transactions with the lowest interest rates [10];

12. Fallback procedure defining the index determination method in the case of insufficient input data: NBP reference rate (under the ACT/365 Convention) at the index date + average spread between the NBP reference rate (under the ACT/365 Convention) and the value of the WIRON index in the five days preceding the index date

Table 1 Parametrisation of index proposals[11]

Index name	**WIRF**	**WIRF+**	**WIRF-**	**WIRF+/-**
Input data type	Unsecured deposits	Unsecured deposits	Unsecured deposits	Unsecured deposits
DDP segment identification	3.1.1, 3.1.4, 3.1.5, 3.1.10	3.1.1, 3.1.4, 3.1.5, 3.1.9, 3.1.10	3.1.1, 3.1.4, 3.1.5	3.1.1, 3.1.4, 3.1.5, 3.1.9
Minimum Volume Threshold	PLN 30 mn	PLN 55 mn	PLN 40 mn	PLN 25 mn
Maximum Volume Threshold (if applicable)	Yes	Yes	Yes	Yes
Minimum number of data contributors	3	3	3	3
Minimum total volume of Eligible Transactions Pool	PLN 1 000 mn	PLN 1 000 mn	PLN 1 000 mn	PLN 1 000 mn
Maximum threshold for a single data contributor share in volume of Eligible Transactions Pool	75%	75%	75%	75%
Volume scaling-down procedure:	supersegment S1: deposits of Financial Institutions (DDP group 3.1.5) and Other Financial Institutions (3.1.10); maximum threshold for share of supersegment in Eligible Transactions Pool: 70%; maximum threshold for share of data contributor in the supersegment: 50%	supersegment S1: deposits of Financial Institutions (DDP group 3.1.5) and Other Financial Institutions (3.1.10) and supersegment S2: deposits of the so-called public institutions (3.1.9); maximum threshold for share of supersegment in Eligible Transactions Pool: 50%; maximum threshold for share of data contributor in the supersegment: 50%	supersegment S1: deposits of Financial Institutions (DDP group 3.1.5); maximum threshold for share of supersegment in Eligible Transactions Pool: 65%; maximum threshold for share of data contributor in the supersegment: 50%	supersegment S1: deposits of Financial Institutions (DDP group 3.1.5) and supersegment S2: deposits of the so-called public institutions (3.1.9); maximum threshold for share of supersegment in Eligible Transactions Pool: 50%; maximum threshold for share of data contributor in the supersegment: 50%
Cut-off level in the Main Adjustment	20%	25%	25%	25%
Fallback procedure	Yes	Yes	Yes	Yes

[10] Not applicable to index proposals based on unsecured deposits; may apply to index proposals based on conditional transactions in the case of a reasonable adjustment to remove special collateral transactions

[11] Specyfikacja dot. WRR, który jest prezentowany w celach poglądowych w niniejszym dokumencie zawarta jest w poprzednim dokumencie konsultacyjnym.

3. Information on the basic characteristics of transactional data sets

3.1. Comparison of the pool and presentation of information on the volume and number of money market segments used in index proposals simulations

As indicated in the previous consultation document, GPW Benchmark receives data for the purpose of developing benchmarks and conducting the analyses necessary for this purpose, including research related to this consultation process, on the basis of the applicable codes of conduct and, in particular, the Data Delivery Procedure (hereinafter: "PPD") annexed to these codes. From among the data submitted to GPW Benchmark under the PPD, the following sets are used in the analysis of index proposals in public consultations:

- ✓ **3.1.1** - Unsecured deposit transactions between contributors,
- ✓ **3.1.4** - Unsecured deposit transactions entered into by data contributors with Credit Institutions that are not data contributors,
- ✓ **3.1.5** - Unsecured deposit transactions entered into by data contributors with Financial Institutions,
- ✓ **3.1.7, 3.1.8** - REPO and REVERSE REPO transactions (3.1.7) and Buy/Sell Back and Sell/Buy Back transactions (3.1.8) entered into by data contributors with Credit Institutions and Financial Institutions,
- ✓ **3.1.9** - Unsecured deposit transactions entered into by data contributors with the Social Insurance Institution, the Social Insurance Fund, the Demographic Reserve Fund and the Bridging Pension Fund,
- ✓ **3.1.10** - Unsecured deposit transactions entered into by data contributors with the Other Financial Institutions,
- ✓ **3.1.12** - REPO and REVERSE REPO transactions entered into by data contributors with Other Financial Institutions (within which only REPO and REVERSE REPO transactions executed in a trading venue covered by central clearing of trades at the NDS CCP (KDPW CCP) are used).
- ✓ **3.1.14 -** Unsecured deposit transactions entered into by data contributors with Enterprises broken down by Large Enterprises and SMEs.

In connection with the decision of KS NGR as to the subject matter of the current consultation round, the analyses presented in this document use sets 3.1.1 and 3.1.4 concerning unsecured deposits of the interbank sector, 3.1.5 and 3.1.10 representing the segment of deposits of Financial Institutions and Other Financial Institutions, respectively, together with segment 3.1.9 presenting deposits of the so-called public institutions.

As in the case of the previous round of consultations, the information in Table 2 presents basic descriptive statistics concerning the analysis period for the above-mentioned PPD sets in terms of transaction data used in determining index proposals in order to enable comparison of the general characteristics of the basic groups of transactions grouped before the application of any tools limiting

the information resource, i.e. e.g. the Minimum Volume Threshold. This document reiterates the full set of information to provide an overview of trends and developments in selected money market segments. You are encouraged to compare the values of the statistics on the index proposals presented in Chapter 4 (Tables 8-12) with the values presented in the tables below. The additional information presented in Table 2a will allow us to identify those segments that, from the point of view of the first half of 2024, recorded the most interesting changes in the average daily volume and number of transactions - increases in the range of 3.1.9 and 3.1.14 in the SME category, as well as growth recorded in the 3.1.7 category compensated by a decrease in 3.1.8, stand out here. Changes in the average volume in relation to the statistics for the long analysis period were not significant on average, with the average daily number of transactions increasing significantly only for SME deposits and category 3.1.7.

Table 2 Basic statistical measures of transaction datasets used for interest rate index proposals determination in the period 2021-2023

SEGMENT	Total volume of transactions (PLN)	Total number of transactions	Working days count	Average daily volume of transactions (PLN)	Average daily number of transactions
3.1.1	1 368 044 000 000	4 288	757	1 807 191 546	5,7
3.1.10	723 169 566 673	22 312	757	955 309 864	29,5
3.1.12 (since April 2022)	27 295 346 245	630	425	64 224 344	1,5
3.1.14_Large	1 981 739 307 071	92 142	757	2 617 885 478	121,7
3.1.14_SME	1 269 121 840 850	299 981	757	1 676 514 981	396,3
3.1.4	1 239 896 359 000	5 513	757	1 637 908 004	7,3
3.1.5	2 422 276 010 012	119 915	757	3 199 836 209	158,4
3.1.7	338 493 536 786	4 172	757	447 151 304	5,5
3.1.8	3 469 471 431 675	68 597	757	4 583 185 511	90,6
3.1.9	2 035 192 231 178	3 631	757	2 688 497 003	4,8
3.1.1 + 3.1.4	2 607 940 359 000	9 801	757	3 445 099 550	12,9

Table 2a Basic statistical measures of transaction datasets used for interest rate index proposals determination in the period H1'2024

SEGMENT	Total volume of transactions (PLN)	Total number of transactions	Working days count	Average daily volume of transactions (PLN)	Average daily number of transactions
3.1.1	201 453 000 000	567	125	1 611 624 000	4,5
3.1.10	132 519 445 080	5 208	125	1 060 155 561	41,7
3.1.12	20 573 608 550	256	125	164 588 868	2,0
3.1.14_Large	311 361 341 646	20 318	125	2 490 890 733	162,5
3.1.14_SME	327 840 402 174	92 646	125	2 622 723 217	741,2
3.1.4	186 800 650 000	958	125	1 494 405 200	7,7
3.1.5	416 173 118 383	10 849	125	3 329 384 947	86,8
3.1.7	140 116 285 202	1 812	125	1 120 930 282	14,5
3.1.8	440 568 293 928	13 612	125	3 524 546 351	108,9
3.1.9	600 309 483 630	974	125	4 802 475 869	7,8
3.1.1 + 3.1.4	388 253 650 000	1 525	125	3 106 029 200	12,2

3.1.1. Structure of unsecured deposit transactions

Figure 1 and Figure 1a (below) present the distribution of the volume of O/N transactions for PPD sets in a broad sense, including information on data from H1'2024. Due to the changes and differentiation (sometimes increase) of the Minimum Volume Threshold, it was decided to present (Figure 1a) information not only broken down into volume value ranges based on an increase of PLN 10 million, but also on an increase of PLN 25 million. Again, the most similar in the distribution of transaction volume is characterized by PPD groups 3.1.1, 3.1.4 and 3.1.9. The distribution of transactions by their nominal value is also similar in the case of 3.1.5 and 3.1.10, and taking into account segment 3.1.14, it can be concluded that these segments (as well as subcategories of segment 3.1.14) indicate a lower share of high-volume transactions compared to the set of transactions made by entities from the banking sector and the sector of so-called public institutions.

In the case of pie charts presented for the volume structure and volume of the Eligible Transaction Pool of each of the index proposals, with and without taking into account the calibrated Minimum Volume Threshold, it is noteworthy that the application of this threshold has a limited impact on the volume structure presented for each of the index proposals during the analysis period. Slight differences can be noted primarily in the case of shares in the volume of the Eligible Transaction Pool of transactions of banking sector entities.

In the case of the structure presenting shares in the number of transactions, the impact of the Minimum Volume Threshold is significant and best reflects the change in the structure where there are numerous low-volume transactions in the structure of the index proposals – in the case of the current set of proposals, the impact of limiting primarily the share of transactions 3.1.5 in the structure of the index proposals volume is noticeable.

No significant changes are noted – primarily in the case of the volume structure – when comparing the situation in H1'2024 compared to the analysis period 2021-2023, apart from a marked increase in the share of deposits of the so-called public institutions, which corresponds to the significant increase in the average daily volume of transactions from the PPD 3.1.9 group in H1'2024 visible in Tables 1 and 1a. In the case of the PPD 3.1.5 group, these changes can be noted primarily as a result of the impact of the Minimum Volume Threshold and can be considered together with Figures 1 and 1a, where, compared to previous years, H1'2024 led to an increase in the average level of the average nominal value of transactions from the PPD 3.1.5 group, due to a decrease in the share of transactions with a lower volume in favor of an increase in transactions with the highest volume. It is worth noting that the change in the share of 3.1.5 in the population structure is accompanied by the increased level of activity observed in the 3.1.9 segment observed in H1'2024.

Due to the importance of the need for development of the secured transaction market by KS NGR and comparative analyses in relation to WRR, the additional information presented on the structure of secured transactions allows to observe a clear increase in the volume share of REPO transactions (PPD 3.1.7 and 3.1.12 groups) in the WRR Eligible Transaction Pool from 10% in the analysis period 2021-2023 to approx. 27% in H1'2024, with a simultaneous increase in the share of REPO transactions in the WRR Eligible Transaction Pool in the WRR Eligible Transaction Pool in the same visible, but to a lesser extent.

Figure 1 Frequential distribution of ON transaction volume by year and DDP set (ranges of PLN 10 mn width)

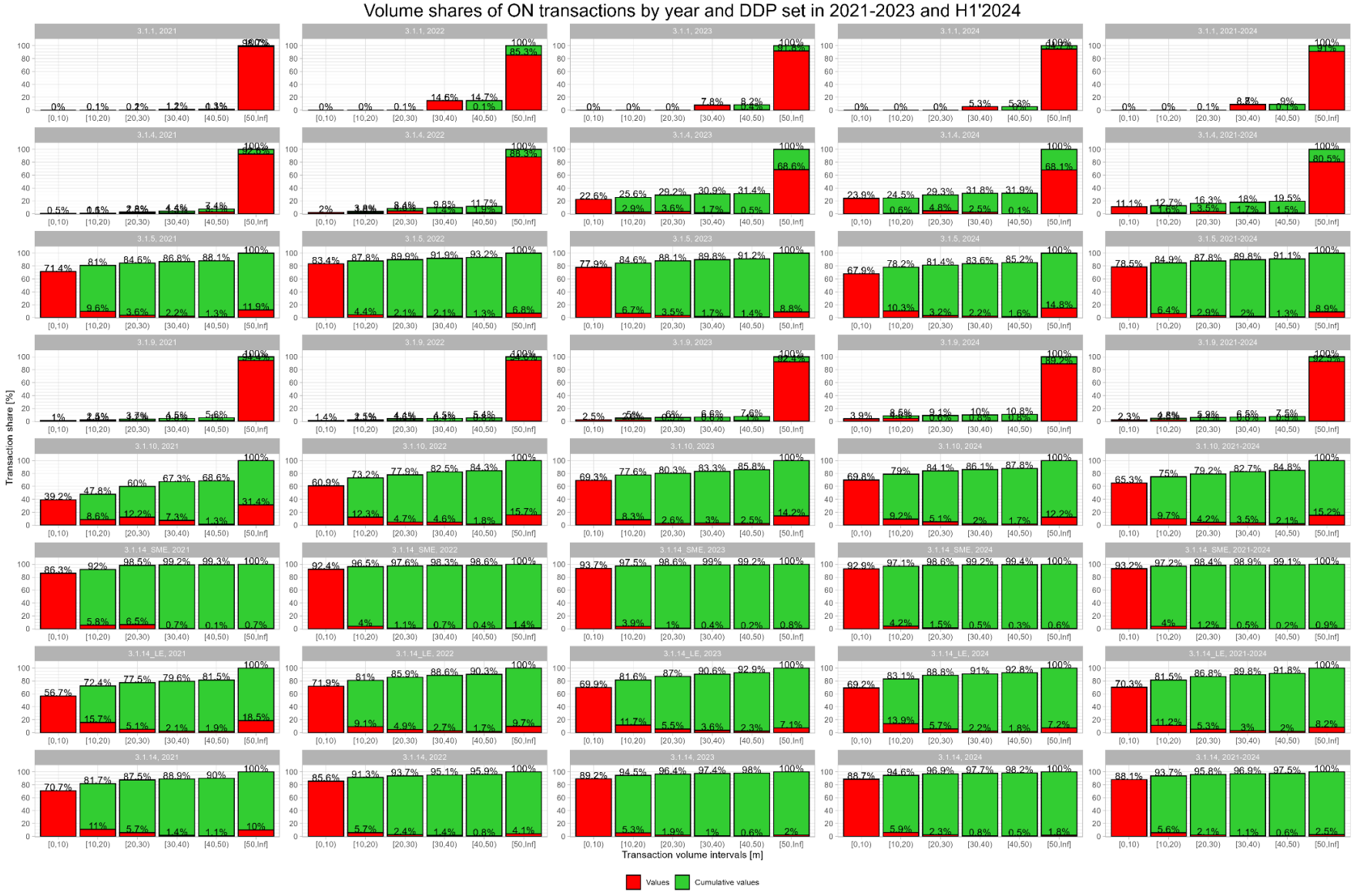


Figure 1a Frequential distribution of ON transaction volume by year and DDP set (ranges of PLN 25 mn width)

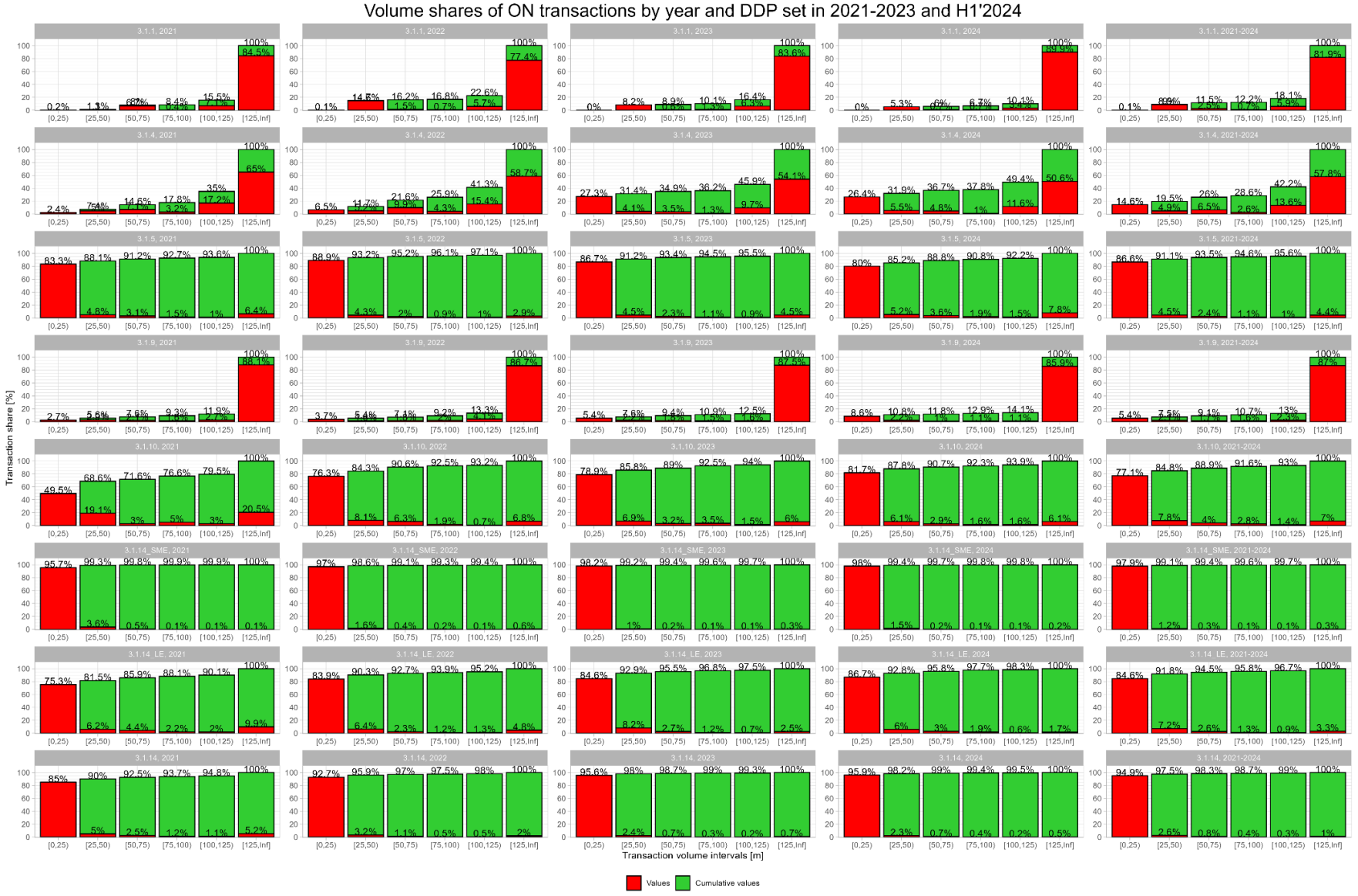
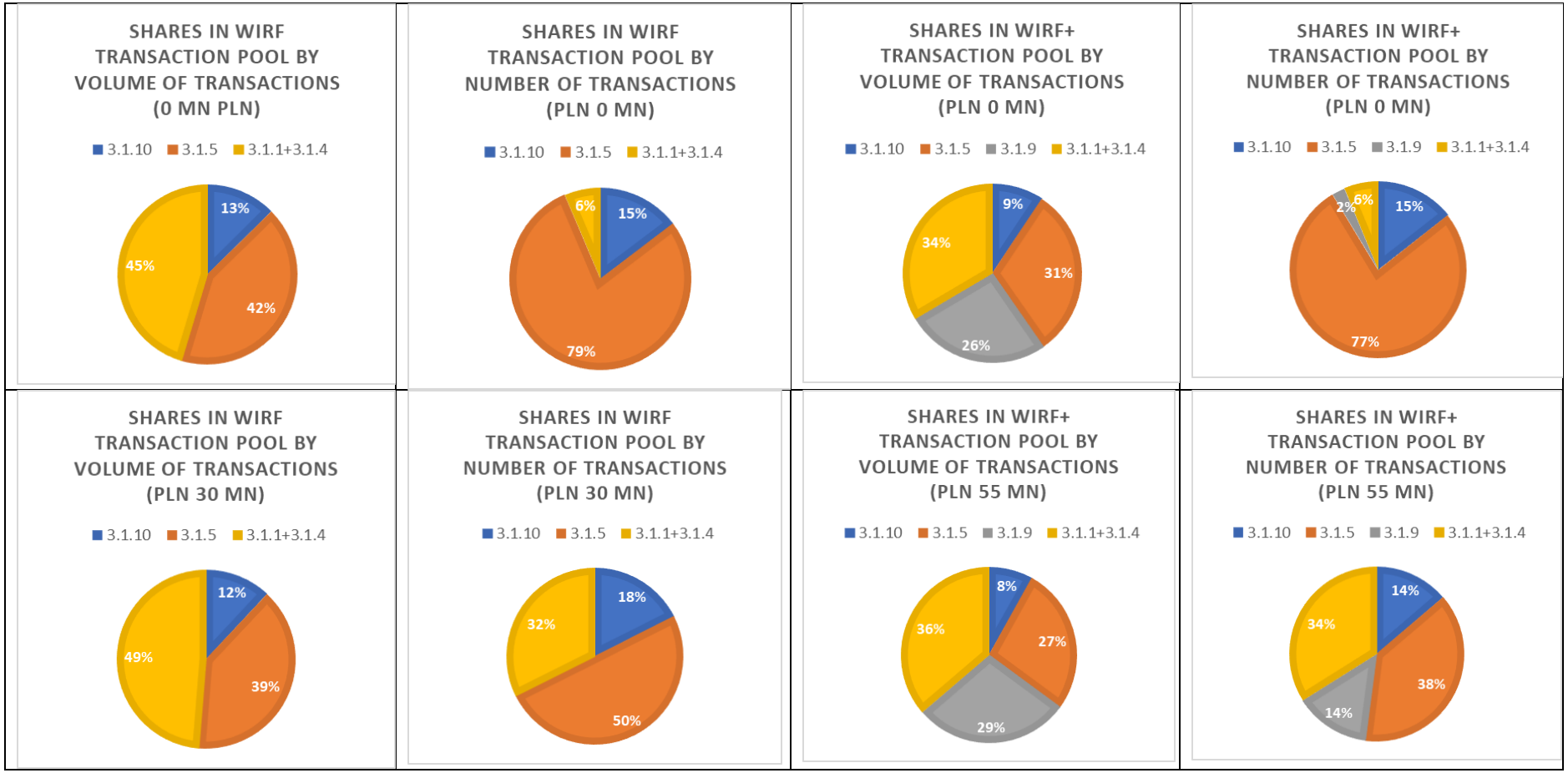


Figure 2 Structure of transaction volume and transaction number of the WIRF, WIRF+, WIRF- and WIRF+/- index proposals taking into account the applied Minimum Volume Threshold in the analysis period 2021-2023



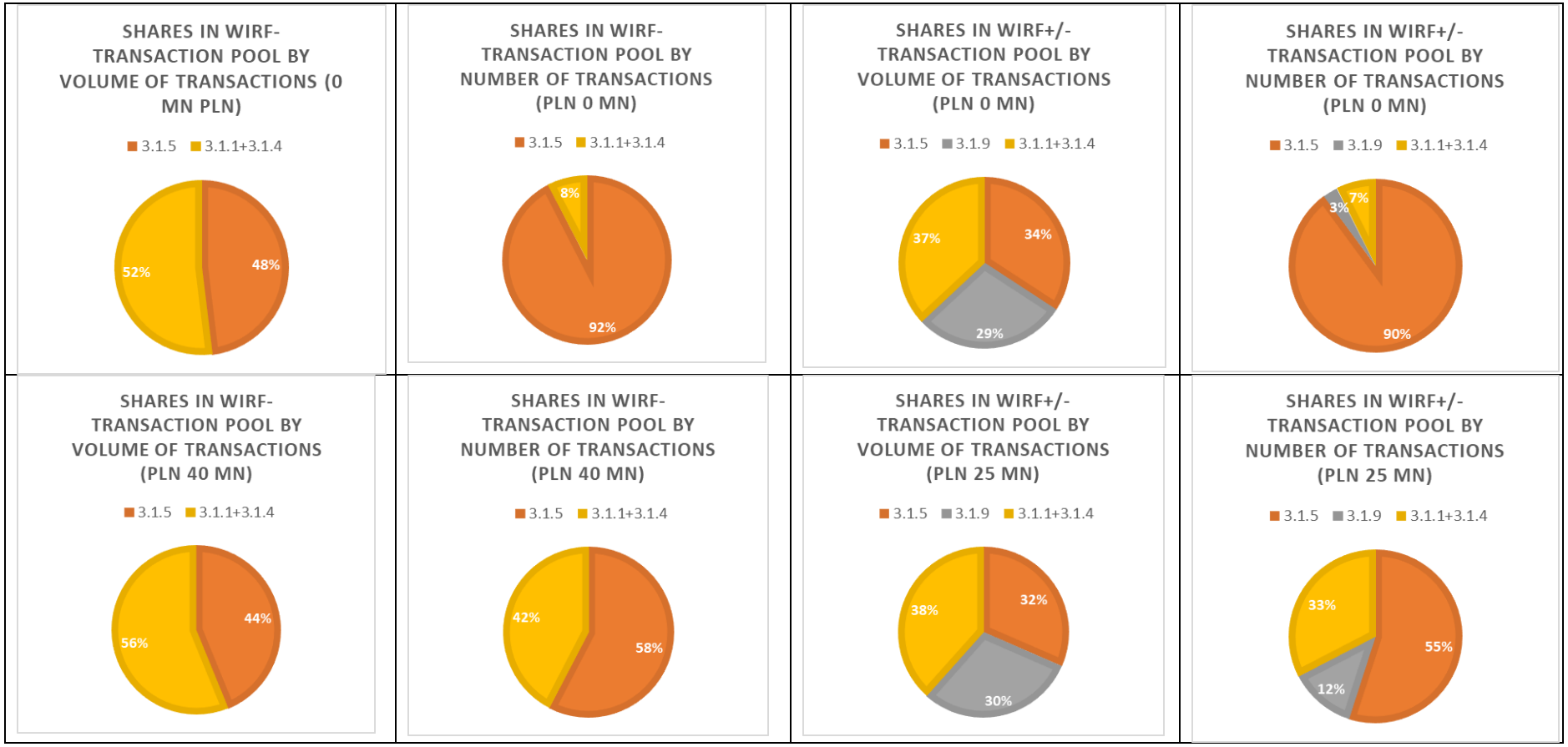
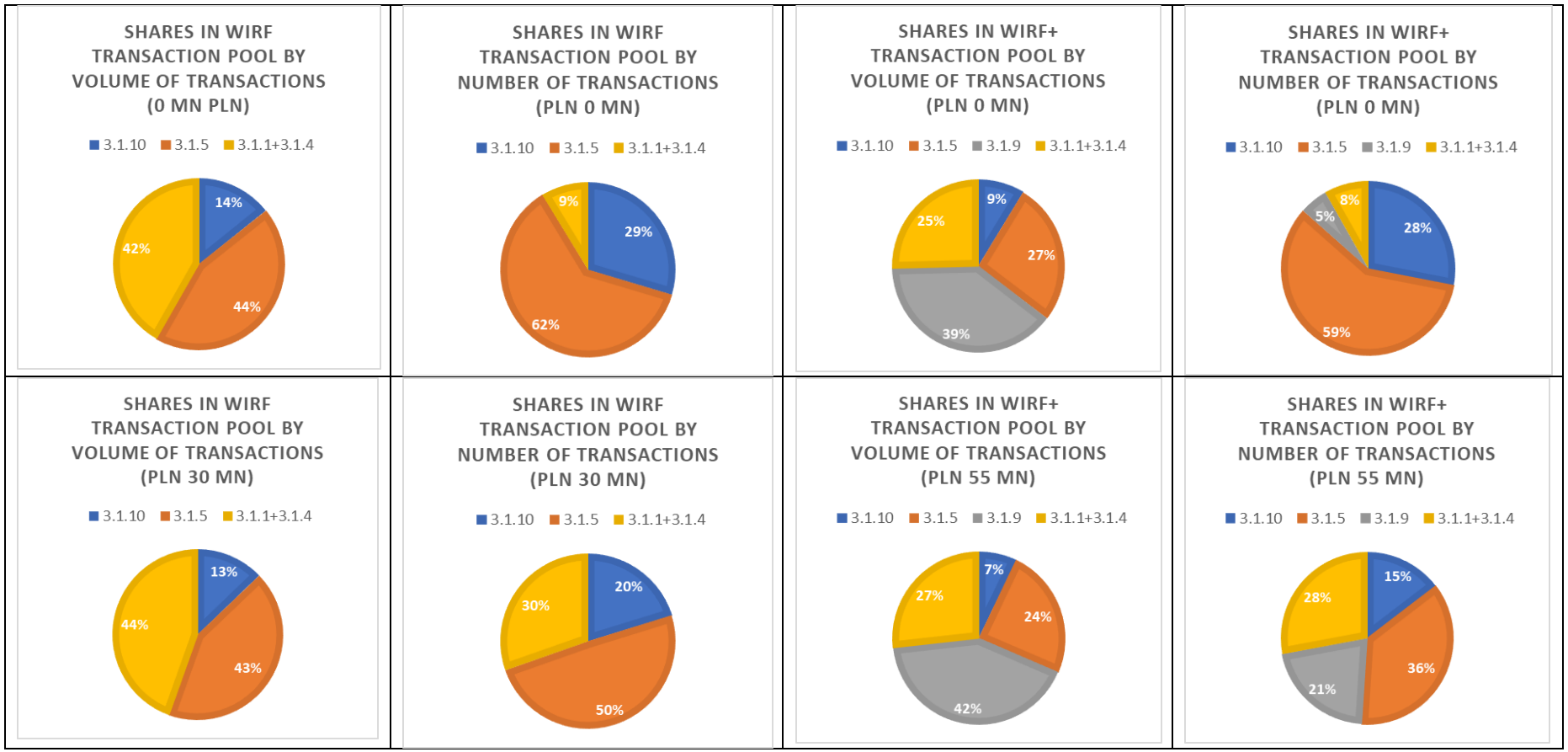
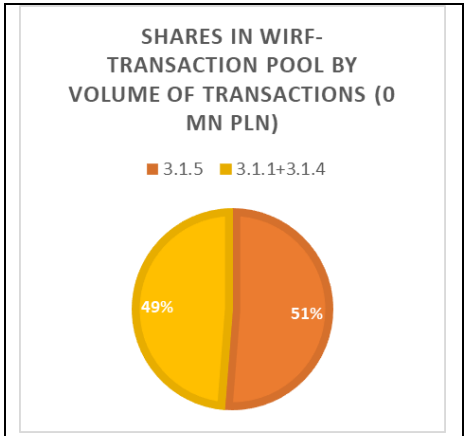
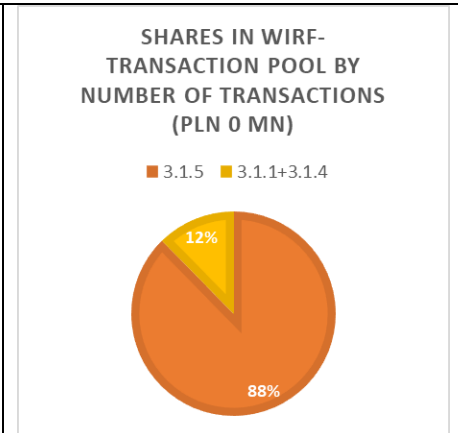
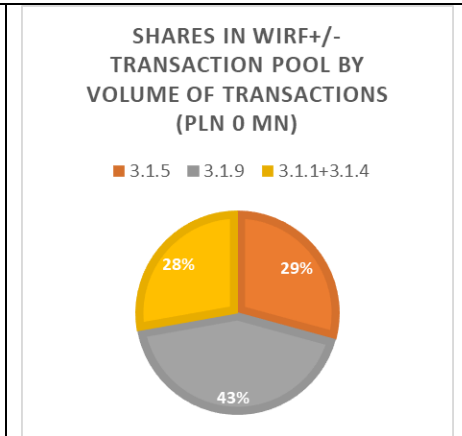

SHARES IN WIRF- TRANSACTION POOL BY VOLUME OF TRANSACTIONS (0 MN PLN)
3.1.5
3.1.1+3.1.4
48%
52%
SHARES IN WIRF- TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 0 MN)
3.1.5
3.1.1+3.1.4
8%
92%
SHARES IN WIRF+/- TRANSACTION POOL BY VOLUME OF TRANSACTIONS (PLN 0 MN)
3.1.5
3.1.9
3.1.1+3.1.4
34%
29%
37%
SHARES IN WIRF+/- TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 0 MN)
3.1.5
3.1.9
3.1.1+3.1.4
3%
7%
90%
SHARES IN WIRF- TRANSACTION POOL BY VOLUME OF TRANSACTIONS (PLN 40 MN)
3.1.5
3.1.1+3.1.4
44%
56%
SHARES IN WIRF- TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 40 MN)
3.1.5
3.1.1+3.1.4
42%
58%
SHARES IN WIRF+/- TRANSACTION POOL BY VOLUME OF TRANSACTIONS (PLN 25 MN)
3.1.5
3.1.9
3.1.1+3.1.4
32%
38%
30%
SHARES IN WIRF+/- TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 25 MN)
3.1.5
3.1.9
3.1.1+3.1.4
33%
55%
12%

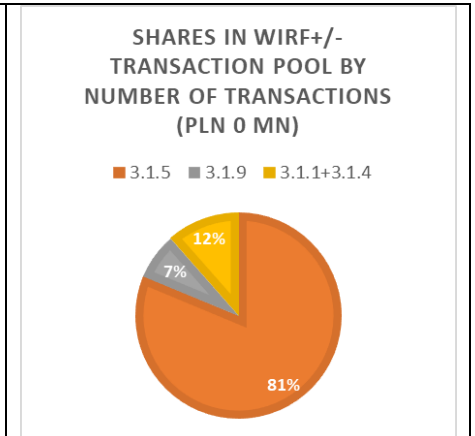
Figure 3 Structure of transaction volume and transaction number of the WIRF, WIRF+, WIRF- and WIRF+/- index proposals taking into account the applied Minimum Volume Threshold in H1'2024

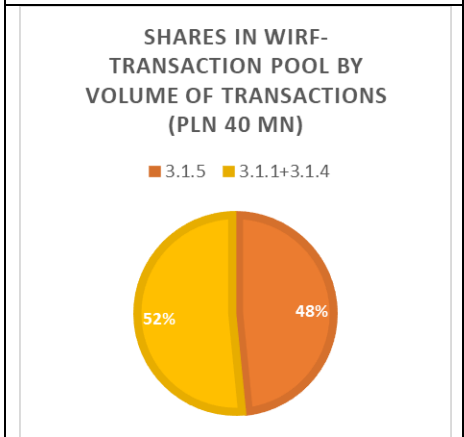


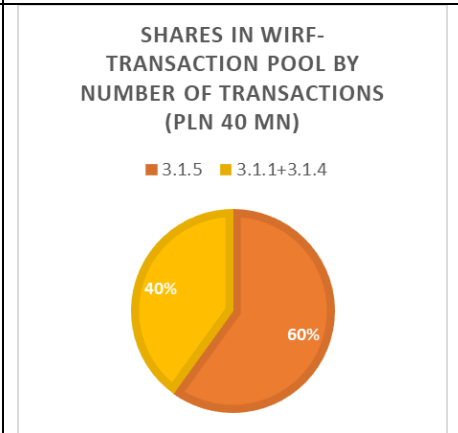

SHARES IN WIRF-TRANSACTION POOL BY VOLUME OF TRANSACTIONS (0 MN PLN)
3.1.5
3.1.1+3.1.4
49%
51%

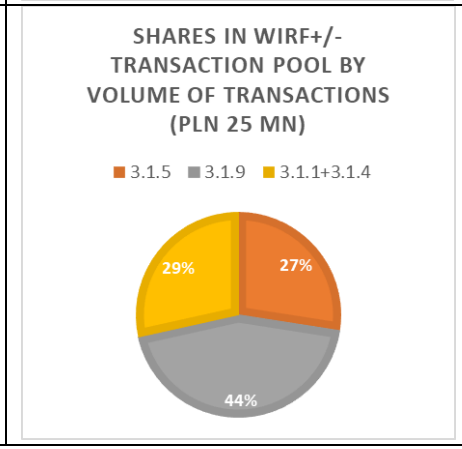

SHARES IN WIRF-TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 0 MN)
3.1.5
3.1.1+3.1.4
12%
88%


SHARES IN WIRF+/-TRANSACTION POOL BY VOLUME OF TRANSACTIONS (PLN 0 MN)
3.1.5
3.1.9
3.1.1+3.1.4
28%
29%
43%


SHARES IN WIRF+/-TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 0 MN)
3.1.5
3.1.9
3.1.1+3.1.4
12%
7%
81%


SHARES IN WIRF-TRANSACTION POOL BY VOLUME OF TRANSACTIONS (PLN 40 MN)
3.1.5
3.1.1+3.1.4
52%
48%


SHARES IN WIRF-TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 40 MN)
3.1.5
3.1.1+3.1.4
40%
60%


SHARES IN WIRF+/-TRANSACTION POOL BY VOLUME OF TRANSACTIONS (PLN 25 MN)
3.1.5
3.1.9
3.1.1+3.1.4
29%
27%
44%

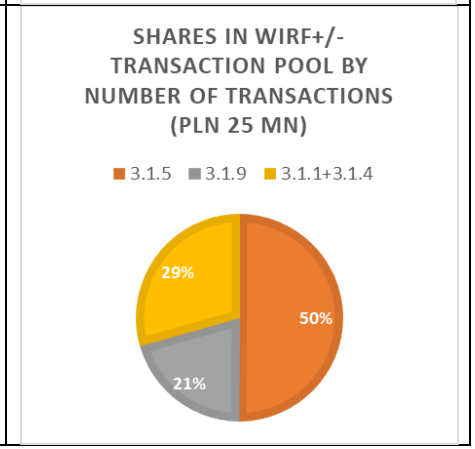
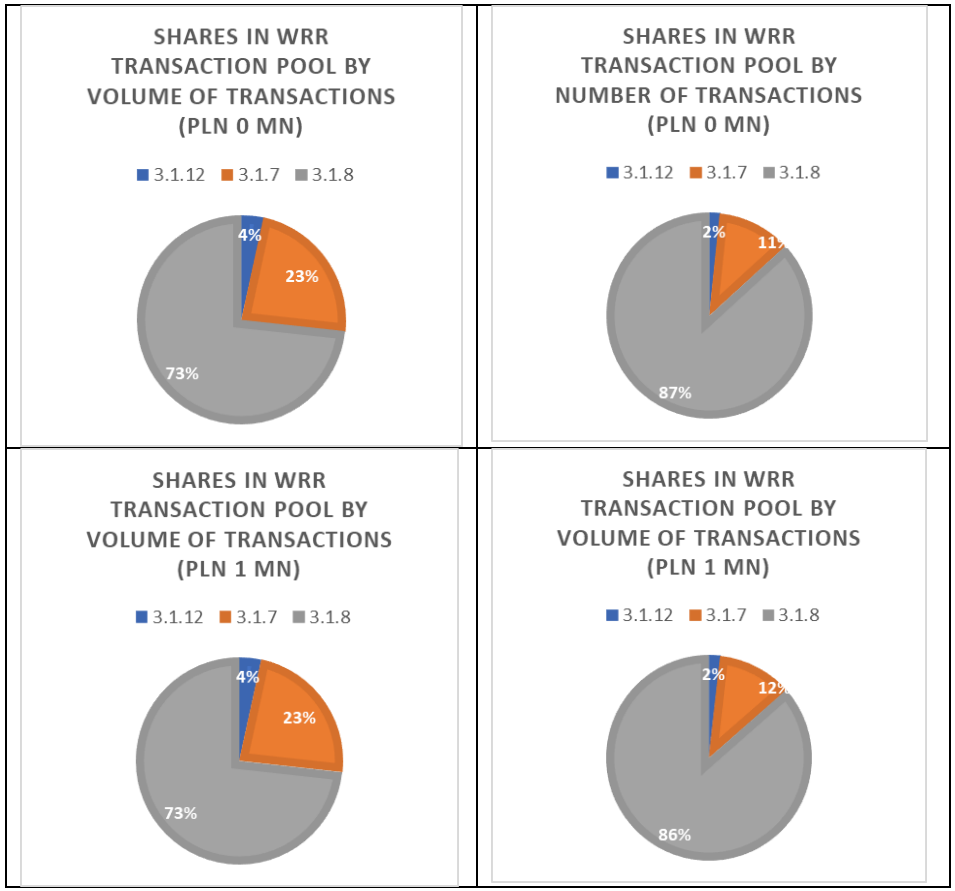

SHARES IN WIRF+/-TRANSACTION POOL BY NUMBER OF TRANSACTIONS (PLN 25 MN)
3.1.5
3.1.9
3.1.1+3.1.4
29%
50%
21%

Figure 4 Structure of transaction volume and transaction number of the WRR index proposal taking into account the applied Minimum Volume Threshold in the analysis period 2021-2023

Figure 5 Structure of transaction volume and transaction number of the WRR index proposal taking into account the applied Minimum Volume Threshold in H1'2024



3.2. Interest rate distribution by money market segments

The evolution of interest rates distribution across all transaction data sets is presented in the document to a supplementary extent compared to the previous round of consultations. In this part of the document, it is proposed to compare the similarities and differences in the distribution of interest rates in specific segments of the money market, included in individual index proposals, taking into account the impact of the Minimum Volume Threshold levels used in the calibration. This allows us to compare (compared to the information already available in the previous consultation round) the extent to which different money market segments will react to the change in this threshold. Despite the limitation of the range of segments taken into account in the construction of the index proposal, the distributions of all segments are presented. The analysis presented in this part of the document takes into account information on the development of appropriate distributions in the period 2021-2023 for all PPD groups. The aim is to present and expand the general level of knowledge about the development of the situation on the money market using identical volume thresholds and assumptions. Due to the size of the presentation, information on the distributions in individual years and in H1'2024 is presented in Annex 7.

The Administrator presents the empirical interest rate distributions (frequency and volume-weighted distributions) in two approaches:

- unadjusted rate distributions, i.e. taking into account the entire impact of changes in the level of NBP interest rates in the analysis period,

- rate distributions adjusted for the level of the NBP deposit rate[12], i.e. those aimed at removing the impact of changes in monetary conditions.

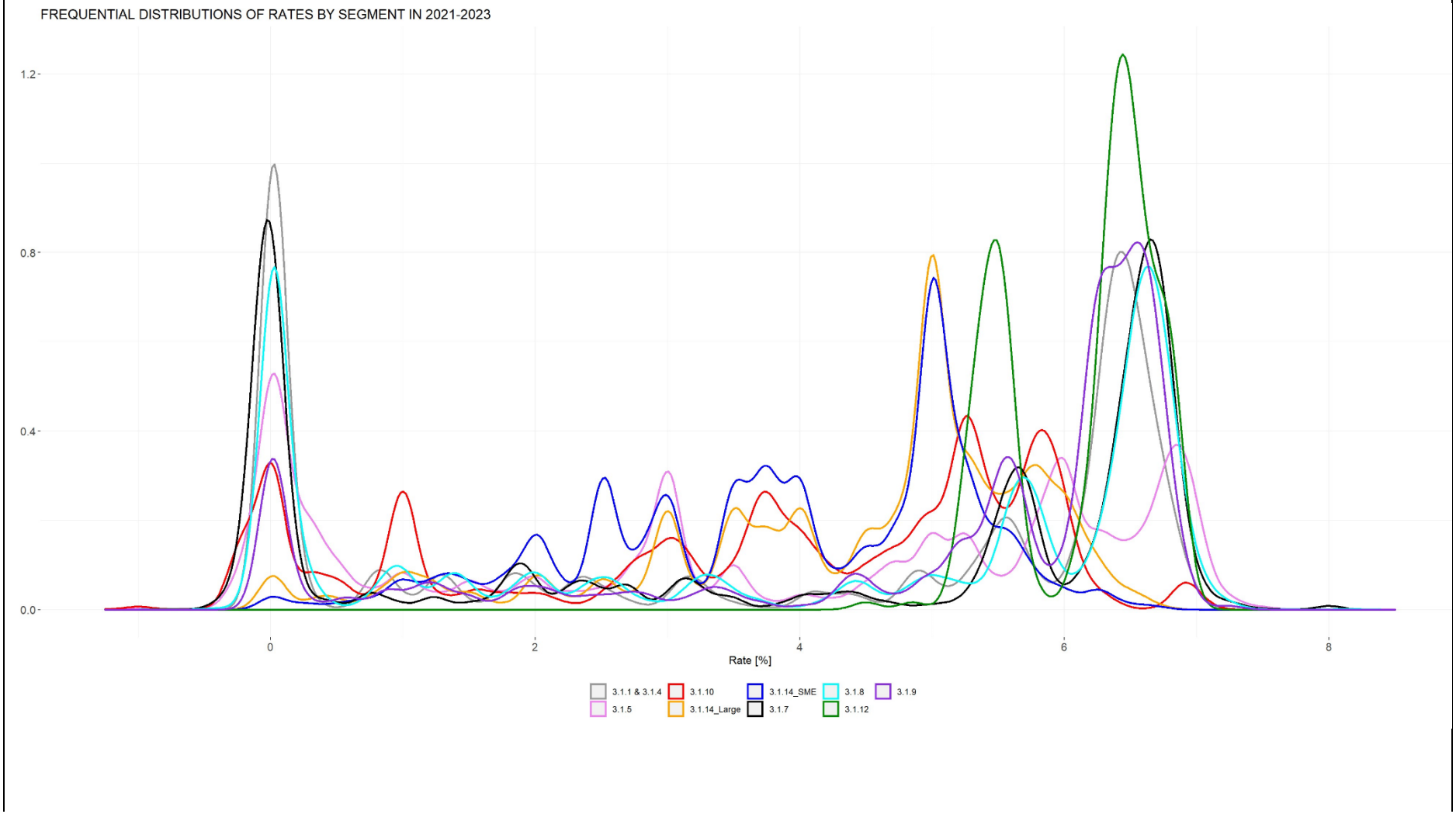
Detailed analysis can lead to many interesting conclusions when making comparisons between individual segments of the money market. The following conclusions were drawn for volume-weighted distributions of rates adjusted by the NBP deposit rate

What is worth noting is that the increase in the Minimum Volume Threshold does not significantly affect the structure of the rate distribution. There is a similarity in the interest rate distributions in the interbank segment (3.1.1+3.1.4) and the segments of secured transactions (3.1.7, 3.1.8, 3.1.12), as well as 3.1.9, due to the strong concentration near the central value of the distribution. In the case of segment 3.1.5, the graphical presentation shows that, in relation to the above-mentioned segments, the central value of the interest rate distribution in this segment remains similar, but the concentration of interest rates around it is significantly lower. The foot distributions in the other segments (3.1.10, 3.1.14_Duze, 3.1.14_MSP) present clearly different features in relation to the previous PPD groups due to a much higher level of polymodality and significantly higher left skewness.

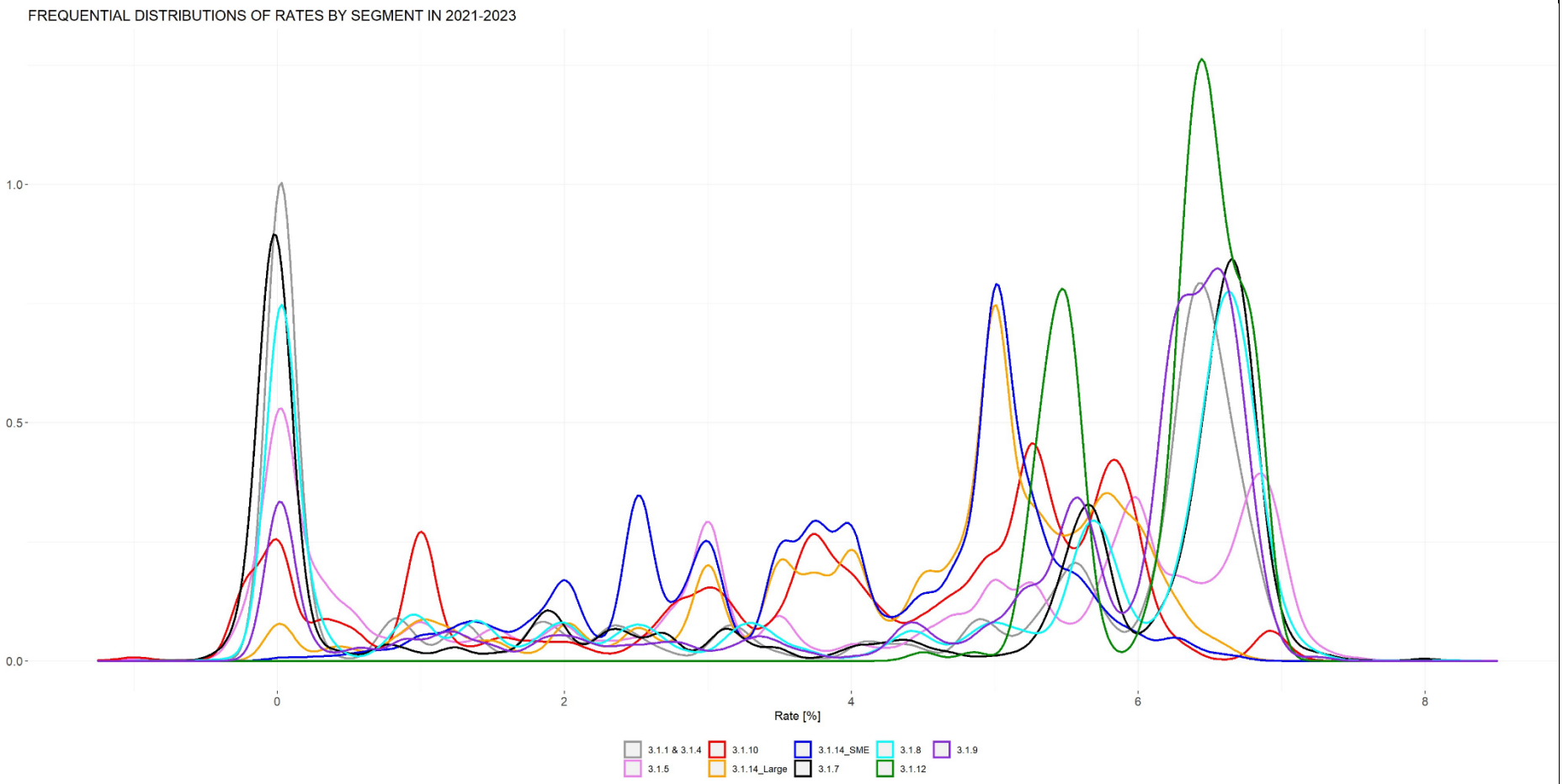
[12] Adjustment of the transaction rate by the level of the NBP deposit rate consists in subtracting the current value of the NBP deposit rate from its level.

Chart 1 Distribution of interest rate by segment in the period 2021-2023

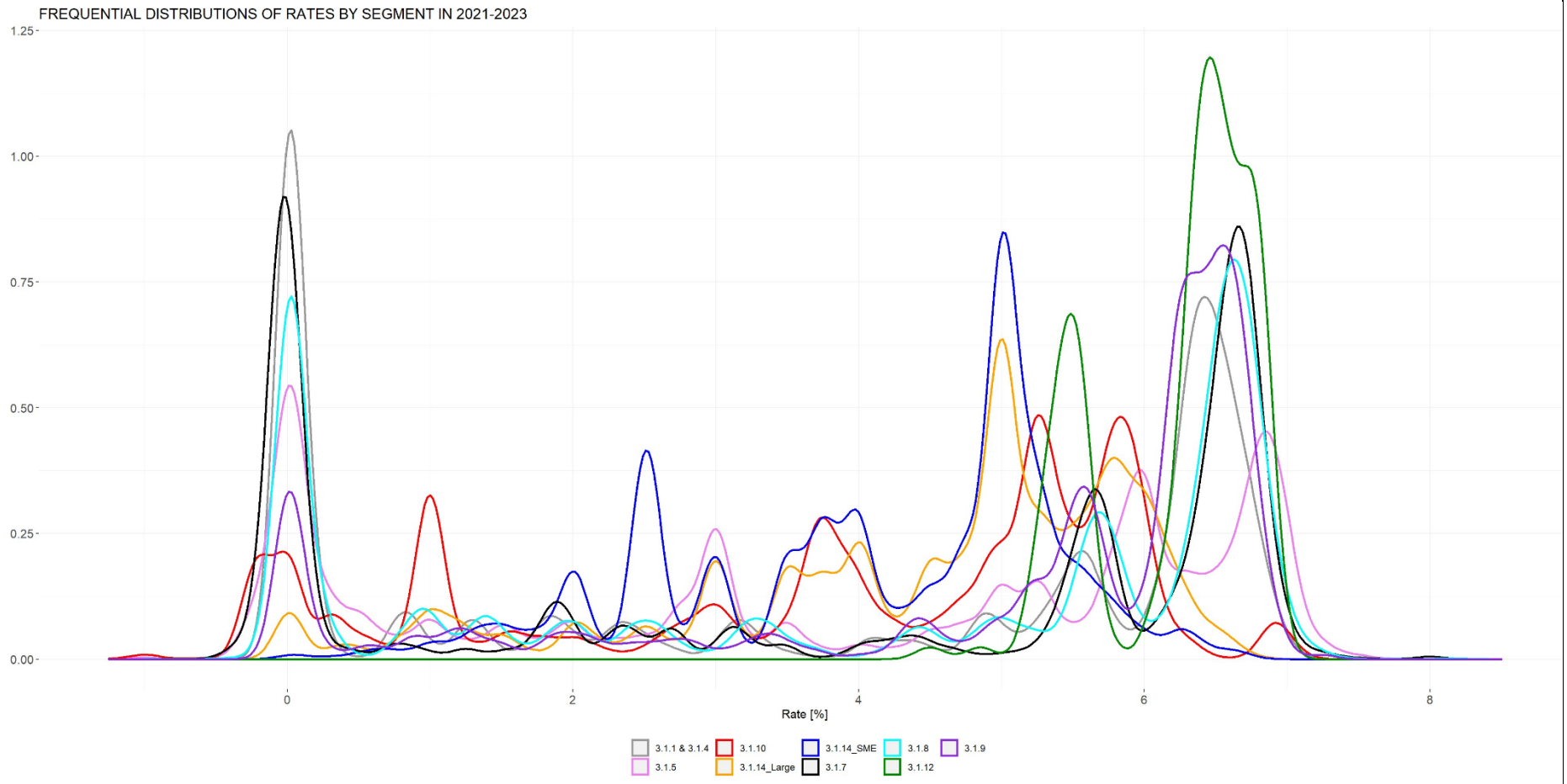
a. Distribution of interest rate for the Minimum Volume Threshold of PLN 25 mn



b. Distribution of interest rate for the Minimum Volume Threshold of PLN 30 mn



c. Distribution of interest rate for the Minimum Volume Threshold of PLN 40 mn



d. Distribution of interest rate for the Minimum Volume Threshold of PLN 55 mn

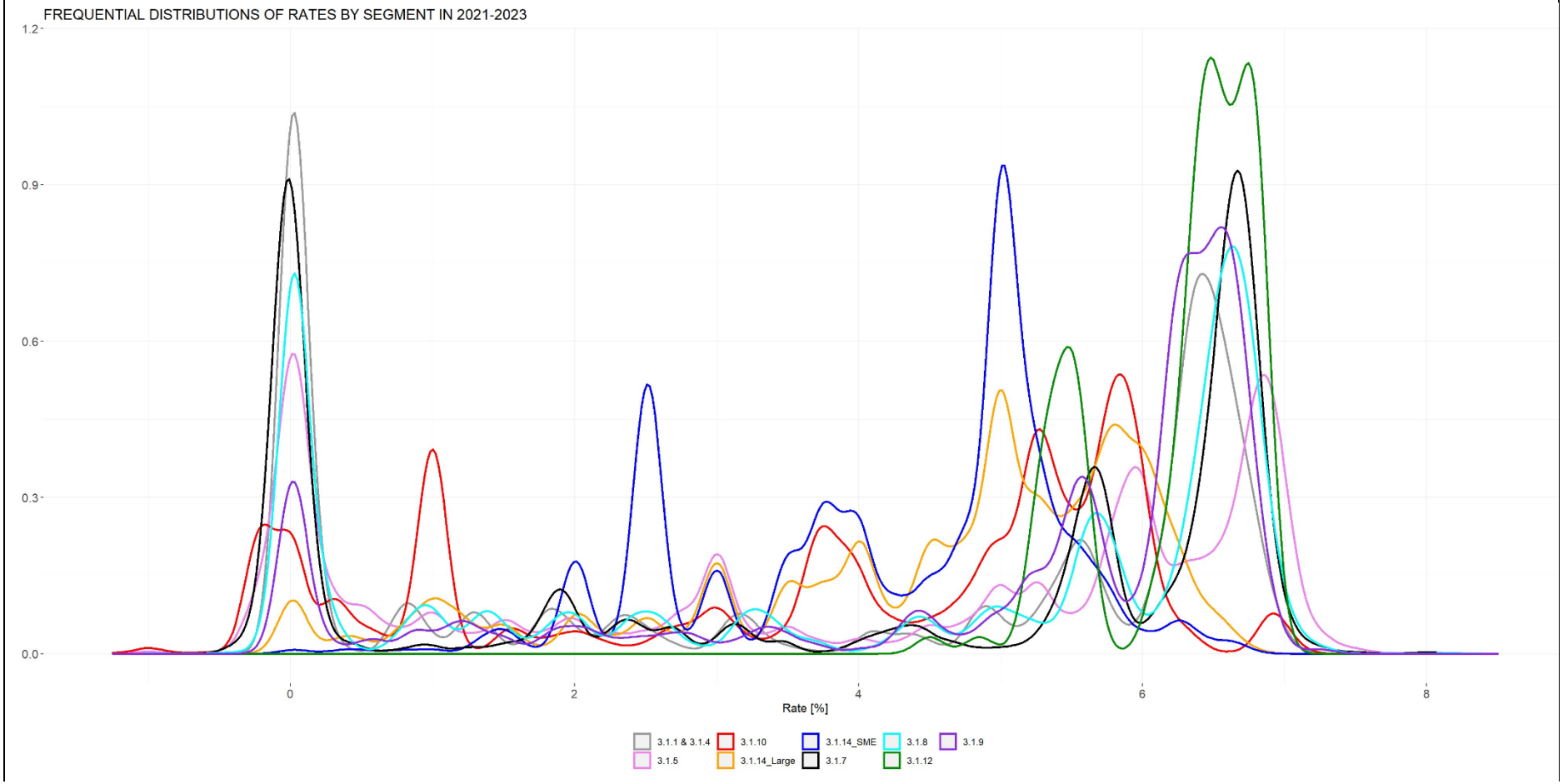
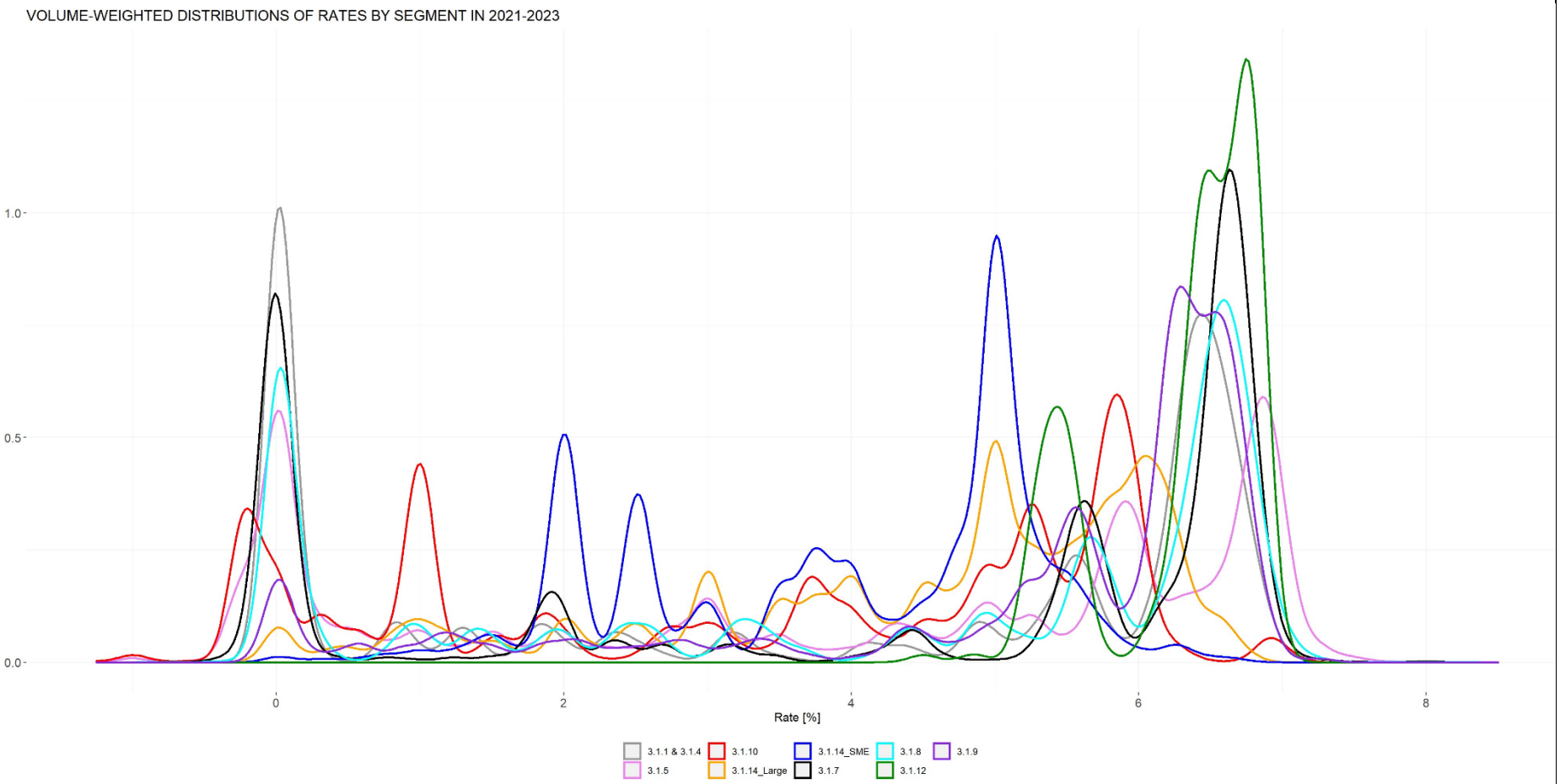
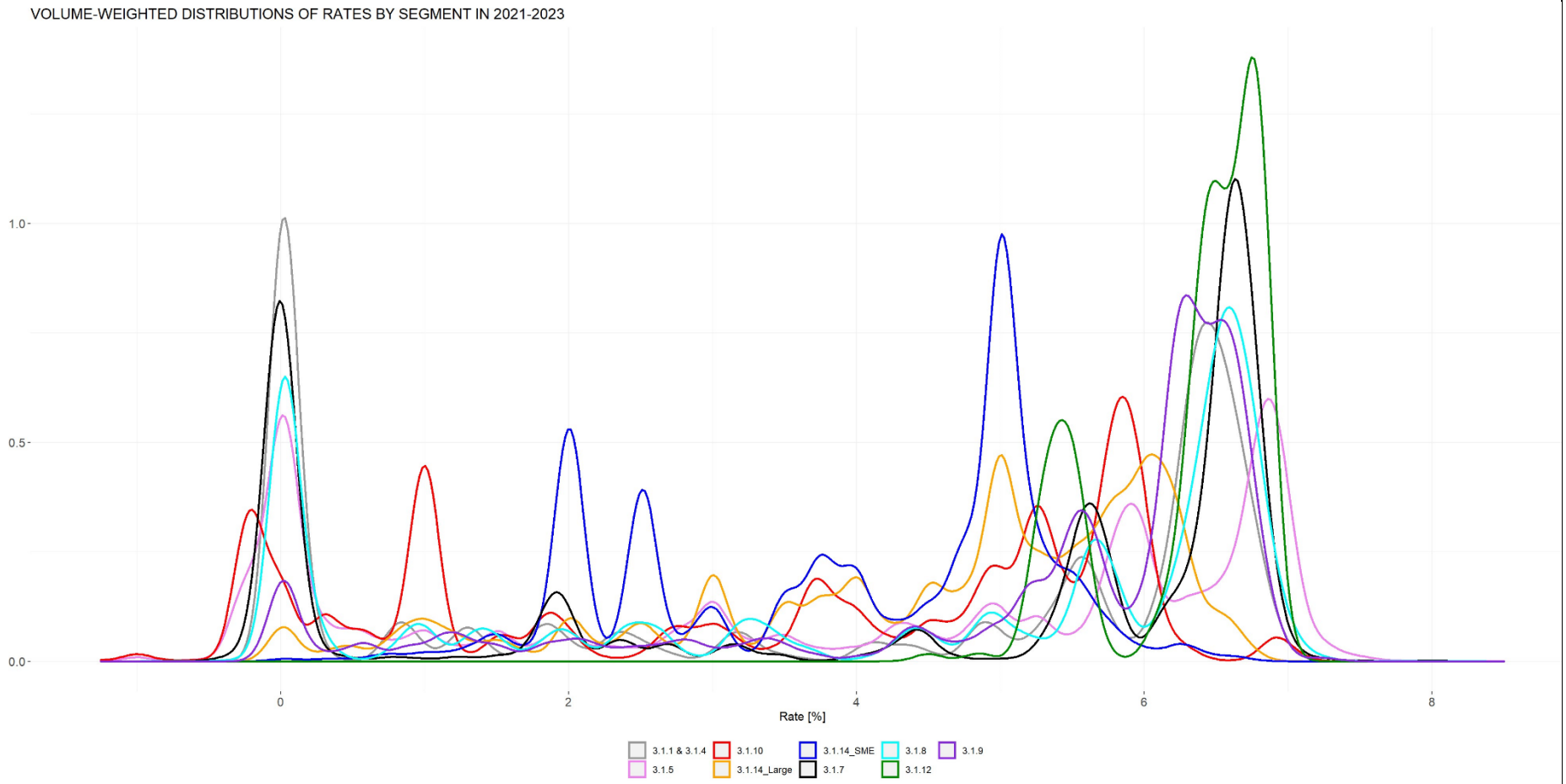


Chart 2 Volume-weighted distribution of interest rate by segment in the period 2021-2023

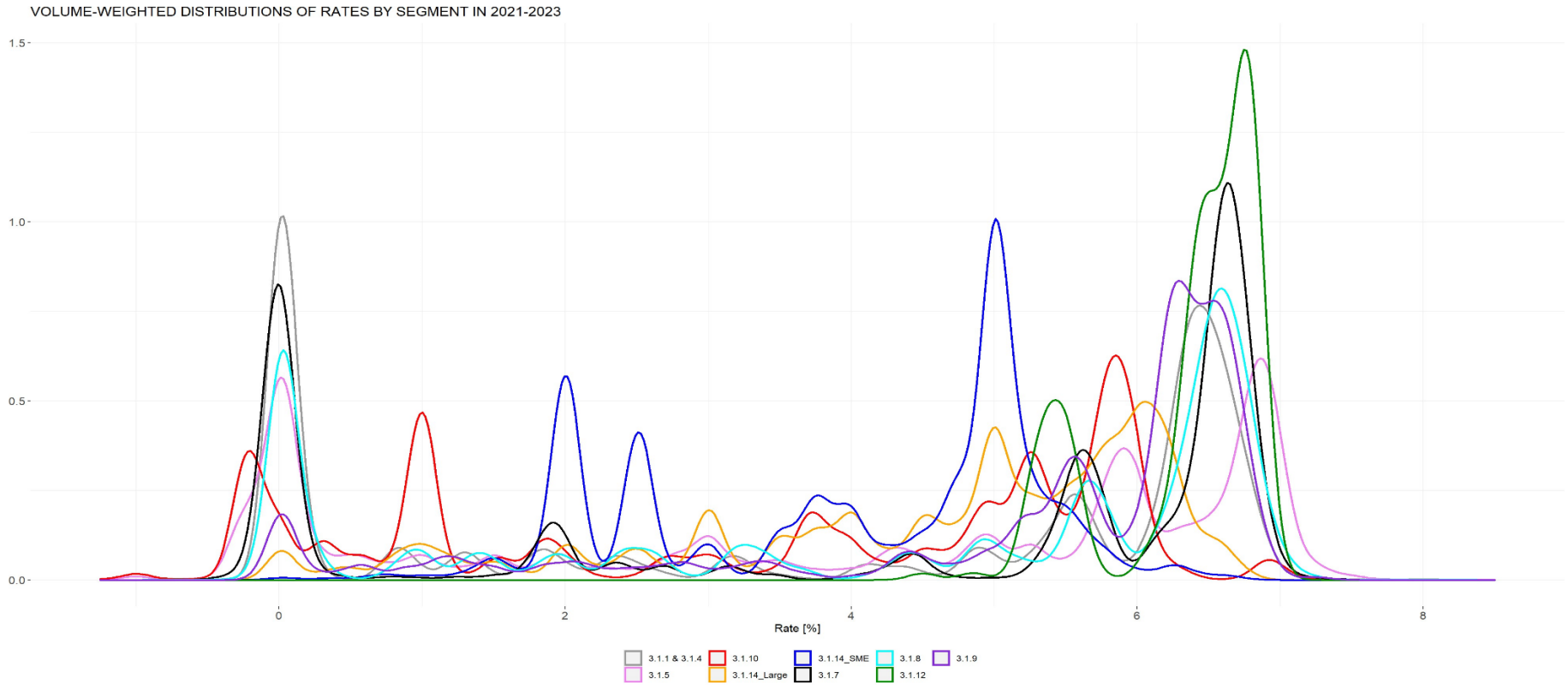
a. Volume-weighted distribution of interest rate for the Minimum Volume Threshold of PLN 25 mn



b. Volume-weighted distribution of interest rate for the Minimum Volume Threshold of PLN 30 mn



c. Volume-weighted distribution of interest rate for the Minimum Volume Threshold of PLN 40 mn



d. Volume-weighted distribution of interest rate for the Minimum Volume Threshold of PLN 55 mn

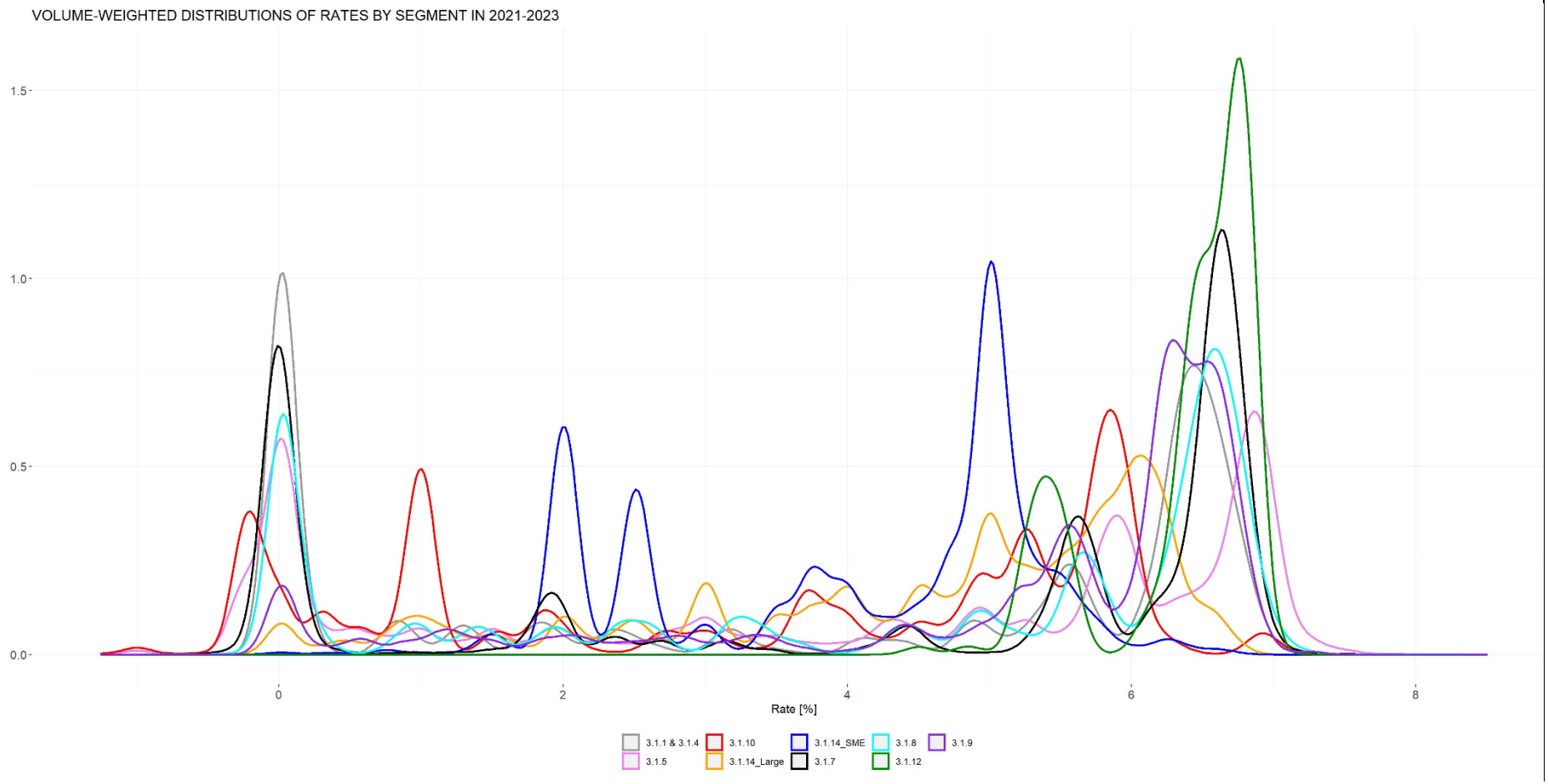
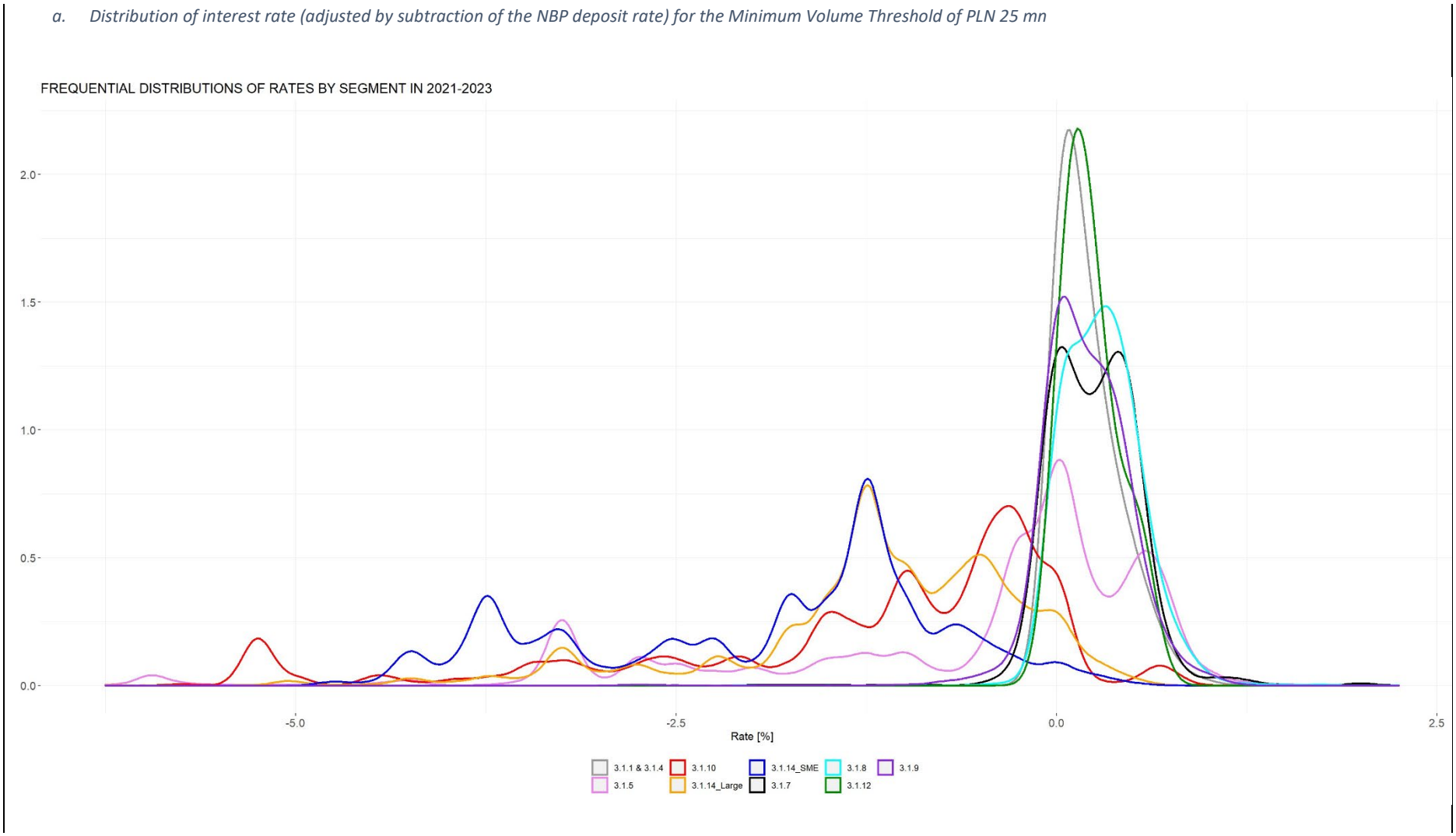
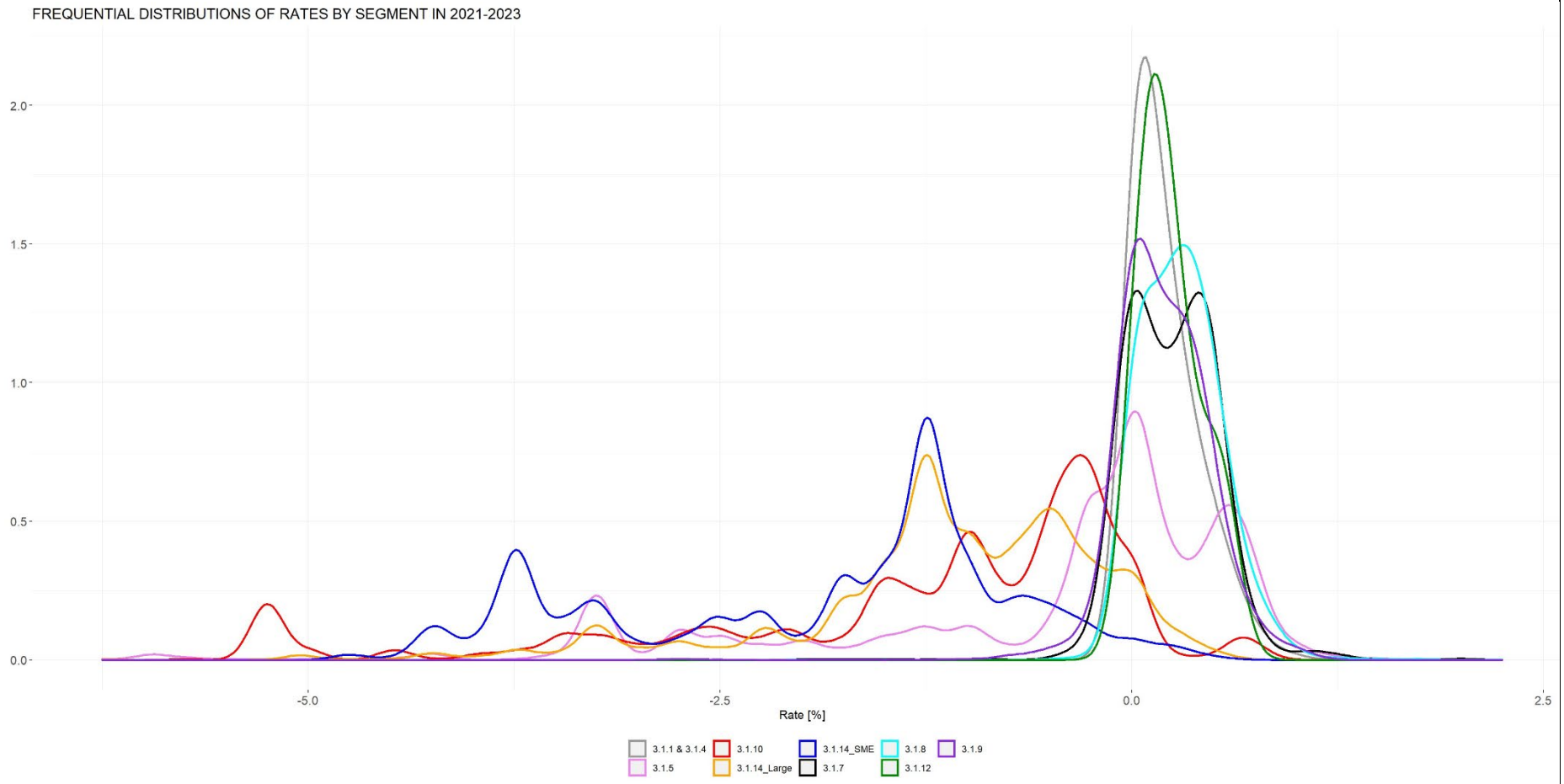


Chart 3 Distribution of interest rate (adjusted by subtraction of the NBP deposit rate) by segment in the period 2021-2023

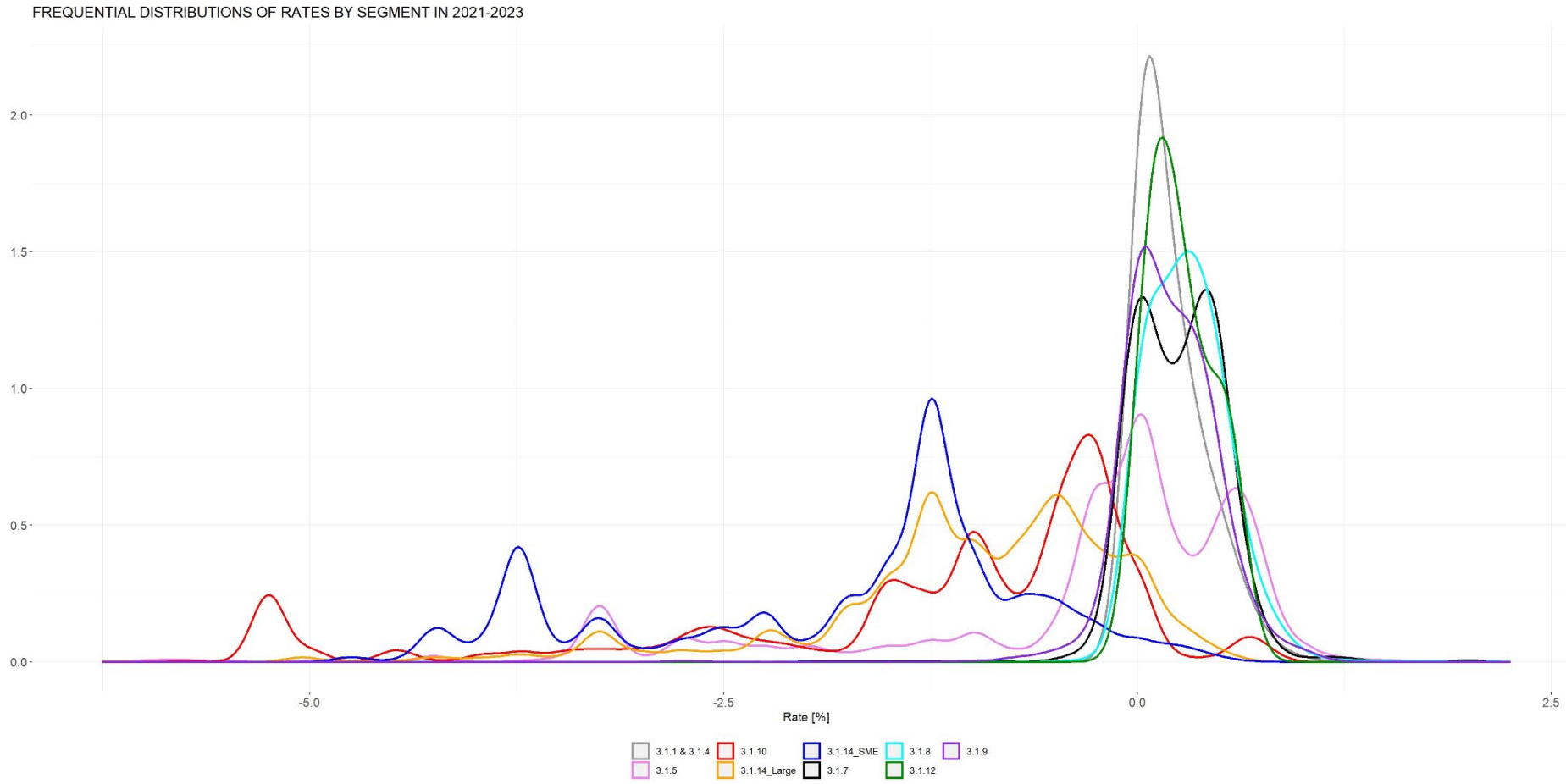
a. Distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 25 mn



b. Distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 30 mn



c. Distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 40 mn



d. Distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 55 mn

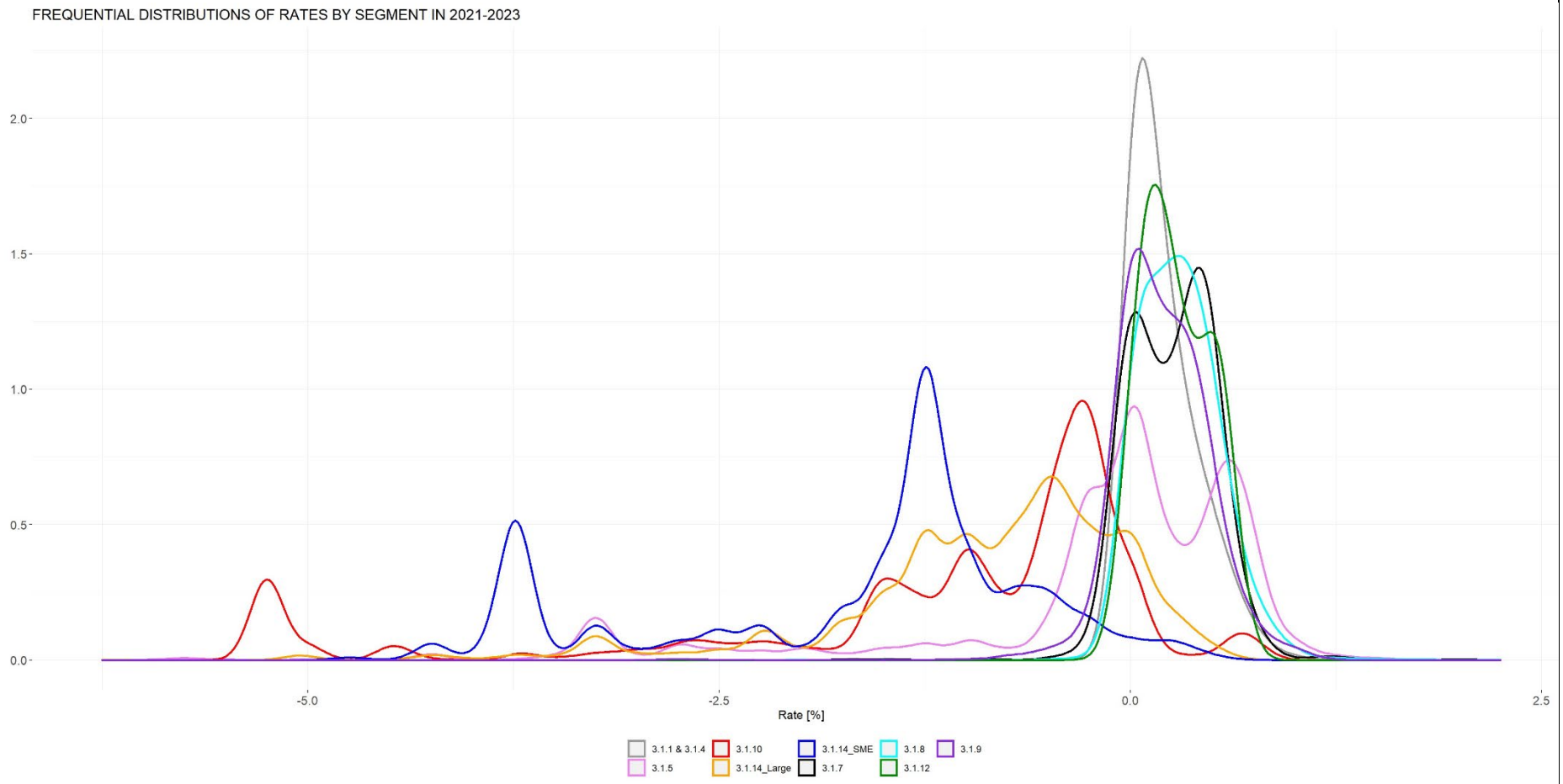
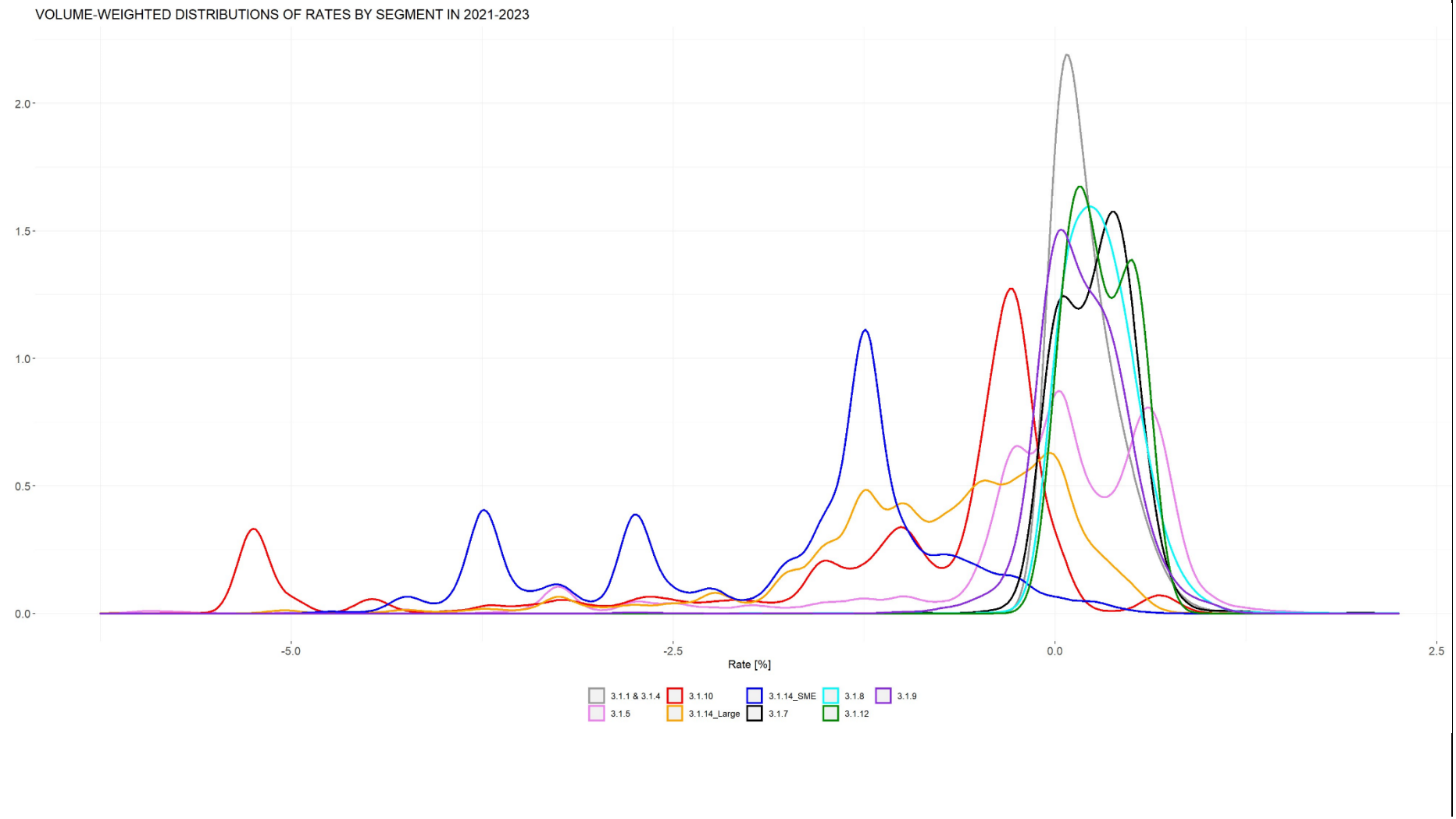
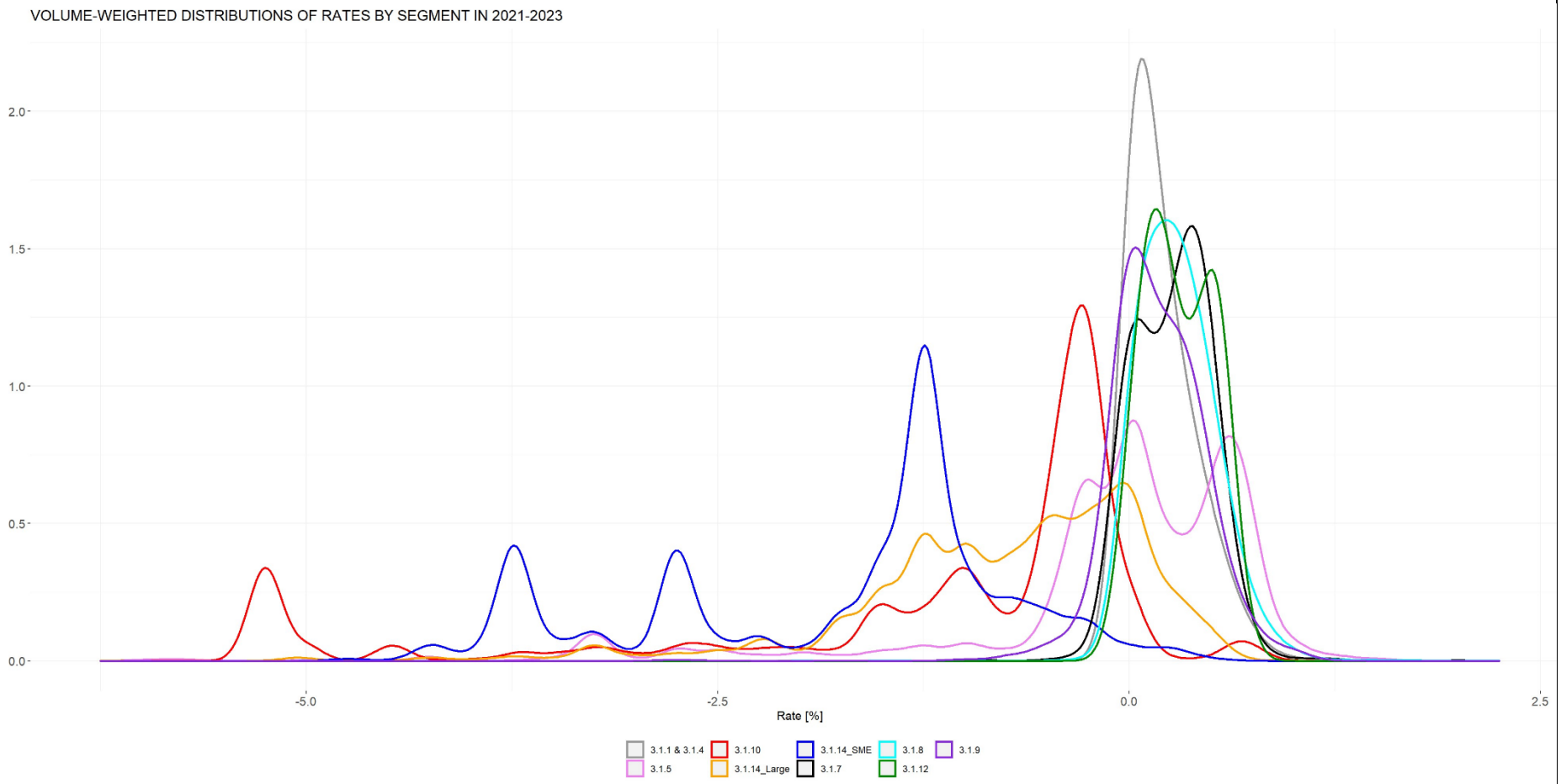


Chart 4 Volume-weighted distribution of interest rate (adjusted by subtraction of the NBP deposit rate) by segment in the period 2021-2023

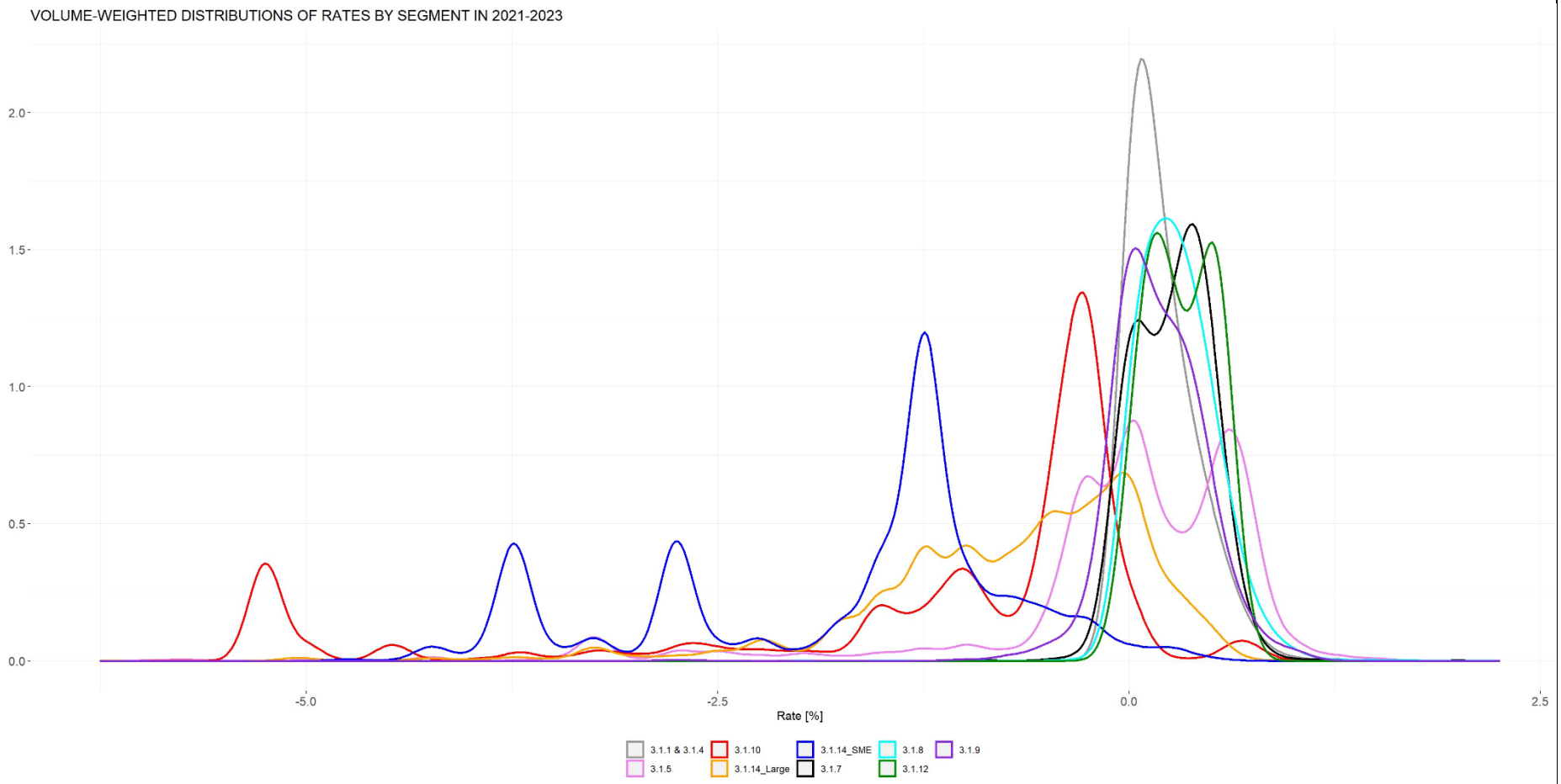
a. Volume-weighted distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 25 mn



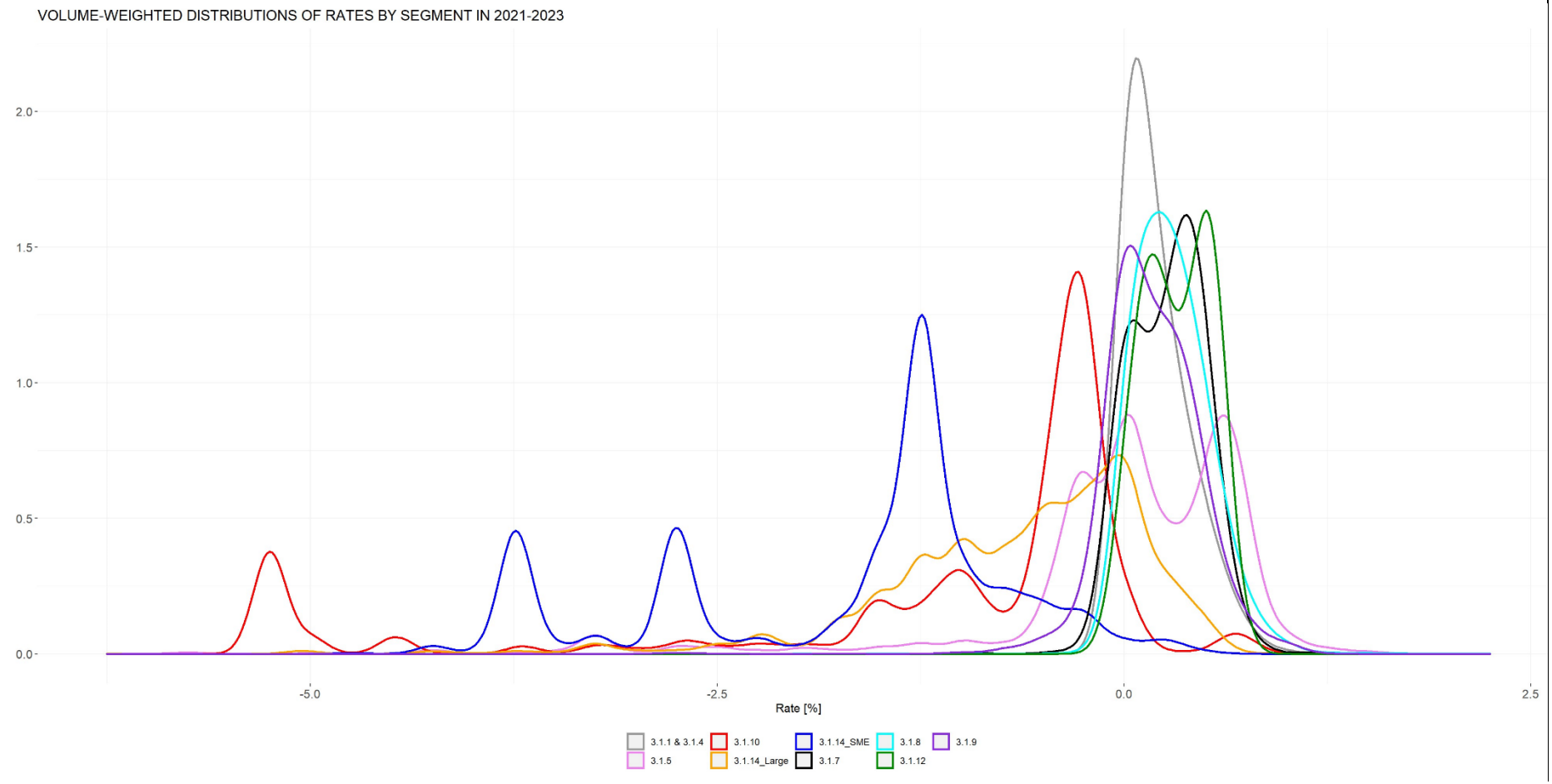
b. Volume-weighted distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 30 mn



c. Volume-weighted distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 40 mn



d. Volume-weighted distribution of interest rate (adjusted by subtraction of the NBP deposit rate) for the Minimum Volume Threshold of PLN 55 mn



4. Information about the main descriptive statistics on index proposals presented in the document

4.1. General overview of index statistics

In this part of the document, Tables 3 and 4 and Tables 5 and 6 present updated sets of descriptive statistics in relation to the previous consultation document,[13] determined respectively for the main analysis period (i.e. 2021-2023) and for H1'2024 for selected parametric variants of each of the studied index proposals, with the aim of expanding the possibilities of interpreting the behavior of the simulated time series, The scope of the presented statistics has been extended.

In the first part concerning the development of descriptive statistics reflecting the characteristics of the Eligible Transaction Pool, information on the average daily volume of the Eligible Transaction Pool before the application of the Minimum Volume Threshold (**MEAN_TRANSVOL (MPW=0)) has been added**. The application of the Minimum Volume Threshold in the case of assessing the size of the Eligible Transaction Pool is of key importance. The Minimum Volume Threshold serves as a calibration "tool" serving (in addition to the cut-off level used in the Main Adjustment) primarily to optimize the method in terms of the volatility of the course of a given index proposal within the adopted assumptions regarding the acceptable scale of the loss of the Eligible Transaction Pool of a given index proposal. The optimisation of runs was carried out on the assumption that - if justified from the point of view of improving the quality of the index measured by its volatility - the increase in the Minimum Volume Threshold is taken into account to such an extent as not to significantly reduce its Eligible

[13] Statistic designations:
CONTR.NUMBER.MEAN – average daily number of index contributors in a given period
CONTR.NUMBER.MIN – minimum daily number of index contributors in a given period
MEAN_TRANSVOL – the average daily volume of the Eligible Transaction Pool of an index in a given period
MIN_TRANSVOL – the minimum daily volume of the Eligible Transaction Pool of an index in a given period
MEAN_TRANSVOL (MPW=0) – the average daily volume of the Eligible Transaction Pool of and index in a given period, assuming that the Minimum Volume Threshold is not applied
MEAN_TRANSNUMBER – the average daily number of the Eligible Transaction Pool of an index in a given period
MIN_TRANSNUMBER – the minimum daily number of the Eligible Transaction Pool of an index in a given period
MEAN – average index level in a given period
SHARE.RANGE.MEAN – average daily range of contributors' shares in the volume of the Eligible Transaction Pool in a given period
SHARE. RANGE. MEAN. PPW - the average daily range of contributors' shares in the volume of the Eligible Transaction Pool in a given period after the volume scaling-down procedure has been applied
DIFF.SD – standard deviation of the first differences of index values in a given period
DIFF.SD.MOD – modified standard deviation of the first differences of index values (i.e. excluding the index value for the last business days of the month) in a given period
RANGE.5D.MEAN – mean centered 5-day moving range of index values
RANGE.5D.MEAN.MOD – Modified mean centered 5-day moving range of index values (i.e. excluding the index value for the last business days of the month) in a given period
RANGE.5D.MAX – maximum centered 5-day moving range of index values in a given period
INTERQUANTILE.RANGE.MEAN – mean difference between the quantiles of the daily distribution of rates in the Eligible Transaction Pool of an index resulting from Main Adjustment in a given period
FALLBACK.NUMBER - number of index dates in a given period for which the index calculation fallback procedure was used

Transaction Pool, taking into account the structure and behaviour of a given index proposal over time[14]. For the avoidance of doubt, it is indicated that the Administrator calibrates the methodology independently for each index proposal (unless it decides otherwise for comparison purposes, as in the case of the previous consultation document on WIRF+ and WIRON+), and through the calibration performed it aims to best combine the objective of ensuring the ability to represent the market whose measurement is the objective of the index proposal, and optimization of its features by selecting appropriate method parameters.

The presentation of information on the size of the Eligible Transaction Pool with the hypothetical application of the Minimum Volume Threshold at zero (which means that there is no limit on the volume of a single transaction that enters the Eligible Transaction Pool) allows to illustrate the full size of the market whose measurement is the purpose of a given index proposal. It is worth remembering that the Minimum Volume Threshold does not have to be considered a fixed element of the method – it is an element that can be verified as part of the validation procedure of its method. The administrator may amend some elements of the methodology if the market situation justifies it, and in particular if it benefits from the representativeness or volatility of the index or benchmark being developed[15]. Information on the rest of the volume of transactions from segments qualified for the input data of a given index proposal may allow to assess the current volume "buffer" of a given index proposal. However, the assessment of such a "buffer" should be made through the prism of sensitivity analysis, including, above all, the development of descriptive statistics (primarily volatility statistics) depending on the Minimum Volume Threshold applied, which is presented below in section 4.1.1 and in Appendix 3 presenting the extensive results of the sensitivity analysis of the index proposals.

The second part of the information set concerns statistics illustrating mainly the volatility of index proposals. As part of this set, an additional descriptive statistic was proposed in relation to the scope presented in the previous consultation document, i.e. the average daily range of contributors' shares in the volume of the Eligible Transaction Pool in a given period after applying the volume scaling-down procedure (**SHARE.RANGE.MEAN.PPW).** The presentation of the value of this statistic after the application of this procedure is intended to illustrate how this procedure affects the concentration structure in the group of contributors (an analysis of the maximum shares of contributors in the daily volume of the Eligible Transaction Pool, presented below, is also presented in the relevant appendix taking into account this impact).

In the Administrator's opinion, the parametric variants presented in this document of each of the analysed index proposals best combine the objectives of its development, i.e. care for the ability to represent the market whose measurement is the purpose of the index proposal, and the optimisation of its characteristics through the selection of appropriate method parameters. In addition, in the Administrator's opinion, the actions taken at this stage, including, for example, extending the scope of the volume scaling-down procedure to include set 3.1.9, allow to strengthen the resilience and

[14] After identifying the maximum acceptable level of the Minimum Volume Threshold that meets the condition of not deteriorating the average level of the average daily volume of a given index proposal on an excessively large scale (as indicated in Chapter 1 of the document), further calibration of this parameter and other elements of the index proposal methodology is carried out.

[15] For example, GPW Benchmark verified the Minimum Volume Threshold of the WIRON benchmark in 2024 (the changes have not been implemented), but changes to this parameter are also taking place in the case of other key benchmarks. ® The European Money Markets Institute (EMMI) (emmi-benchmarks.eu) has revised the minimum level of eligible trading volume from EUR 20 million to EUR 10 million as part of its EURIBOR review.

mitigate the potential risk of excessive impact of entities with a leading role in certain segments of the money market included in the input data of index proposals taking into account deposits of the so-called public institutions.

As part of the presented statistics, the reader will also find information on the WIRON in its current calibration, information on the WRR and statistics that could be determined for the POLONIA Reference Rate. In order to facilitate the comparison process, information on the average level of the NBP deposit rate and the NBP reference rate in the analysis period has also been added to the tables presented below, however, the NBP reference rate has been transformed to the ACT 365 convention from the ACT 360 convention applicable to this rate, which has an impact on its level, but ensures comparability with the value of the levels set for the proposed indices based on transactions, for which ACT 365 applies.

Table 3 Measures of Eligible Transactions Pool of index proposals and the mean level of index proposals and other selected interest rates in 2021-2023

STATISTICAL MEASURE	WIRON PLN 1 mn 25%	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%	WRR PLN 1 mn 12,5%	POLONIA	NBP ref. rate (ACT365)	NBP dep. rate
CONTR.NUMBER.MEAN	**8,873**	8,473	8,276	8,066	8,464	6,375	-	-	-
CONTR.NUMBER.MIN	**6**	3	4	3	5	1	-	-	-
MEAN_TRANSVOL (PLN)	**10 154 503 158**	7 051 102 174	9 355 138 522	6 082 204 970	8 945 713 656	5 062 735 941	2 497 905 086	-	-
MIN_TRANSVOL (PLN)	**2 258 548 018**	1 697 060 817	1 489 000 000	1 055 196 401	1 400 519 491	46 537 667	0	-	-
MEAN_TRANSVOL (MVT=0) (PLN)	**10 189 950 614**	7 593 600 972	10 282 097 975	6 634 955 573	9 323 452 576	5 066 394 075	-	-	-
MEAN_TRANSNUMBER	**211,1**	36,8	31,9	26,6	36,9	90,3	-	-	-
MIN_TRANSNUMBER	**42**	14	9	10	13	7	-	-	-
MEAN (%)	**3,509**	3,727	3,777	3,808	3,793	3,885	3,817	4,070	3,617

Table 4 Volatility measures and the number of fallback procedures of index proposals and other selected interest rates in 2021-2023

STASTITCAL MEASURE	WIRON PLN 1 mn 25%	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%	WRR PLN 1 mn 12,5%	POLONIA	NBP ref. rate (ACT365)	NBP dep. rate
SHARE.RANGE.MEAN (pp)	**27,280**	32,709	35,375	35,705	36,504	54,726	-	-	-
SHARE.RANGE.MEAN.PPW (pp)	**27,268**	32,682	35,299	35,623	36,319	-	-	-	-
DIFF.SD (pp)	**0,233**	0,198	0,137	0,143	0,125	0,127	0,131	-	-
DIFF.SD.MOD (pp)	**0,158**	0,116	0,108	0,115	0,108	0,117	0,118	-	-
RANGE.SD.MEAN (pp)	**0,314**	0,247	0,203	0,197	0,193	0,191	0,195	-	-
RANGE.SD.MEAN.MOD (pp)	**0,249**	0,185	0,177	0,178	0,174	0,173	0,177	-	-
RANGE.SD.MAX (pp)	**3,023**	2,442	1,094	1,647	1,069	0,976	1,040	-	-
INTERQUATILE.RANGE.MEAN (pp)	**0,848**	0,576	0,237	0,238	0,193	0,198	-	-	-
FALLBACK.NUMBER	**0**	0	0	1	1	22	13	-	-

Table 5 Measures of Eligible Transactions Pool of index proposals and the mean level of index proposals and other selected interest rates in H1 2024

STATISTICAL MEASURE	WIRON PLN 1 mn 25%	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%	WRR PLN 1 mn 12,5%	POLONIA	NBP ref. rate (ACT365)	NBP dep. rate
CONTR.NUMBER.MEAN	**8,873**	8,272	8,200	7,704	8,112	5,696	-	-	-
CONTR.NUMBER.MIN	**8**	4	4	3	5	3	-	-	-
MEAN_TRANSVOL (PLN)	**9 967 840 682**	6 936 184 901	11 447 828 126	5 968 352 401	10 880 356 018	4 804 124 142	2 046 424 000	-	-
MIN_TRANSVOL (PLN)	**5 205 942 502**	3 068 913 809	5 373 800 000	1 547 680 000	4 561 672 348	666 408 751	0	-	-
MEAN_TRANSVOL (MVT=0) (PLN)	**9 986 460 441**	7 431 761 708	12 234 237 577	6 371 606 147	11 174 082 016	4 810 065 501	-	-	-
MEAN_TRANSNUMBER	**243,3**	32,8	32,9	23,8	34,6	115,6	-	-	-
MIN_TRANSNUMBER	**154**	14	16	7	14	29	-	-	-
MEAN (%)	**5,060**	5,432	5,422	5,521	5,442	5,565	5,472	5,830	5,250

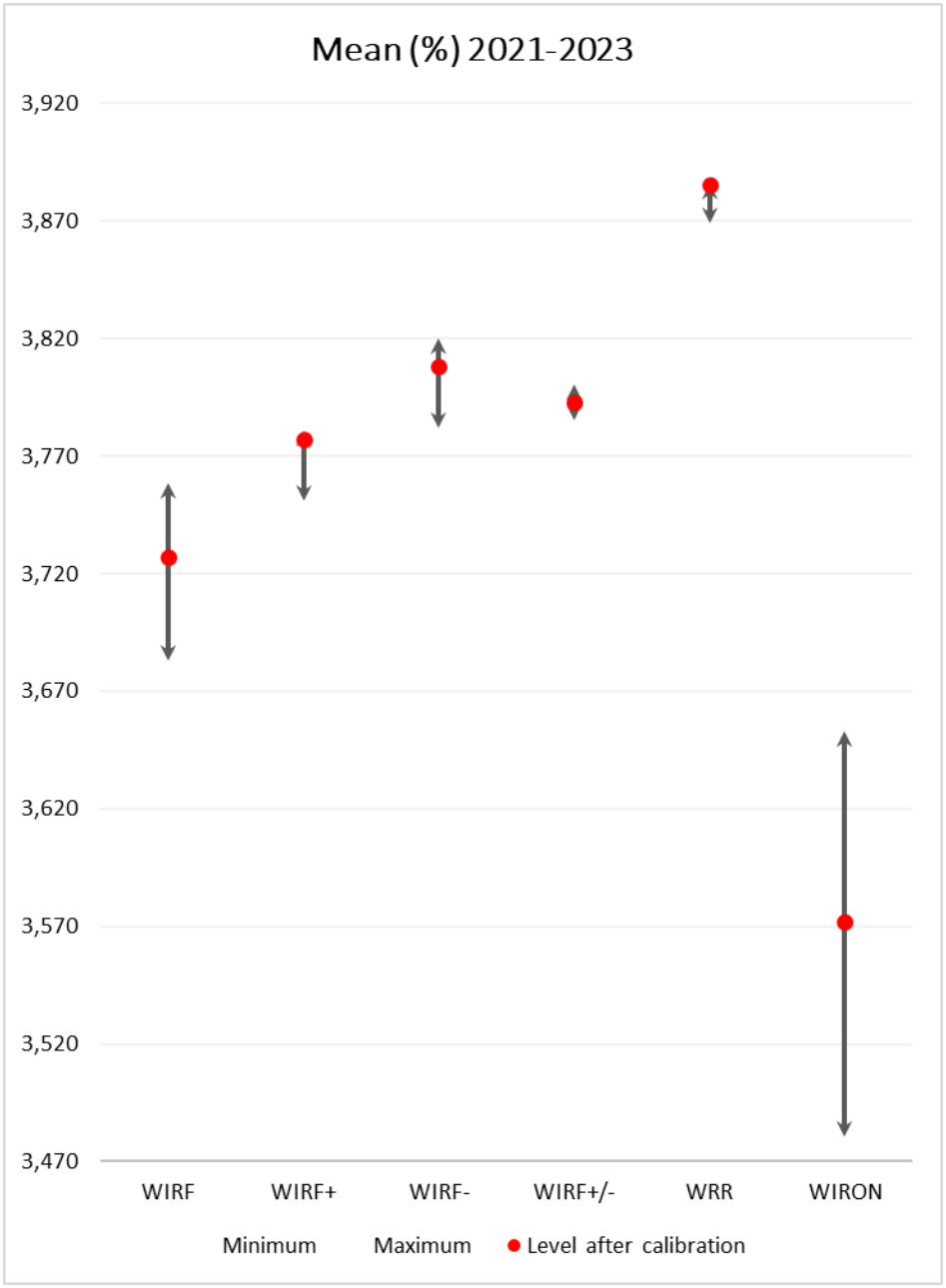
Table 6 Volatility measures and the number of fallback procedures of index proposals and other selected interest rates in H1 2024

STATISTICAL MEASURE	WIRON PLN 1 mn 25%	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%	WRR PLN 1 mn 12,5%	POLONIA	NBP ref. rate (ACT365)	NBP dep. rate
SHARE.RANGE.MEAN (pp)	**25,130**	30,146	31,994	33,105	34,135	51,295	-	-	-
SHARE.RANGE.MEAN.PPW (pp)	**25,130**	30,146	31,909	33,051	33,668	-	-	-	-
DIFF.SD (pp)	**0,340**	0,190	0,142	0,122	0,115	0,100	0,131	-	-
DIFF.SD.MOD (pp)	**0,200**	0,086	0,082	0,103	0,083	0,078	0,118	-	-
RANGE.5D.MEAN (pp)	**0,486**	0,252	0,207	0,217	0,181	0,171	0,200	-	-
RANGE.5D.MEAN.MOD (pp)	**0,343**	0,175	0,154	0,194	0,153	0,146	0,170	-	-
RANGE.5D.MAX (pp)	**1,589**	1,013	0,791	0,637	0,576	0,589	0,640	-	-
INTERQUATILE.RANGE.MEAN (pp)	**1,568**	0,708	0,272	0,317	0,232	0,224	-	-	-
FALLBACK.NUMBER	**0**	0	0	0	0	1	3	-	-

4.1.1. Graphical presentation of the sensitivity of some descriptive statistics depending on the Minimum Volume Threshold

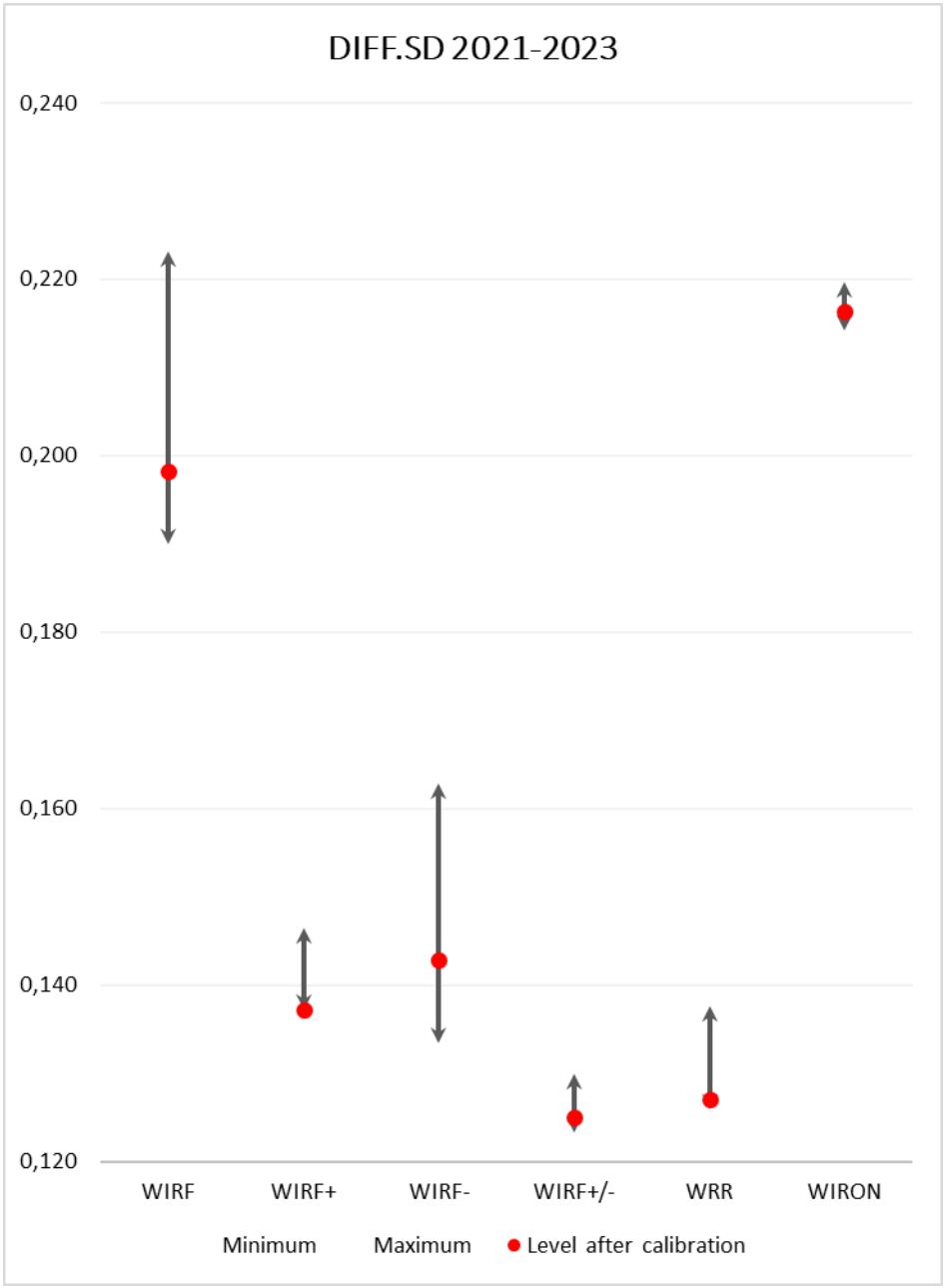
Sensitivity analysis allows us to observe how the characteristics of a given index proposal are shaped in response to a change in some of the parameters of the method. It is considered that the recognition of the sensitivity range of a future benchmark, in light of comments from some participants in the consultation on the relevance of predictability of the volatility and behaviour of the future benchmark over time, is an important element in deciding on the index proposal preferred for future use.

Figure 6 Graphical presentation of sensitivity of the mean value of index proposals to the Minimum Volume Threshold within the assumed range of variation of this threshold (PLN 0 - 75 mn)



Bearing in mind the above, so far the consultation document has contained information indicating, among others, a comparison of the volume structure and size of a given index proposal, in the absence and application of the Minimum Volume Threshold. Nevertheless, as an additional support in decision-making, a graphical presentation of the minimum and maximum of the main descriptive statistics and their values resulting from the calibration made on the basis of current empirical data – i.e. from the selected level of the Minimum Volume Threshold for each index proposal – is presented. The greater the scope of a given statistic (statistics on volatility and the average value of a given index proposal are presented), the greater its sensitivity to a potential change in the method of the Minimum Volume Threshold. The presentation allows you to observe which index proposals are characterized by higher and lower sensitivity to changes in this method parameter. While the Administrator makes a change in the methodology means that there have been changes in market conditions that may lead to a change in the sensitivity structure, this analysis, based on transaction data from the adopted analysis period (i.e. 2021-2023), allows some conclusions to be drawn as to the extent of volatility of the statistics on the index proposals submitted for consultation.

Figure 7 Graphical presentation of sensitivity of the standard deviation of first differences of index proposals to the Minimum Volume Threshold within the assumed range of variation of this threshold (PLN 0 - 75 mn)



The presentation has been prepared on the assumption that the analysed range of the Minimum Volume Threshold is defined from 0 to the highest of the maximum permissible levels of the Minimum Volume Threshold estimated for individual index proposals, i.e. in this case up to PLN 75 million. The analysis also presents the WRR, which, as previously indicated, was very well assessed by the participants of the previous round of consultations in terms of volatility features, and WIRON (presented here in the version with the Minimum Volume Threshold of PLN 25 million and the cut-off level in the Main Adjustment of 20%, i.e. the calibrated version presented in the previous consultation paper).

Figure 8 Graphical presentation of sensitivity of the standard deviation of first differences of index proposals (excluding month ends) to the Minimum Volume Threshold within the assumed range of variation of this threshold (PLN 0 - 75 mn)

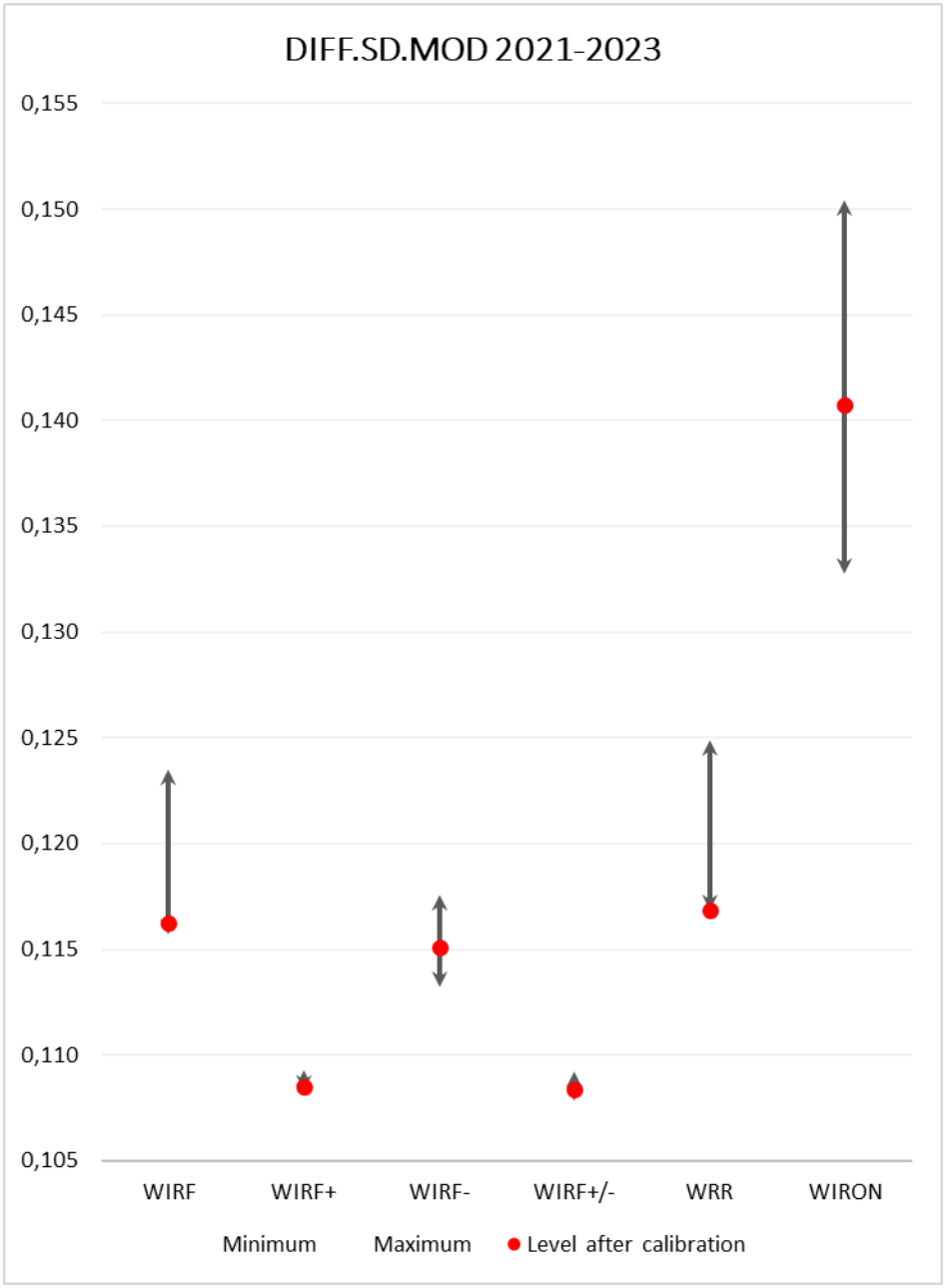


Figure 9 Graphical presentation of sensitivity of the mean centered 5-day moving range of index proposals to the Minimum Volume Threshold within the assumed range of variation of this threshold (PLN 0 - 75 mn)

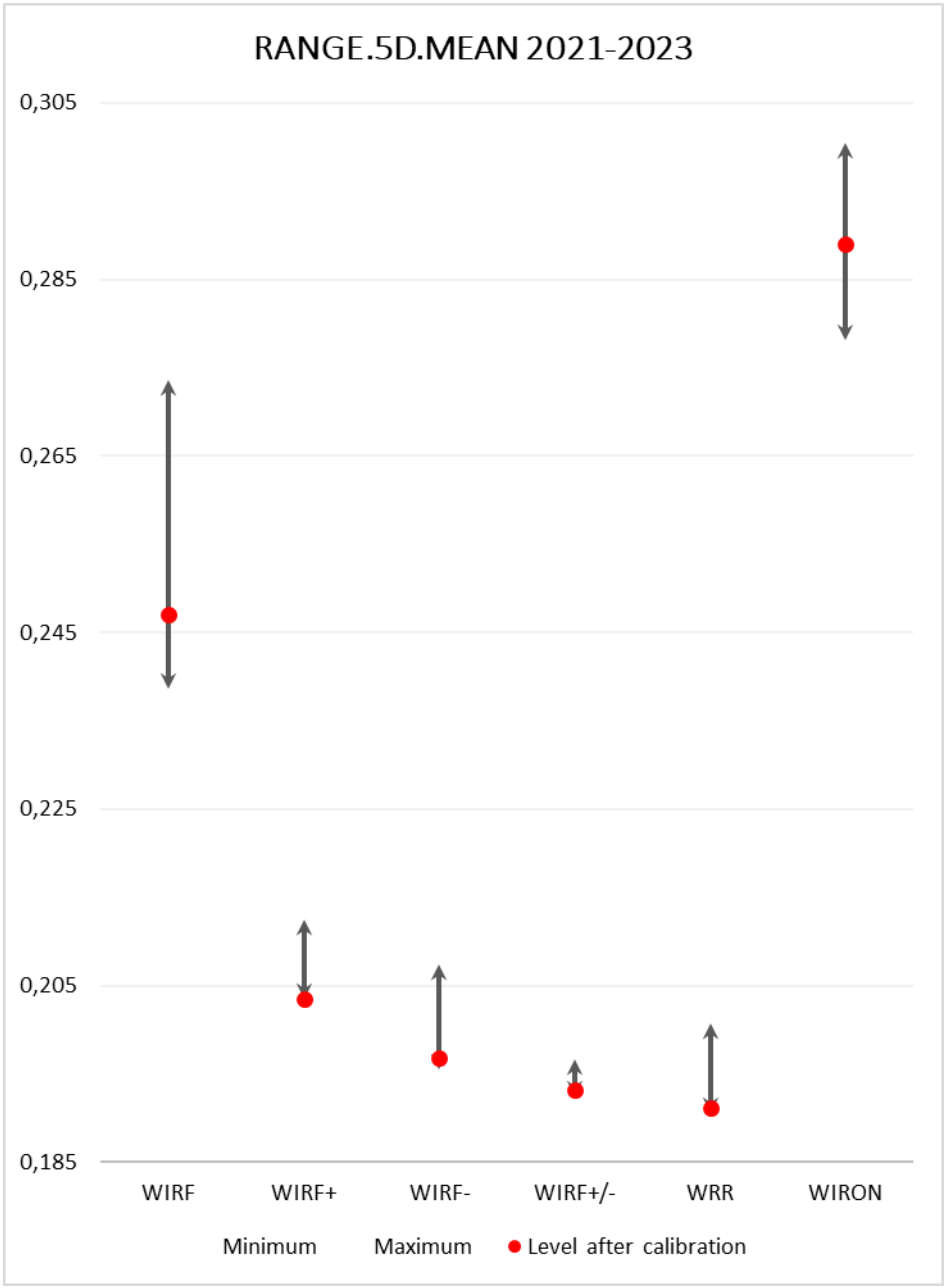
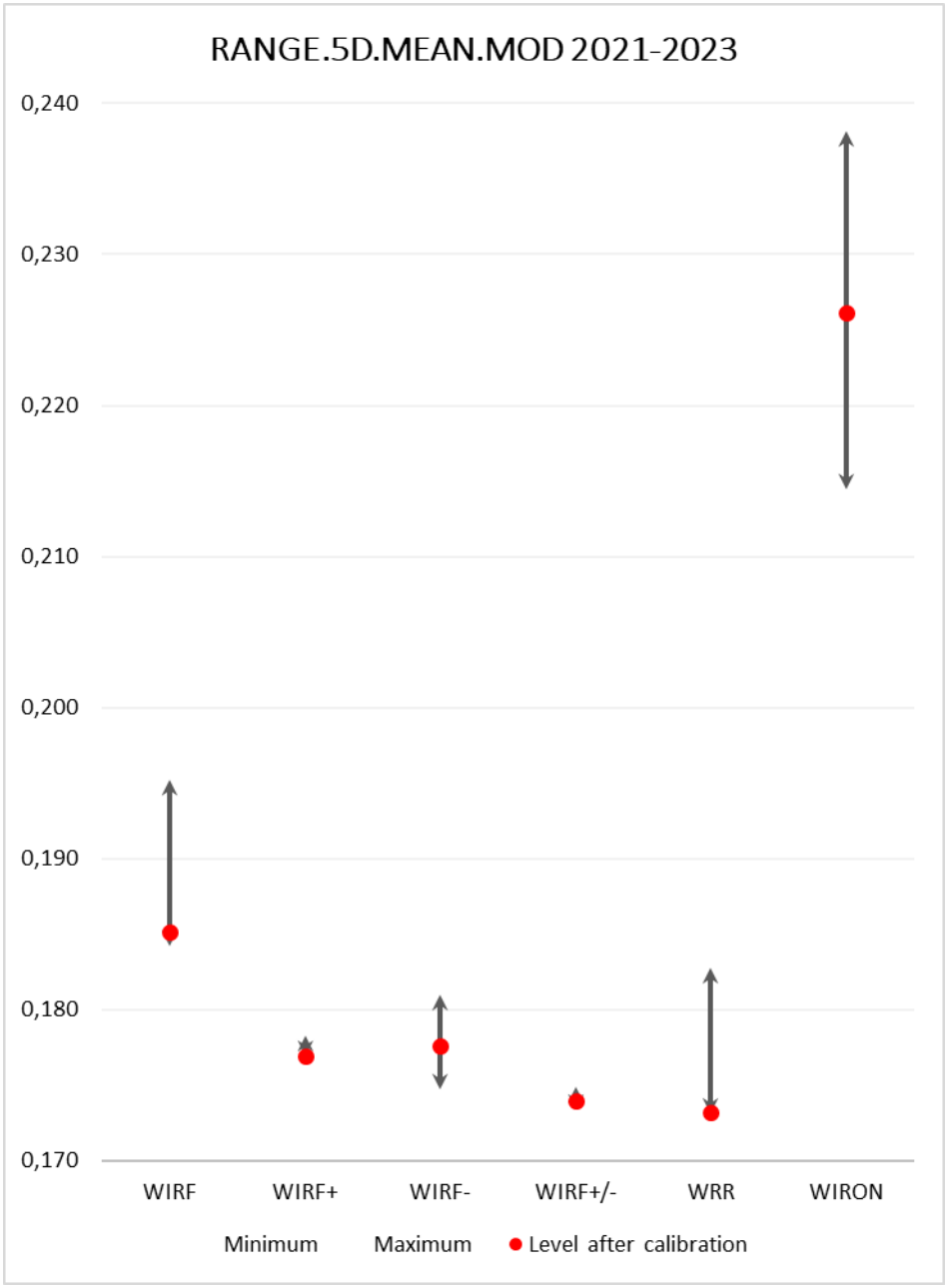


Figure 10 Graphical presentation of sensitivity of the mean centered 5-day moving range of index proposals (excluding month ends) to the Minimum Volume Threshold within the assumed range of variation of this threshold (PLN 0 - 75 mn)



4.2. Conclusions regarding the volume, number of transactions and number of data contributors within the Eligible Transaction Pool of individual index proposal

Graphical analysis of the average level of volume, number and number of contributors to the Eligible Transaction Pool remains an element of verification of the durability of the Eligible Transaction Pool's index proposals submitted for consultation.

The presentation of time series concerning the volume of the Eligible Transaction Pool in the analysis period (extended by H1'2024) allows to observe the differences in the level and volatility of the index proposal against the level and volatility of the volume of its Eligible Transaction Pool. As indicated in the previous consultation document, information on the size of the Eligible Transaction Pool should be considered together with information on the volume of the Eligible Transaction Pool over time. At the same time, it is recalled that the number of transactions within the WRR Eligible Transaction Pool should not be directly compared with the information related to the different types of WIRF, in view of the fact that, as indicated in the previous consultation document, the secured transaction data pool provided by contributors is characterised by the possibility of sharing *large* transactions into smaller records, depending on the rules of their operational settlement. As indicated in the previous consultation document, GPWB does not operationally compile individual records into potential large secured transactions, which means that the number of transactions presented for the WRR may be overstated in relation to the actual number of transactions performed. The minimum number of transactions, as presented in Table 8, must be analysed through the prism of the impact of the Minimum Volume Threshold – it can be seen that for index proposals for which the Minimum Volume Threshold is not higher than PLN 30 million, the minimum number of transactions is recorded at levels above 10, only to decrease to or below this level when the Minimum Volume Threshold is raised to PLN 40 or 55 million, respectively. It is noted, however, that the number of transactions in the Eligible Transaction Pool is a supportive and not a target element of the calibration process, and analyses of the structure of calibrated index proposals should be considered taking into account what movements the calibration has allowed to make in order to reduce volatility, while assessing the ability to sustainably develop a given index proposal over time. t

A comparison of individual WIRF index proposals allows us to observe that the maximum volume of the Eligible Transaction Pool reaching PLN 15-20 billion occurs in the case of those proposals that take into account segment 3.1.9, and such observations occur quite evenly during the analysis period compared to, for example, the chart for WRR, where maximums of PLN 15-20 billion occur sporadically. The regular high-volume of WIRF+ and WIRF+/- allows the average daily volume to stabilise at higher levels. The range of volatility of the volume value is significantly lower in the case of WIRF and WIRF- - the volume maximums are clearly lower for them than in the case of index proposals taking into account 3.1.9. With reference to Table 8, it may also be noted that the loss of the average daily volume of WIRF- compared to WIRF is close to PLN 1bn, and the difference in the level of the Minimum Volume Threshold for both index proposals (PLN 40m for WIRF vs. PLN 30m for WIRF) does not significantly affect this difference (without applying the Minimum Volume Threshold, the difference is very similar).

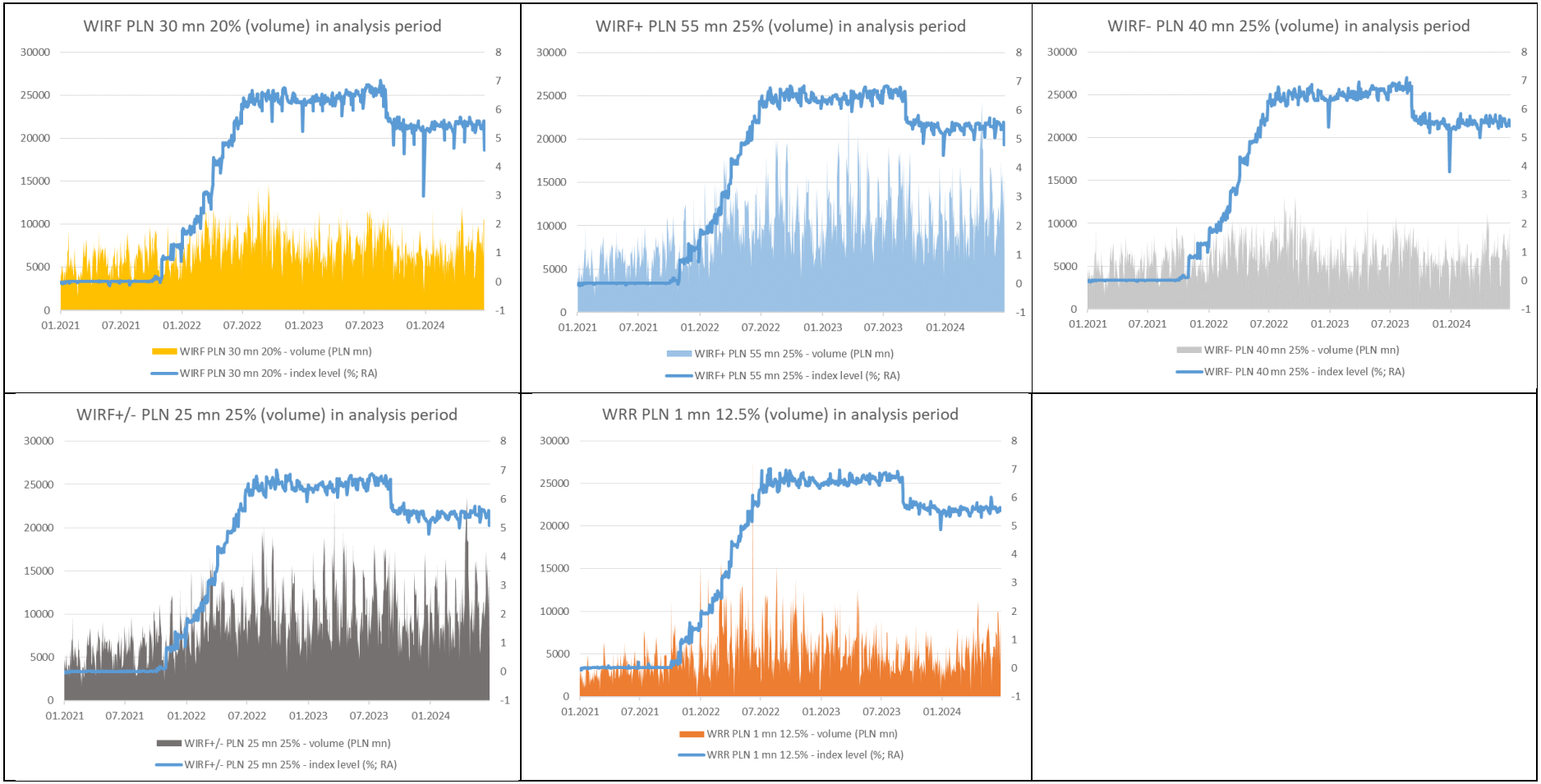


Figure 11 Eligible Transactions Pool volume and the index proposal level in the analysis period extended till H1'2024

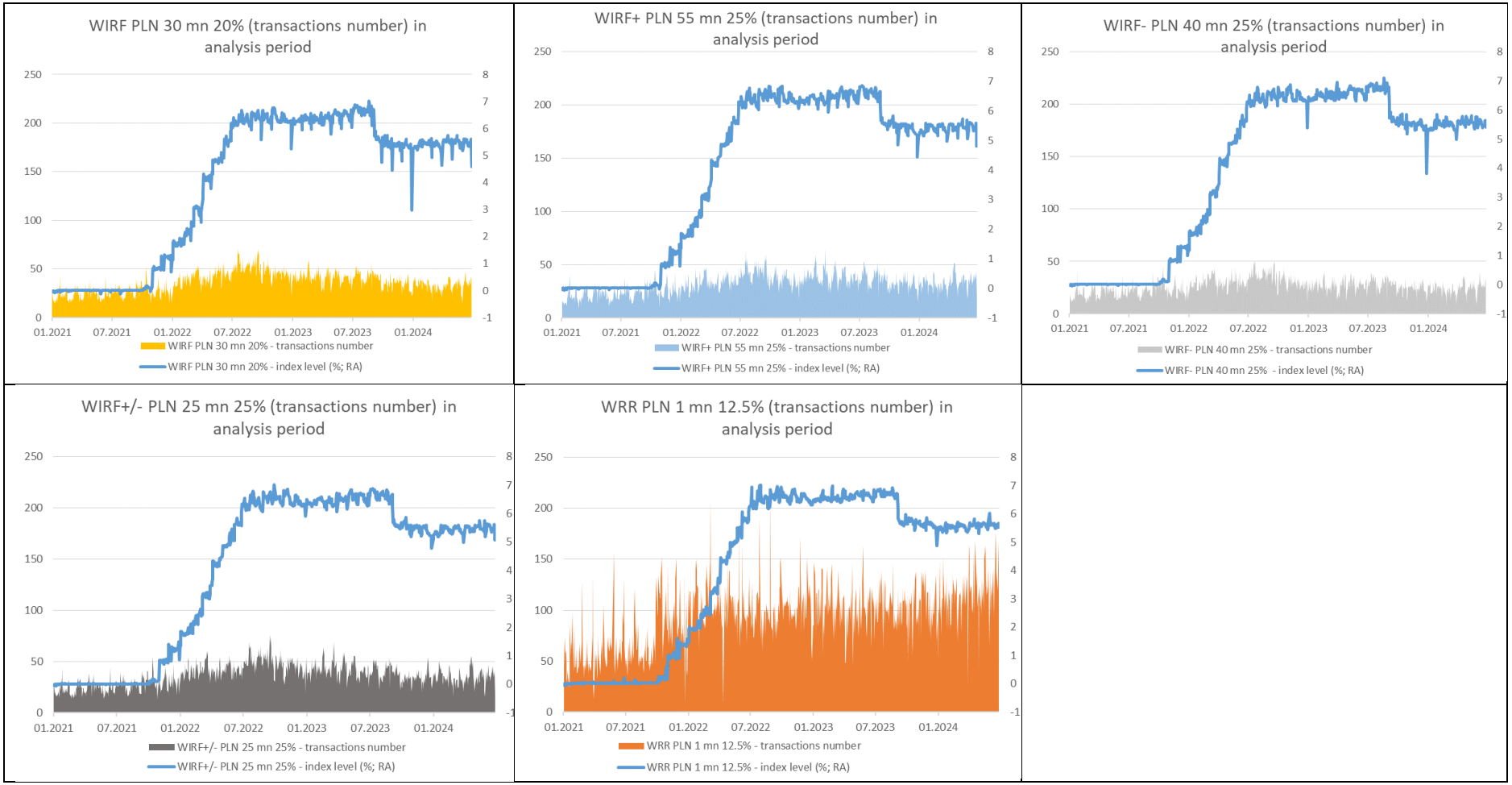


Figure 12 Number of transactions within Eligible Transactions Pool and the index proposal level in the analysis period extended till H1'2024

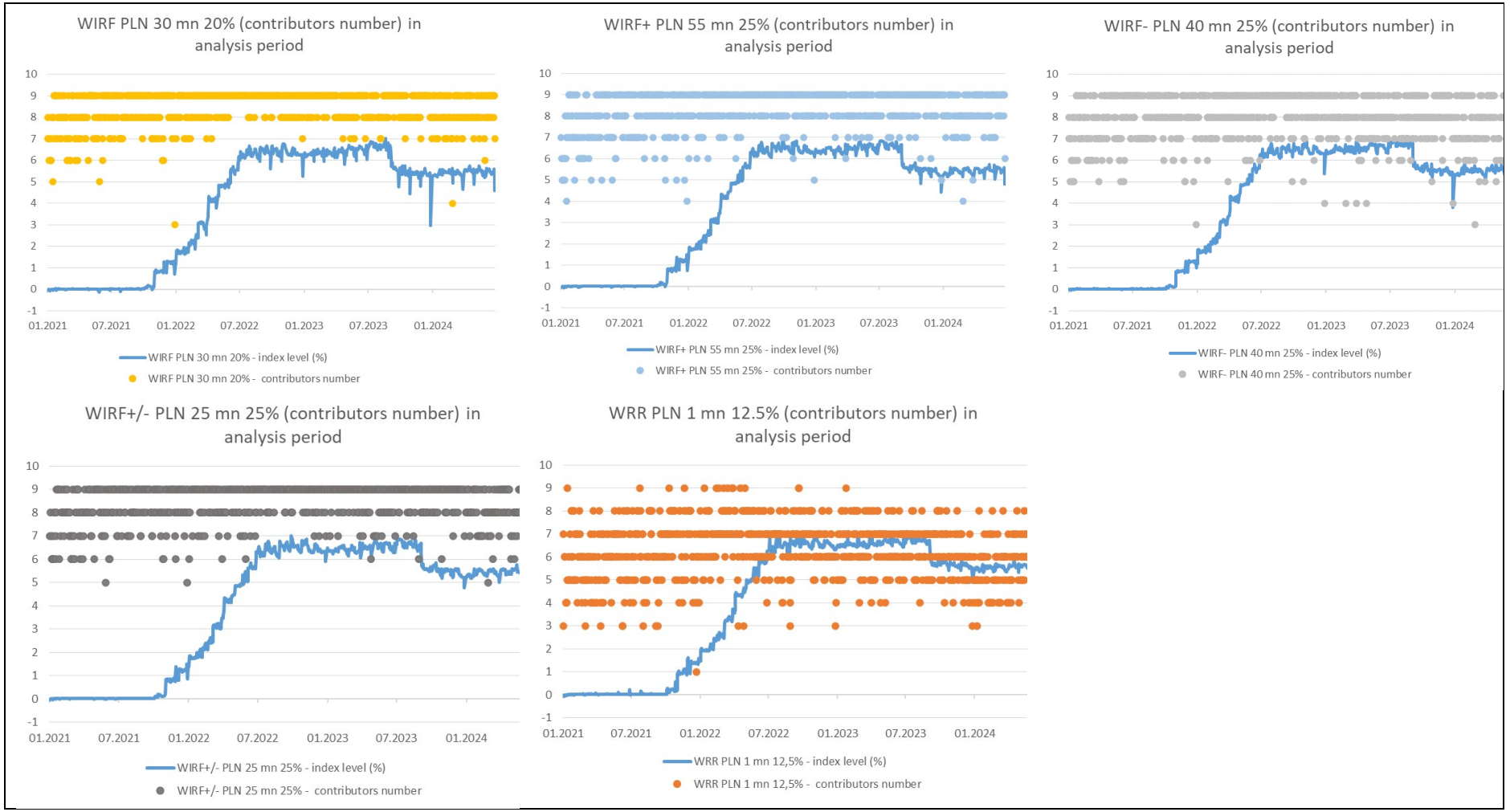


Figure 13 Number of contributors within Eligible Transactions Pool and the index proposal level in the analysis period extended till H1'2024

As in the case of the previous round of consultations, the comparative presentation of the number of contributors remains an important element indicating how the representativeness of the index is affected by the number of entities active in a given "set" of money market segments. It is recalled that the current index simulations are based on data provided by 9 contributors who are parties to the Code of Conduct of the Transaction Benchmarks Family at the time of this document. The Y-axis scale range in the graphs in Figure 13 (the maximum of the Y-axis is 10) therefore exceeds the maximum achievable number of data contributors[16].

The average levels and the lowest numbers of contributors for the proposed indices from the WIRF group seem to be related primarily to the Minimum Volume Threshold, which ranges from PLN 25 to 55 million in the case of the adopted calibrations. In addition, however, the subjective scope of a given index proposal is also critical, i.e. how wide a range of money market segments is included in the input data of a given index proposal. For WIRF, there are isolated days when the number of contributors drops to level 3, which is the minimum acceptable level for determining the index value, in accordance with the conditions for triggering the fallback procedure. It is worth noting that the newly presented proposal of the WIRF- index, i.e. WIRF without taking into account unsecured deposits of Other Financial Institutions, taking into account the Minimum Volume Threshold in accordance with the results of calibration of this proposal at the level of PLN 40 million, records on average higher levels of the number of contributors in relation to the WRR (whose Minimum Volume Threshold is at the level of PLN 1 million), which is based on the same groups of entities (but with a different scope of the subject group). This is due to the higher frequency of days with the highest level of contributor counts in WIRF- (and other WIRF proposals) compared to WRR, as well as the higher frequency of observations with the lowest level of contributor counts in WRR.

[16] The number of contributors may increase if another entity fulfilling the criteria set out in a given code of conduct assumes the role of contributor.

4.3. Analysis of the structure of the Eligible Transaction Pool in respect of the dataset concentration by contributors

A concentration analysis was carried out within the contributors of each index proposal to reflect the details of the assessment of the dispersion of the information asset depending on the index being analysed. Section 4.1 presents the statistics of the average range between the shares of contributors (*SHARE. RANGE. MEAN)* confirming that index proposals based on data on unsecured deposits show lower levels of concentration expressed by this measure in relation to, for example, the WRR, which is presented in the document for comparison purposes.

As in the previous round of consultations, the structure of the shares of individual contributors in the Eligible Transaction Pool from the perspective of the volume of transactions and their number is presented below, as well as information on the level of the maximum share of the contributor in the daily volume of the Eligible Transaction Pool for each of the index proposals. In addition, as part of the analysis of the volume structure and number of the Eligible Transaction Pool, additional information was presented on the shares of the entities providing data in the set of transactions concluded between contributors and the set of transactions between contributors and other entities, in accordance with the scope of entities resulting from the structure of a given index proposal. An extended analysis of the structure of concluded transactions allows for a new perspective on the share of interbank transactions in the Eligible Transaction Pool of individual index proposals, taking into account the internal structure (expressed by the shares of individual contributors in the number or volume) of the set of mutual transactions of the contributors and the set of transactions that are not mutual transactions of the contributors, in accordance with the subjective scope.

4.3.1. Structure of the Eligible Transaction Pool in respect of the dataset concentration by contributors

In the context of the analysis of the shares of individual contributors in the Eligible Transaction Pool of the index proposals, the results were updated with information for H1'2024 for the selected proposals, taking into account their adjusted calibration. Information on the possible impact of changes in the calibration of the index proposals is described in more detail below and presented in Figures 14 and 15, respectively. In order to ensure that appropriate inferences are drawn as to the internal distribution of the activity structure of the different contributors, it is proposed to draw conclusions on the scale of the concentration in conjunction with the presentation referred to in Section 4.3.2.

The structure of the WRR Eligible Transaction Pool, which is presented for comparison purposes in H1'2024, has not changed significantly in terms of both volume structure and numbers, while the role of the leader has changed from Bank 1 to Bank 4 in the case of transaction volume analysis. The outliers in terms of volume of Banks 2 and 7 in 2021-2023 are accompanied in H1'2024 by Bank 6. A significant increase in the share in the volume was recorded by Bank No. 8.

For the WIRF index, for which there was no change in the parameterization of the index proposal compared to the version from the first round of consultations, a symbolic decrease in the level of concentration was observed, measured by the average level of share of individual contributors (average 13.4 in 2021-2023 to 13.1 in H1 2024) The decrease resulted from the reduction in the level

of participation of the two leaders, i.e. Bank No. 5 and Bank No. 8. In the first half of 2024, it is observing two banks whose share was below 5%.

In the case of WIRF+, for which the Minimum Volume Threshold level has now been defined at PLN 55 million, the structure of the share of data contributors in the volume of the index proposal has not changed compared to the previous index parameterization (i.e. PLN 36 million presented in the previous consultation document), which means that the change in the level of the Minimum Volume Threshold has a neutral impact on this feature of the index proposal. In H1'2024, a slight flattening of the shareholding structure is observed, as a result of a decrease in the share of Bank 5 and Bank 8 with an increase in the share of Bank 9.

In the case of the structure of the shares of the contributors in the number of transactions of the Eligible Transaction Pool for WIRF and WIRF+, there were no significant changes in H1'2024, although there were decreases in the shares of Bank 2 in both index proposals and an increase in the share of Bank 9 in the case of WIRF+ and Bank 6 for WIRF. Bank 8 is recorded with the leader in the share of transactions in WIRF, and in the case of WIRF+ there are two equal leaders in the form of Bank 5 and Bank 8.

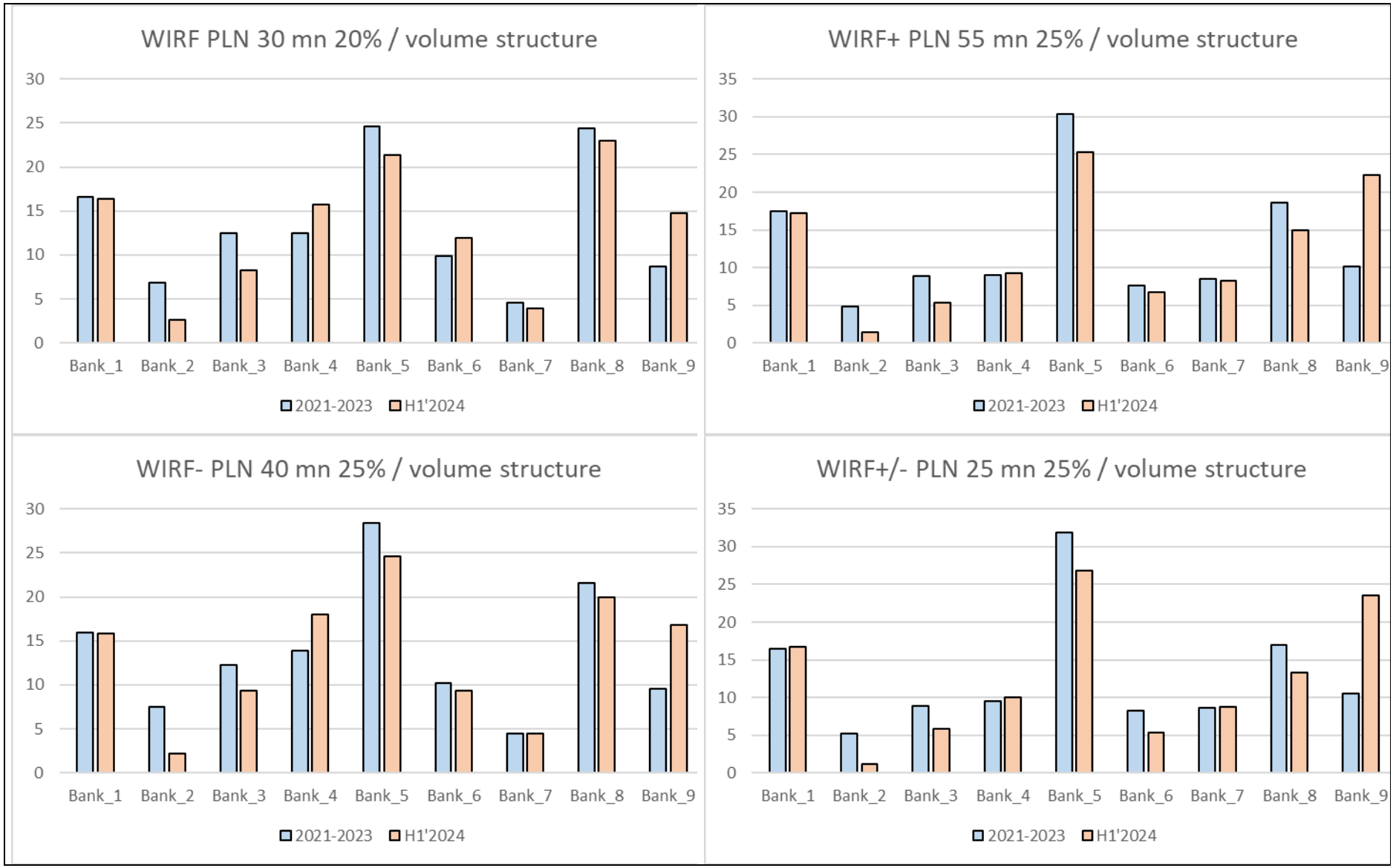
It is noted that by adding deposits of public institutions to the WIRF Eligible Transaction Pool, in the analysis period 2021-2023 the leader status for Bank 5 was strengthened by increasing the bank's share by 5pp compared to the share in WIRF and the share of Bank 8 lower than in relation to WIRF. Interestingly, in the H1'2024 period, the shareholding structure in volume was flattened again through a decrease in the share of Bank 5 and an increase in the share of Bank 9.

In the case of WIRF-, which differs from WIRF in the removal of unsecured Other Financial Institutions deposits from the Eligible Transaction Pool and the increase in the Minimum Volume Threshold, the status of the leader of Bank 5 was strengthened, while the share in the volume of Bank 8 decreased. As in the case of the comparison of WIRF+ vs WIRF, it should be pointed out that the scale of changes in the shares of these banks is limited. It is worth noting that the main trends in the volume structure in the case of adding deposits of public institutions to WIRF and subtracting Other Financial Institutions deposits from the WIRF Resource are identical – there is a similar in scale, but slightly greater in the case of WIRF+, an increase in the role of Bank 5, a decrease in the share of Bank 8, and the share of other Banks is similar, but slightly lower for Banks 3, 4 and 6 for WIRF+. What is more, in H1'2024, for the proposed indices, i.e. WIRF+ and WIRF- there is a flattening of the share structure.

In the case of the analysis of the share in the number of transactions, it is worth noting the similarity of the structure between the WIRF and WIRF- Eligible Transaction Pool. In the case of WIRF+, it is worth noting the significant increase in the share of Bank 5 in the case of WIRF+ vs WIRF, with Bank 8 remaining the leader in the share in numbers.

In the case of WIRF+/- it should be noted that it is characterized by the lowest value of the Minimum Volume Threshold (PLN 25 million) among the analysed index proposals. It is worth noting that despite the lower Minimum Volume Threshold of this index proposal compared to WIRF+, and the subtraction of Other Financial Institutions deposits from the Eligible Transaction Pool, the structure of shares in volume between these index proposals remained very similar. There was a slight (below 2 pp) strengthening of the leading position, i.e. Bank 5, which in turn H1'2024 was weakened by a decrease in the share of this bank, and an increase in the share of Bank 9, as was the case with previous types of the WIRF. In the case of numbers, the role of Bank 5 is weakened, the share of Bank 1 decreases and the role of Bank 8 is strengthened. In the case of H1'2024, the most important change in the share of contributors was, again as in the case of some other index proposals, the increase in the share of Bank 9.

A common feature of all the analysed index proposals is the maintenance of the leading role for Bank 5, whereas, importantly, the role of Bank 5 does not become dominant, as its share oscillates in the range of 25-32%. Thus, we remain permanently below 1/3 of Bank 5's share in the volume of the Eligible Transaction Pool, followed by a group of stable contributors: Bank 1 and Bank 8, and then banks whose share is quite volatile but often oscillates around 10-15% (for example, Bank 9 especially in H1'2024, Bank 3 and Bank 4 in the case of WIRF- and WIRF+/-). On average, in the analysed group, Bank 2 and Bank 7 have the lowest share in volume in the Eligible Transaction Pool, although their share is not as low as in the case of their share in the WRR.


WIRF PLN 30 mn 20% / volume structure
30
25
20
15
10
5
0
Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024
WIRF+ PLN 55 mn 25% / volume structure
35
30
25
20
15
10
5
0
Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024
WIRF- PLN 40 mn 25% / volume structure
30
25
20
15
10
5
0
Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024
WIRF+/- PLN 25 mn 25% / volume structure
35
30
25
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Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024

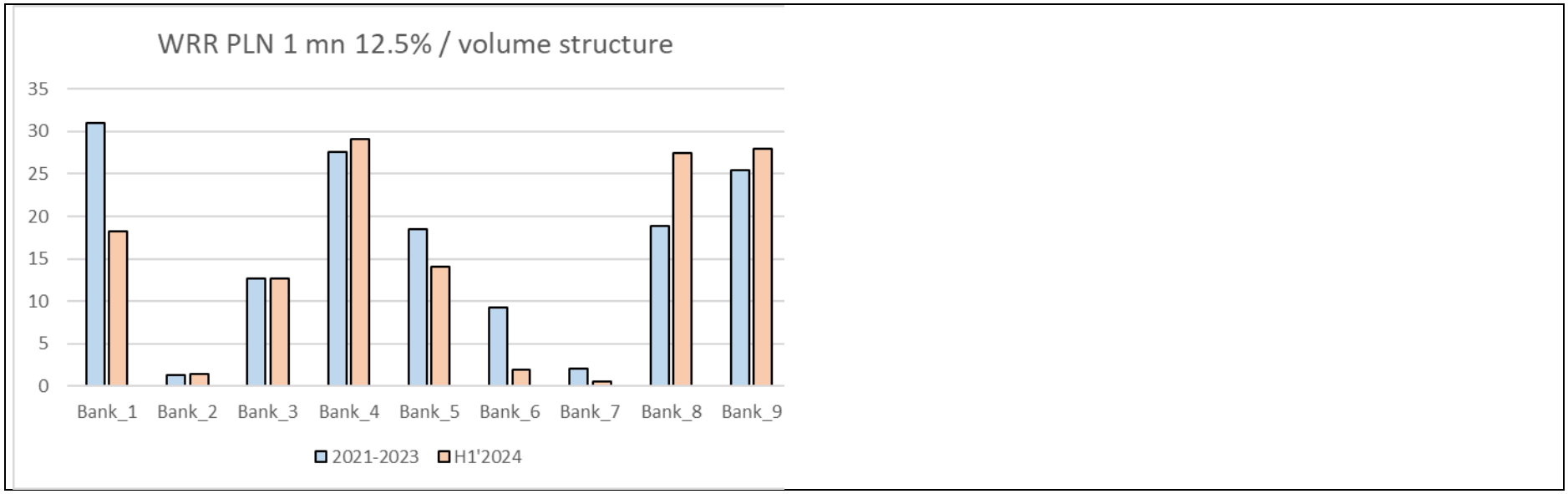
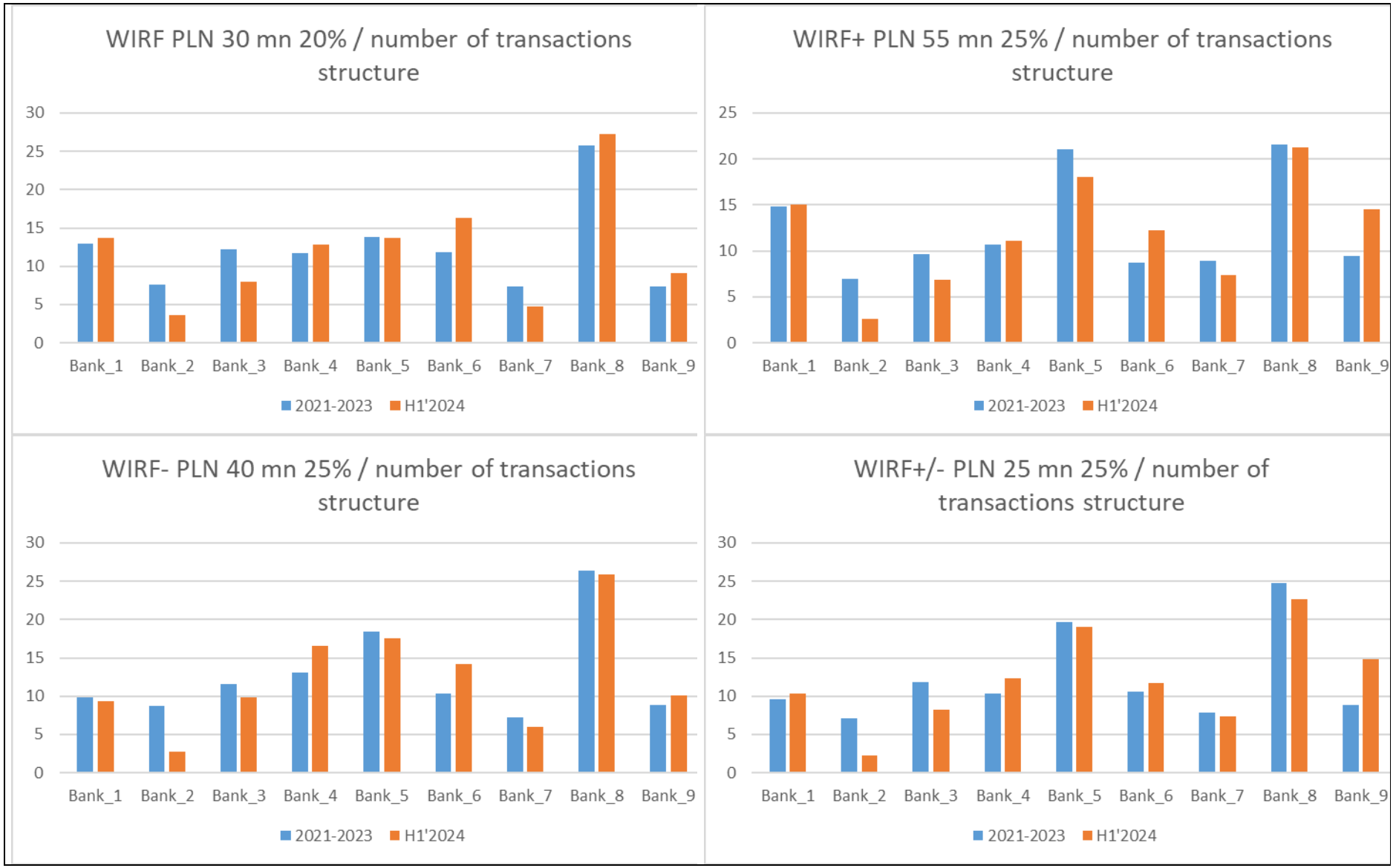


Figure 14 Shares of individual data contributors in the volume of the Eligible Transactions Pool of index proposals


WIRF PLN 30 mn 20% / number of transactions structure
30
25
20
15
10
5
0
Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024
WIRF+ PLN 55 mn 25% / number of transactions structure
25
20
15
10
5
0
Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024
WIRF- PLN 40 mn 25% / number of transactions structure
30
25
20
15
10
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0
Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024
WIRF+/- PLN 25 mn 25% / number of transactions structure
30
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Bank_1 Bank_2 Bank_3 Bank_4 Bank_5 Bank_6 Bank_7 Bank_8 Bank_9
2021-2023 H1'2024

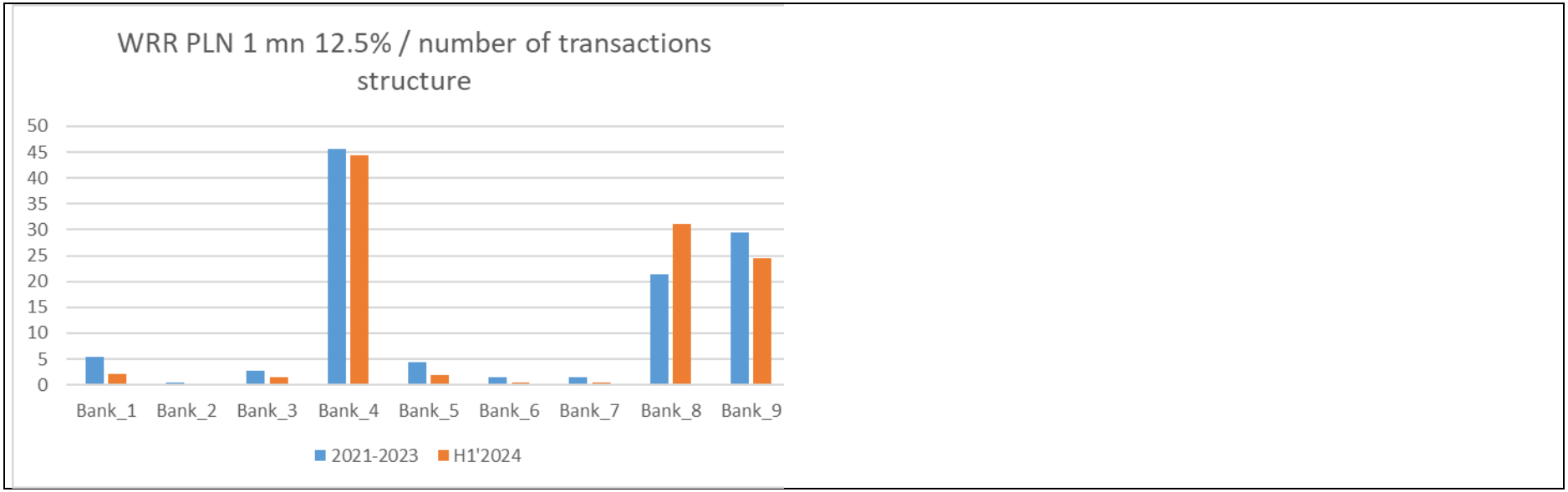


Figure 15 Shares of individual data contributors in the transactions number within the Eligible Transactions Pool of index proposals

4.3.2. Analysis of the shareholding structure of contributors in the Eligible Transaction Pool, highlighting the set of mutual transactions of contributors

The extended analysis of the structure of transactions allows for a new perspective on the share of transactions of individual segments included in the input data of index proposals by assessing the role of interbank transactions concluded between entities providing data in the Eligible Transaction Pool of individual index proposals, taking into account their internal structure (expressed by the shares of individual contributors in the number or volume). The analysis of the following results may be a valuable element in the assessment of the transaction structure of the index proposal from the point of view of concentration.

The criterion used in this subchapter for the division of the Eligible Transaction Pool allows to determine the share of the set of mutual transactions of the contributors (hereinafter: ”transactions with DC”) and the set of transactions that are not the mutual transactions of the contributors(hereinafter: ”transactions with NDC”), in accordance with the scope of the subjects, which means that the set of transactions from the PPD 3.1.1 group is separated from other sets of transactions included in the 4 index proposals analysed in this consultation document (i.e. WIRF, WIRF+, WIRF-, WIRF+/-). In addition, given the similarity of the scope of WIRF and WRR, achieved by removing deposits of Other Financial Institutions from the WIRF input data set, an analysis of the WRR index proposal is presented for illustrative purposes.

The following information supports the interpretability of the information contained in the previous subsection. Box 1 provides a detailed analysis of the volume structure and Box 2 provides a detailed analysis of the abundance structure. The statements are presented on the Eligible Transaction Pool, i.e. a set of transactions before the volume scaling-down procedure is applied, in order to present the picture of the market that is the purpose of measuring, especially since the volume scaling-down procedure (cf. information from Chapter 2, footnote 9) is aimed at mitigating extreme situations and not radically influencing the market picture presented by the index proposal. In the rightmost column of the tables presented below, there is information on the total volume (Box 1) or number (Box 2) of the analysed sets of transactions in the analysed periods, with the values of the above features for the set of "transactions with DC" and the set of "transactions with NDC" adding up to their values for the full Eligible Transaction Pool.

It is recalled that the sum of the shares of the contributors in the set of "transactions with DC" and in the full Eligible Transaction Pool exceeds 100%, due to the fact that each of the "transactions with DC" is assigned to two different contributors at the same time, which naturally translates into a higher potential average level of the contributor's share in the "transactions with DC" compared to the "transactions with NDC".

In the following lists, it is worth noting that the share of "transactions with DC" in the Eligible Transaction Pool is much smaller for the WIRF index proposal than for the WRR.

From the perspective of the set of transactions concluded with non-contributors (i.e. "transactions with the NDC"), depending on the type of index proposal from the WIRF group, the dominant role of selected entities is more or less visible, but despite the presence of a leader (or two as in the case of the WIRF index), even entities with a moderately low contribution to the index in individual years of the analysis period (2021-2023) were able to demonstrate levels of contribution in the share of this

set of a few percentage points higher (cf. Bank 7). Based on historical statistics, it can be concluded that each of the contributors had the potential to generate a positive impact on the Eligible Transaction Pool of individual index proposals from the WIRF group.

Interestingly, the removal of the set of deposits of Other Financial Institutions from the WIRF Eligible Transaction Pool (see: WIRF-) affects on average the structure of "transactions with NDC" to a rather limited extent, while WIRF- compared to the WRR developed on the basis of the same groups of entities (i.e. transactions whose counterparties are Credit Institutions and Financial Institutions) shows a significantly smaller scale of concentration within "transactions with NDC".

Box 1 Data contributors' shares in the Eligible Transactions Pool volume of index proposals including division into transactions with Data Contributors (DC) and transactions with Non Data Contributors (NDC) (charts show values for the period 2021-2023; ALL.VOL – total volume in PLN)

WIRF ELIG. TRANS. POOL

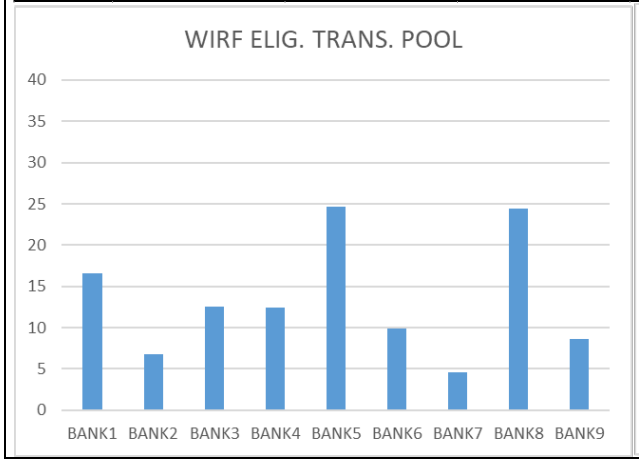
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	**ALL.VOL**
2021	8,9	7,5	12,9	15,4	31,1	7,9	7,5	23,7	9,1	1 446 534 430 831,40
2022	18,2	9,1	15,8	8,2	25,3	12,0	3,6	24,8	6,3	2 057 864 768 529,46
2023	20,8	3,7	8,6	14,9	18,7	9,2	3,4	24,5	10,9	1 833 285 146 172,91
2021-2023	16,6	6,8	12,5	12,5	24,6	9,9	4,6	24,4	8,7	5 337 684 345 533,77
H1'2024	16,4	2,6	8,2	15,7	21,3	11,9	3,9	23,0	14,8	867 023 112 598,28

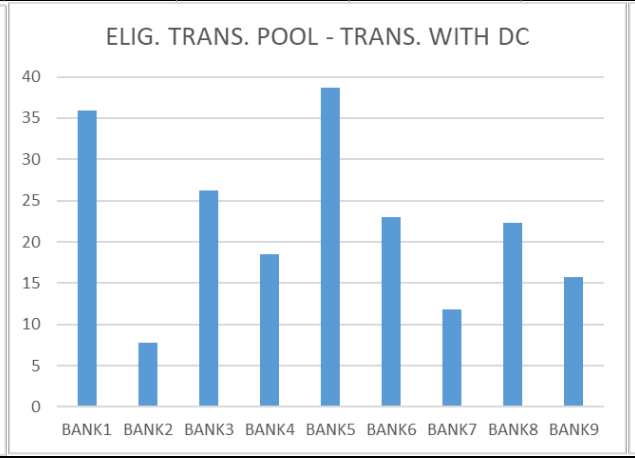
ELIG. TRANS. POOL - TRANS. WITH DC

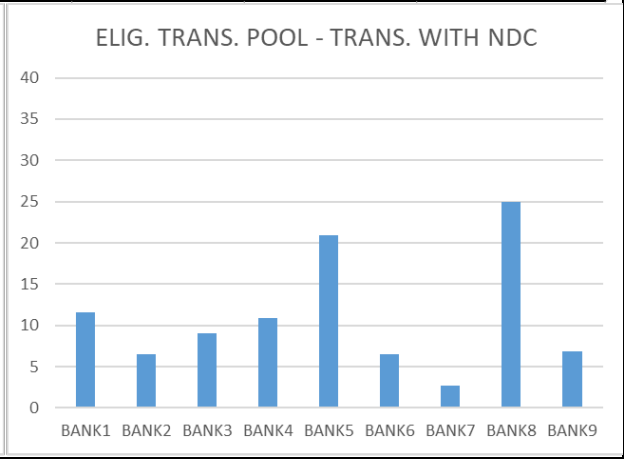
2021	17,0	7,6	29,9	26,5	41,7	24,1	12,9	21,5	18,8	346 581 000 000,00
2022	41,5	9,5	26,9	13,6	34,2	24,4	10,0	26,2	13,6	476 203 000 000,00
2023	50,1	5,1	20,2	16,9	42,8	19,2	13,7	16,4	15,7	271 778 000 000,00
2021-2023	35,9	7,8	26,2	18,5	38,7	23,0	11,9	22,3	15,8	1 094 562 000 000,00
H1'2024	47,4	5,0	26,8	23,1	40,3	16,2	9,4	16,0	15,9	154 408 000 000,00

ELIG. TRANS. POOL - TRANS. WITH NDC

2021	6,4	7,4	7,6	12,0	27,8	2,8	5,8	24,4	6,0	1 099 953 430 831,40
2022	11,2	8,9	12,4	6,6	22,6	8,3	1,6	24,3	4,2	1 581 661 768 529,46
2023	15,7	3,5	6,6	14,6	14,6	7,4	1,6	26,0	10,1	1 561 507 146 172,91
2021-2023	11,6	6,5	9,0	10,9	21,0	6,5	2,7	24,9	6,8	4 243 122 345 533,77
H1'2024	9,7	2,1	4,2	14,1	17,2	11,0	2,7	24,5	14,6	712 615 112 598,28







WIRF+ ELIG. TRANS. POOL

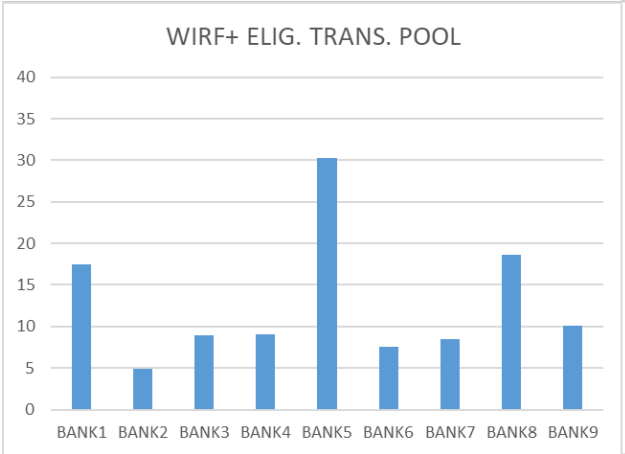
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.VOL
2021	9,5	6,5	11,3	13,7	35,2	7,4	8,7	20,8	8,5	1 601 917 924 265,25
2022	18,0	6,8	11,5	6,0	32,9	10,1	6,4	20,0	6,2	2 651 185 605 294,83
2023	21,5	2,2	5,1	9,2	25,1	5,4	10,2	16,1	14,8	2 828 736 331 625,75
2021-2023	17,5	4,9	8,9	9,0	30,3	7,6	8,4	18,6	10,1	7 081 839 861 185,83
H1'2024	17,2	1,5	5,3	9,3	25,3	6,8	8,3	14,9	22,3	1 430 978 515 734,47

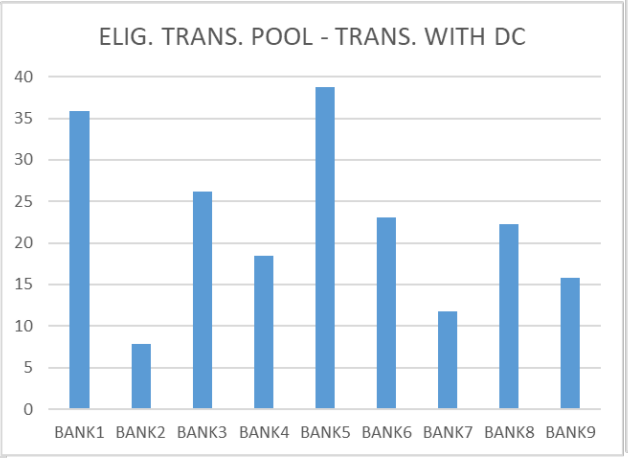
ELIG. TRANS. POOL - TRANS. WITH DC

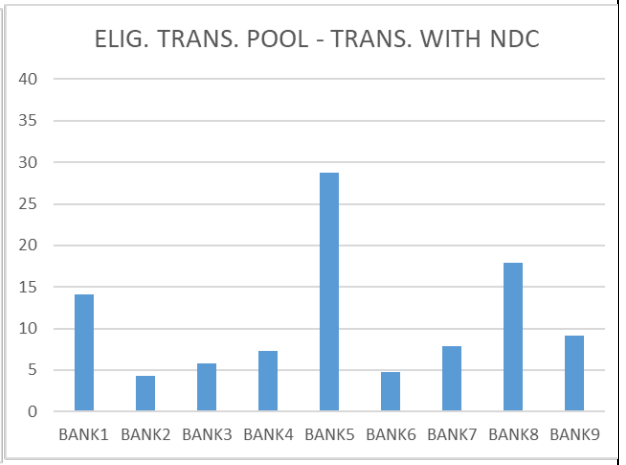
2021	17,0	7,6	29,9	26,4	41,8	24,1	12,8	21,5	18,8	345 711 000 000,00
2022	41,6	9,5	26,9	13,5	34,2	24,5	10,0	26,2	13,6	475 108 000 000,00
2023	50,1	5,1	20,2	16,9	42,8	19,2	13,7	16,3	15,7	271 468 000 000,00
2021-2023	35,9	7,8	26,2	18,4	38,8	23,1	11,8	22,2	15,8	1 092 287 000 000,00
H1'2024	47,3	5,0	26,8	23,1	40,3	16,3	9,4	16,0	15,9	154 148 000 000,00

ELIG. TRANS. POOL - TRANS. WITH NDC

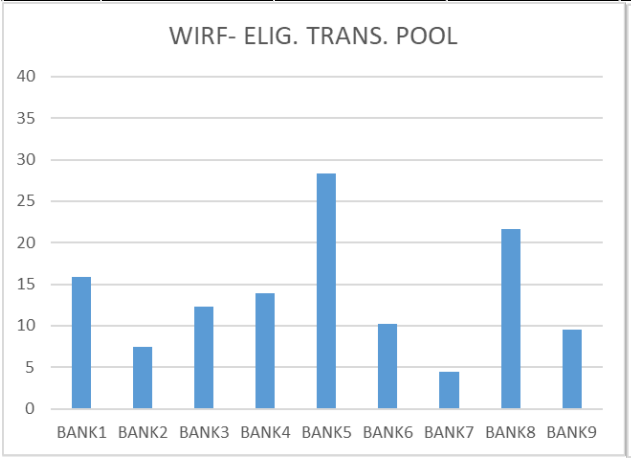
2021	7,4	6,2	6,2	10,1	33,4	2,9	7,6	20,6	5,6	1 256 206 924 265,25
2022	12,8	6,2	8,2	4,3	32,6	6,9	5,7	18,7	4,6	2 176 077 605 294,83
2023	18,5	1,9	3,5	8,4	23,3	3,9	9,8	16,1	14,7	2 557 268 331 625,75
2021-2023	14,1	4,3	5,8	7,3	28,8	4,8	7,8	18,0	9,1	5 989 552 861 185,83
H1'2024	13,6	1,0	2,7	7,6	23,4	5,6	8,2	14,8	23,0	1 276 830 515 734,47

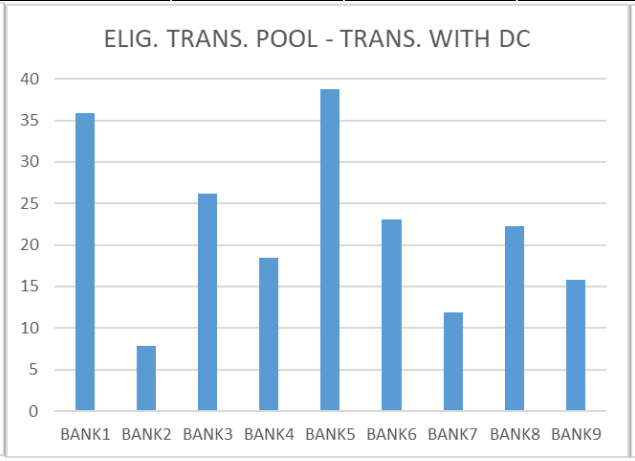


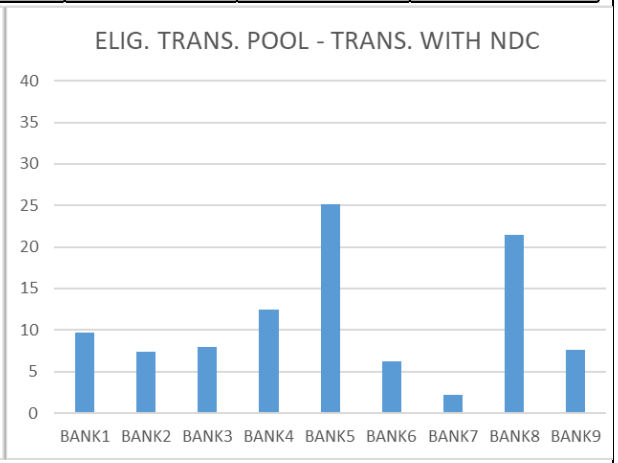




WIRF- ELIG. TRANS. POOL										
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.VOL
2021	9,6	8,0	13,8	16,7	33,7	8,5	6,3	19,5	9,8	1 329 069 924 658,84
2022	18,0	10,0	15,2	8,8	29,2	12,2	3,6	22,8	7,1	1 765 552 899 680,51
2023	19,0	4,0	7,5	17,3	22,7	9,5	3,7	22,1	12,3	1 509 606 338 037,05
2021-2023	15,9	7,4	12,3	13,9	28,4	10,2	4,4	21,6	9,6	4 604 229 162 376,40
H1'2024	15,9	2,2	9,4	18,0	24,6	9,4	4,4	20,0	16,8	746 044 050 172,84
ELIG. TRANS. POOL - TRANS. WITH DC										
2021	17,0	7,6	29,9	26,4	41,8	24,1	12,9	21,4	18,8	346 401 000 000,00
2022	41,6	9,5	26,9	13,5	34,2	24,5	10,0	26,2	13,6	475 208 000 000,00
2023	50,1	5,1	20,2	16,9	42,8	19,2	13,7	16,4	15,7	271 658 000 000,00
2021-2023	35,9	7,8	26,2	18,5	38,7	23,0	11,8	22,2	15,8	1 093 267 000 000,00
H1'2024	47,3	5,0	26,8	23,1	40,3	16,3	9,4	16,0	15,9	154 198 000 000,00
ELIG. TRANS. POOL - TRANS. WITH NDC										
2021	6,9	8,1	8,2	13,3	30,9	3,0	4,0	18,9	6,7	982 668 924 658,84
2022	9,4	10,1	10,8	7,1	27,3	7,7	1,3	21,6	4,7	1 290 344 899 680,51
2023	12,2	3,8	4,7	17,4	18,3	7,4	1,5	23,3	11,5	1 237 948 338 037,05
2021-2023	9,7	7,3	7,9	12,4	25,1	6,3	2,1	21,4	7,7	3 510 962 162 376,40
H1'2024	7,7	1,4	4,8	16,7	20,5	7,6	3,2	21,1	17,0	591 846 050 172,84







WIRF+/- ELIG. TRANS. POOL

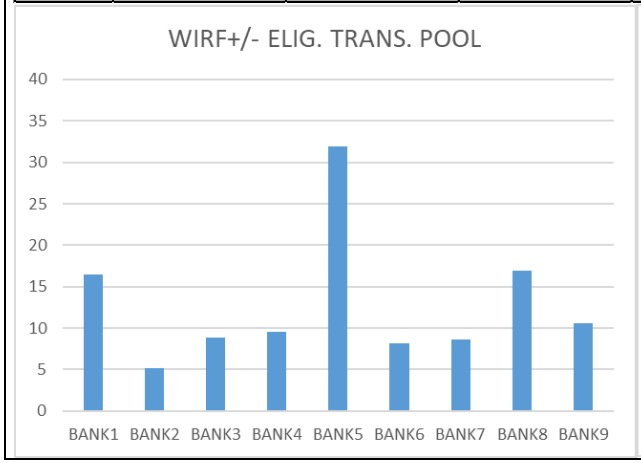
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.VOL
2021	9,9	7,0	12,2	14,4	36,7	7,9	8,1	17,3	8,9	1 552 473 117 339,37
2022	17,0	7,0	11,0	6,2	34,3	10,8	6,7	19,0	6,6	2 559 145 503 090,87
2023	19,8	2,3	4,8	9,9	26,8	5,9	10,7	14,7	15,3	2 660 286 617 144,44
2021-2023	16,5	5,2	8,8	9,5	31,9	8,2	8,6	16,9	10,6	6 771 905 237 574,68
H1'2024	16,7	1,2	5,8	10,0	26,8	5,3	8,7	13,3	23,5	1 360 044 502 220,49

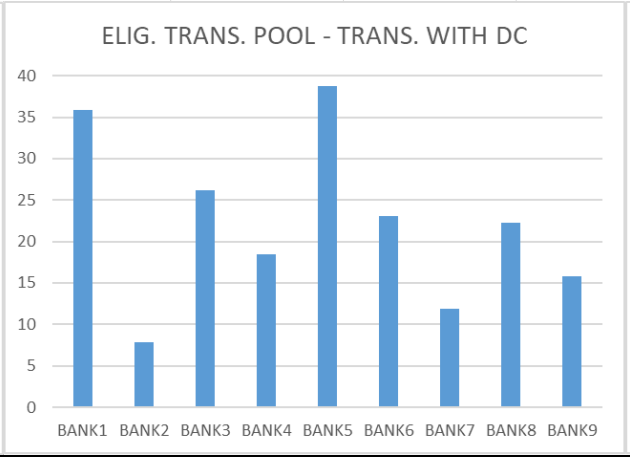
ELIG. TRANS. POOL - TRANS. WITH DC

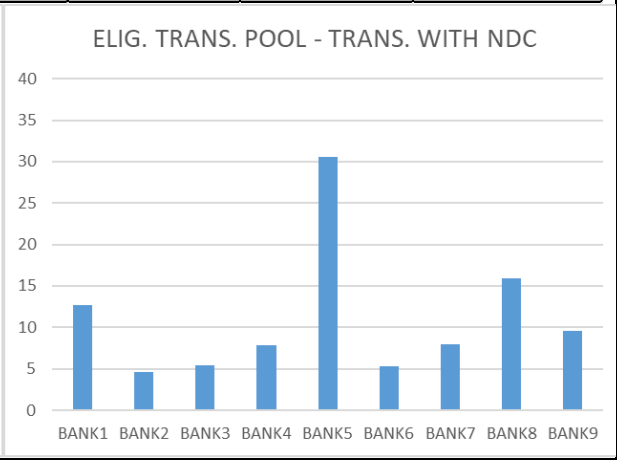
2021	17,0	7,6	29,9	26,5	41,7	24,1	12,9	21,5	18,8	346 581 000 000,00
2022	41,5	9,5	26,9	13,6	34,2	24,4	10,0	26,2	13,6	476 203 000 000,00
2023	50,1	5,1	20,2	16,9	42,8	19,2	13,7	16,4	15,7	271 778 000 000,00
2021-2023	35,9	7,8	26,2	18,5	38,7	23,0	11,9	22,3	15,8	1 094 562 000 000,00
H1'2024	47,4	5,0	26,8	23,1	40,3	16,2	9,4	16,0	15,9	154 408 000 000,00

ELIG. TRANS. POOL - TRANS. WITH NDC

2021	7,9	6,8	7,1	10,9	35,2	3,3	6,7	16,1	6,0	1 205 892 117 339,37
2022	11,4	6,4	7,3	4,5	34,3	7,7	6,0	17,4	5,0	2 082 942 503 090,87
2023	16,3	2,0	3,0	9,1	25,0	4,4	10,3	14,5	15,3	2 388 508 617 144,44
2021-2023	12,7	4,6	5,5	7,8	30,6	5,4	8,0	15,9	9,5	5 677 343 237 574,68
H1'2024	12,8	0,7	3,1	8,3	25,1	3,9	8,7	12,9	24,5	1 205 636 502 220,49







WRR ELIG. TRANS. POOL

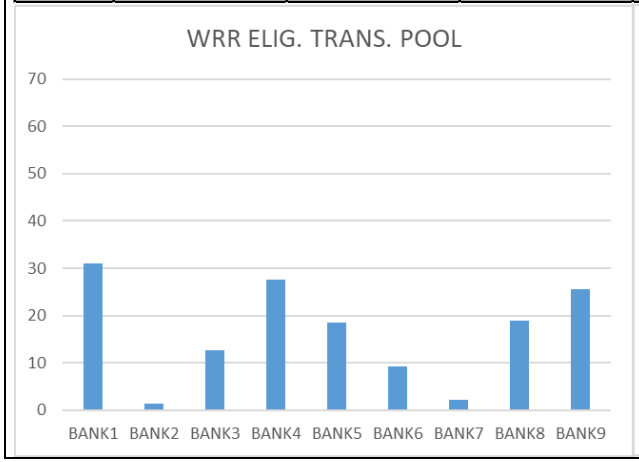
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.VOL
2021	22,8	0,9	10,5	37,3	10,4	8,4	0,9	12,6	31,5	927 927 741 617,00
2022	40,0	1,9	13,7	23,9	23,3	13,0	3,1	16,2	21,7	1 643 896 466 991,38
2023	25,4	0,9	12,8	25,3	18,2	5,1	1,5	27,0	25,9	1 260 666 898 536,72
2021-2023	31,0	1,3	12,6	27,6	18,5	9,3	2,1	18,9	25,5	3 832 491 107 145,10
H1'2024	18,2	1,4	12,6	29,1	14,1	1,9	0,5	27,5	28,0	600 515 517 710,36

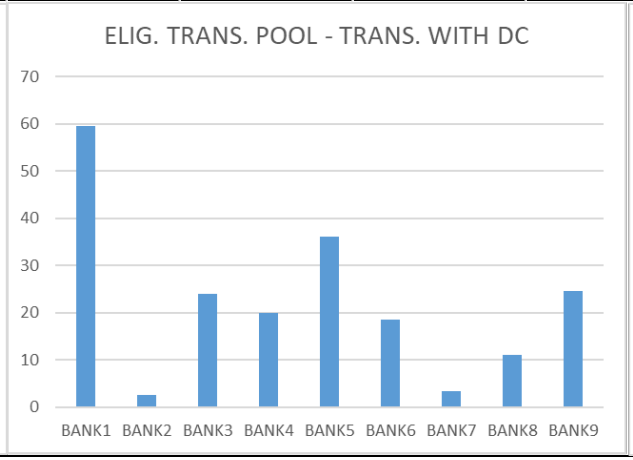
ELIG. TRANS. POOL - TRANS. WITH DC

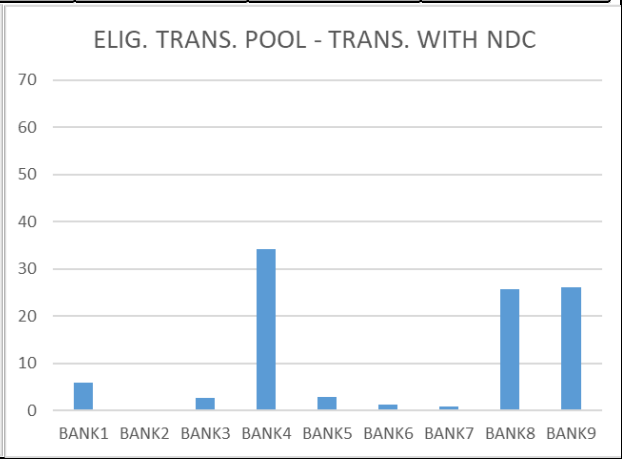
2021	55,0	1,6	25,8	22,0	22,8	23,0	1,9	8,3	39,6	326 409 009 119,30
2022	64,8	3,1	22,3	18,1	38,4	21,4	4,5	10,4	16,9	935 897 421 353,16
2023	53,1	2,1	26,0	22,2	40,6	10,4	2,6	13,9	29,2	530 763 485 981,60
2021-2023	59,6	2,6	24,0	20,0	36,2	18,4	3,5	11,1	24,7	1 793 069 916 454,06
H1'2024	44,8	4,0	30,7	30,8	39,8	4,9	0,8	12,8	31,5	200 059 669 828,21

ELIG. TRANS. POOL - TRANS. WITH NDC

2021	5,3	0,6	2,1	45,6	3,7	0,4	0,4	14,8	27,1	601 518 732 497,70
2022	7,2	0,2	2,4	31,6	3,5	1,9	1,3	23,8	28,1	707 999 045 638,22
2023	5,3	0,0	3,2	27,5	2,0	1,2	0,7	36,5	23,5	729 903 412 555,12
2021-2023	5,9	0,2	2,6	34,3	3,0	1,2	0,8	25,7	26,2	2 039 421 190 691,04
H1'2024	4,9	0,1	3,6	28,3	1,2	0,5	0,3	34,8	26,3	400 455 847 882,15

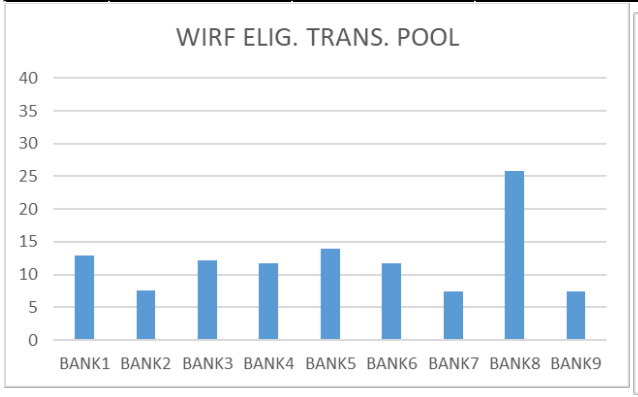


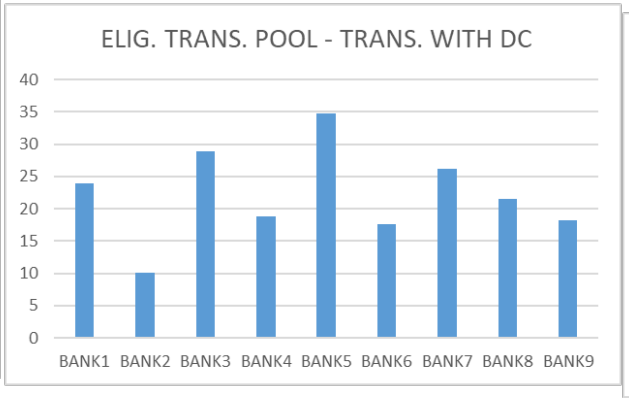


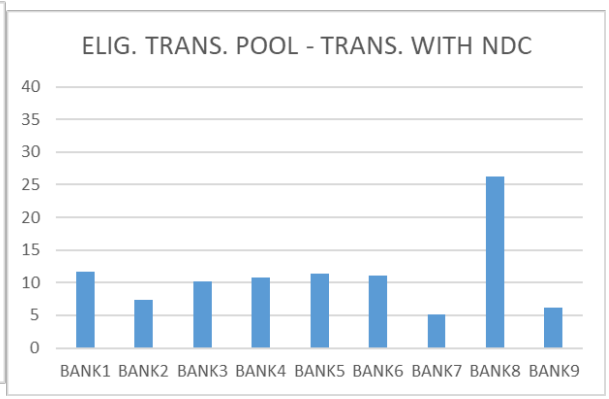


Box 2 Data contributors' shares in the number of transactions within the Eligible Transactions Pool of index proposals including division into transactions with Data Contributors (DC) and transactions with Non Data Contributors (NDC) (charts show values for the period 2021-2023; ALL.NUM – total number of transactions)

WIRF ELIG. TRANS. POOL										
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.NUM
2021	7,5	9,6	10,3	14,6	21,2	6,5	15,6	22,6	7,8	6 508
2022	12,4	8,8	14,7	8,8	13,2	14,1	5,6	26,7	6,5	11 361
2023	17,0	4,9	10,5	13,1	9,8	12,6	3,9	26,8	8,1	10 005
2021-2023	12,9	7,6	12,1	11,7	13,9	11,8	7,3	25,8	7,4	27 874
H1'2024	13,8	3,6	8,0	12,8	13,7	16,3	4,7	27,3	9,1	4 094
ELIG. TRANS. POOL - TRANS. WITH DC										
2021	13,5	10,0	29,4	24,8	35,3	18,0	29,2	20,6	19,3	1 025
2022	26,9	11,6	29,7	15,4	32,7	18,2	23,5	25,0	17,1	1 234
2023	34,6	7,7	26,6	16,2	37,4	16,0	26,9	16,5	18,2	674
2021-2023	24,0	10,1	28,8	18,9	34,7	17,6	26,3	21,5	18,1	2 933
H1'2024	35,9	7,0	33,0	21,7	34,3	15,5	18,0	15,3	19,3	373
ELIG. TRANS. POOL - TRANS. WITH NDC										
2021	6,4	9,5	6,7	12,7	18,6	4,3	13,1	22,9	5,7	5 483
2022	10,7	8,5	12,8	8,0	10,8	13,6	3,5	26,9	5,2	10 127
2023	15,8	4,7	9,3	12,8	7,9	12,3	2,2	27,6	7,4	9 331
2021-2023	11,6	7,3	10,2	10,9	11,4	11,1	5,1	26,3	6,1	24 941
H1'2024	11,5	3,3	5,5	11,9	11,6	16,3	3,4	28,5	8,0	3 721







WIRF+ ELIG. TRANS. POOL

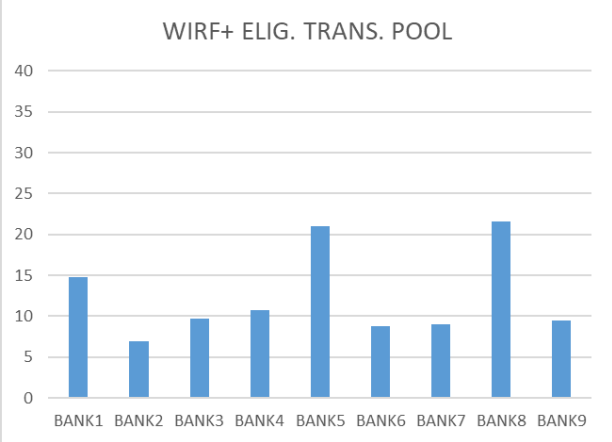
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.NUM
2021	7,8	8,9	9,0	14,5	27,2	6,2	14,8	20,4	8,4	5 841
2022	14,0	9,0	12,7	8,3	21,3	10,7	6,6	23,3	7,1	9 138
2023	20,1	3,8	7,0	10,6	16,8	8,3	7,6	20,7	12,4	9 138
2021-2023	14,8	7,0	9,7	10,7	21,0	8,7	9,0	21,6	9,4	24 117
H1'2024	15,0	2,6	6,8	11,1	18,1	12,2	7,4	21,2	14,5	4 116

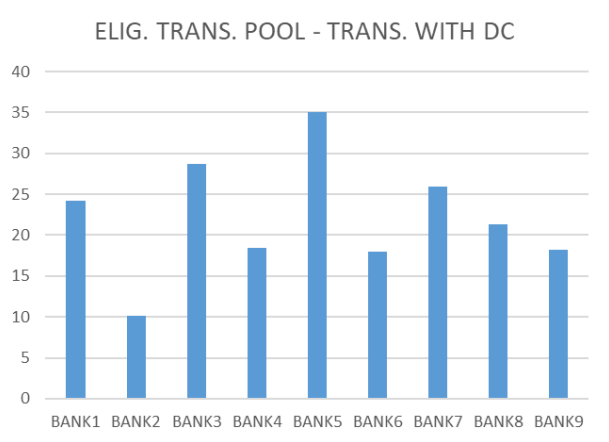
ELIG. TRANS. POOL - TRANS. WITH DC

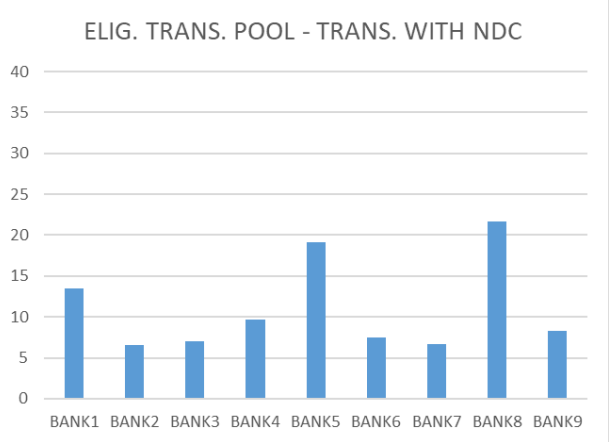
2021	13,4	9,7	29,6	24,4	35,7	18,4	28,7	20,7	19,5	1 005
2022	27,3	11,8	29,3	14,8	33,1	18,5	23,3	24,7	17,3	1 199
2023	34,8	7,8	26,6	16,1	37,7	16,2	26,4	16,2	18,2	666
2021-2023	24,2	10,1	28,7	18,4	35,1	17,9	25,9	21,3	18,3	2 870
H1'2024	34,8	7,1	33,4	21,6	35,1	15,9	17,5	15,6	18,9	365

ELIG. TRANS. POOL - TRANS. WITH NDC

2021	6,6	8,7	4,7	12,4	25,5	3,7	11,9	20,4	6,1	4 836
2022	12,0	8,6	10,3	7,4	19,5	9,6	4,0	23,1	5,6	7 939
2023	18,9	3,4	5,5	10,2	15,1	7,7	6,1	21,0	12,0	8 472
2021-2023	13,5	6,6	7,1	9,7	19,1	7,5	6,7	21,6	8,3	21 247
H1'2024	13,1	2,1	4,2	10,1	16,4	11,9	6,4	21,8	14,1	3 751







WIRF- ELIG. TRANS. POOL

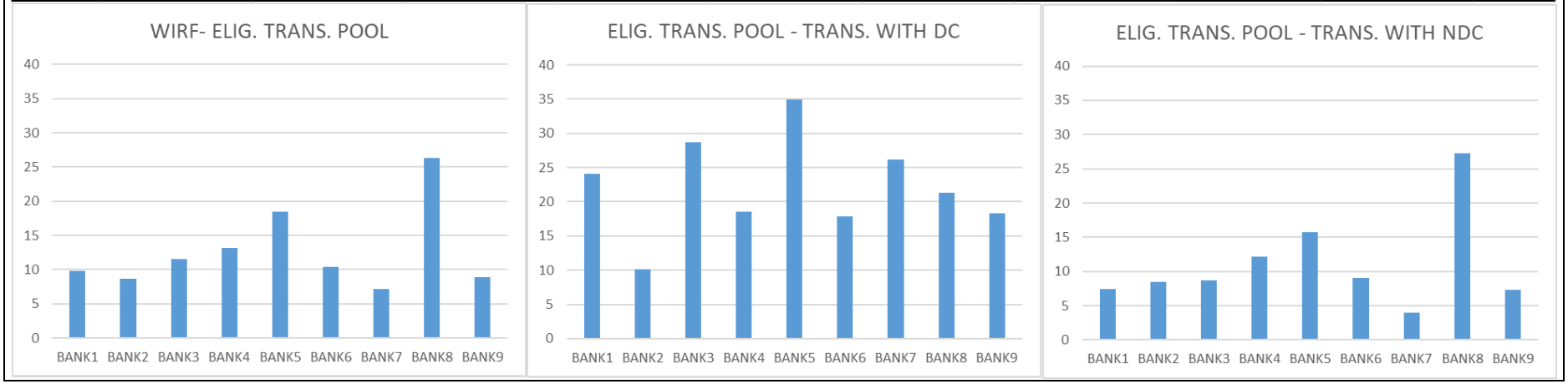
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.NUM
2021	8,4	10,6	10,5	16,7	24,4	7,1	12,4	19,4	9,2	5 466
2022	10,0	10,5	13,7	9,2	17,9	11,8	5,6	28,8	7,6	8 022
2023	10,7	5,0	9,7	14,9	14,3	11,3	4,8	29,2	10,1	6 664
2021-2023	9,8	8,7	11,5	13,1	18,4	10,3	7,2	26,4	8,9	20 152
H1'2024	9,4	2,7	9,9	16,6	17,6	14,1	6,0	25,9	10,1	2 969

ELIG. TRANS. POOL - TRANS. WITH DC

2021	13,5	9,7	29,4	24,4	35,5	18,2	29,2	20,5	19,4	1 019
2022	27,2	11,9	29,2	14,9	33,1	18,5	23,3	24,6	17,2	1 201
2023	34,6	7,8	26,7	16,0	37,5	16,1	26,6	16,4	18,4	670
2021-2023	24,1	10,2	28,7	18,5	34,9	17,8	26,2	21,3	18,3	2 890
H1'2024	34,7	7,1	33,6	21,9	35,0	15,8	17,5	15,6	18,9	366

ELIG. TRANS. POOL - TRANS. WITH NDC

2021	7,2	10,7	6,2	14,9	21,8	4,6	8,5	19,2	6,8	4 447
2022	6,9	10,3	11,0	8,2	15,2	10,6	2,5	29,5	5,9	6 821
2023	8,0	4,7	7,8	14,8	11,7	10,7	2,4	30,6	9,2	5 994
2021-2023	7,4	8,5	8,6	12,2	15,7	9,1	4,0	27,2	7,3	17 262
H1'2024	5,8	2,1	6,5	15,9	15,1	13,9	4,4	27,4	8,8	2 603



WIRF+/- ELIG. TRANS. POOL

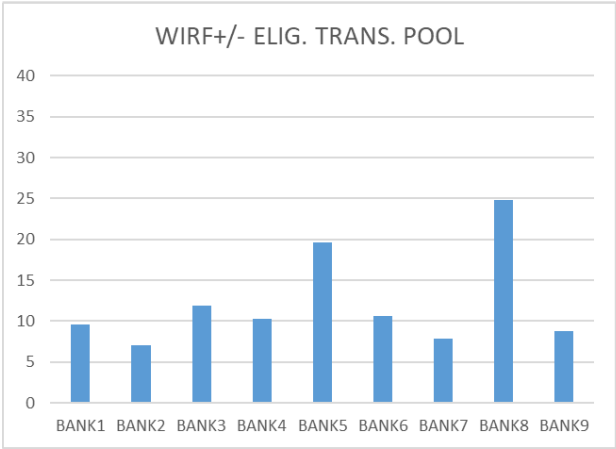
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.NUM
2021	7,7	9,6	11,2	14,5	26,1	6,8	12,1	19,3	8,0	6 666
2022	9,4	8,3	13,6	7,5	18,7	12,8	6,2	27,4	7,1	11 295
2023	11,1	4,0	10,3	10,7	16,2	10,7	7,0	25,5	11,2	9 951
2021-2023	9,6	7,1	11,8	10,3	19,6	10,6	7,9	24,8	8,8	27 912
H1'2024	10,4	2,2	8,2	12,3	19,1	11,7	7,3	22,7	14,8	4 330

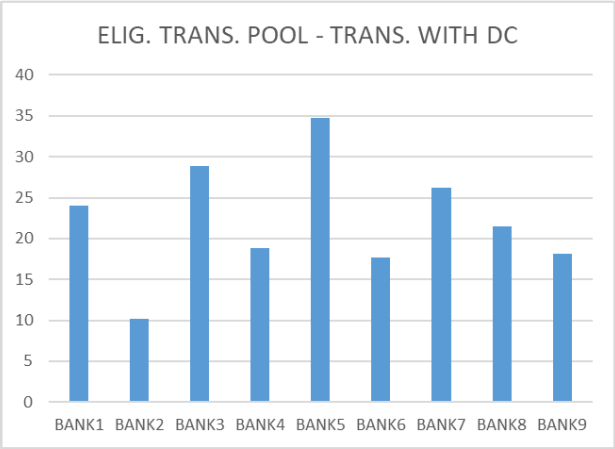
ELIG. TRANS. POOL - TRANS. WITH DC

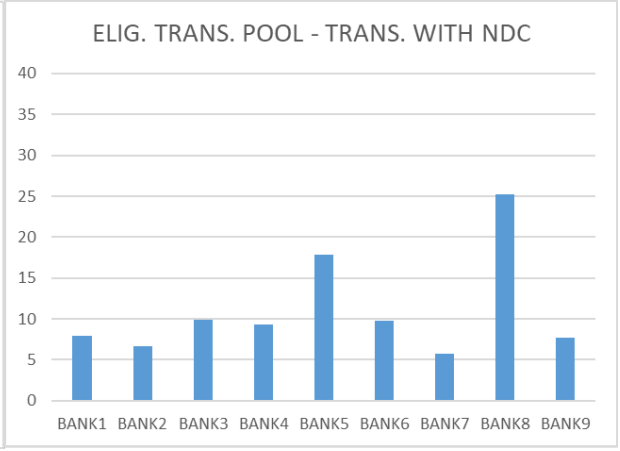
2021	13,5	10,0	29,4	24,8	35,3	18,0	29,2	20,6	19,3	1 025
2022	26,9	11,6	29,7	15,4	32,7	18,2	23,5	25,0	17,1	1 234
2023	34,6	7,7	26,6	16,2	37,4	16,0	26,9	16,5	18,2	674
2021-2023	24,0	10,1	28,8	18,9	34,7	17,6	26,3	21,5	18,1	2 933
H1'2024	35,9	7,0	33,0	21,7	34,3	15,5	18,0	15,3	19,3	373

ELIG. TRANS. POOL - TRANS. WITH NDC

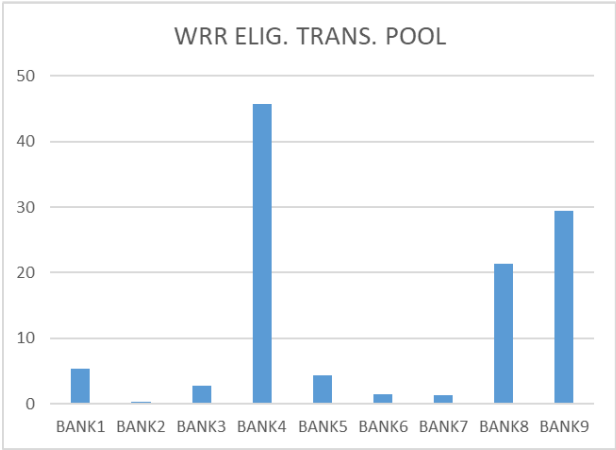
2021	6,6	9,5	7,9	12,6	24,4	4,8	9,0	19,1	6,0	5 641
2022	7,3	7,9	11,6	6,5	17,0	12,1	4,1	27,7	5,9	10 061
2023	9,4	3,7	9,1	10,3	14,7	10,3	5,6	26,2	10,7	9 277
2021-2023	7,9	6,7	9,9	9,3	17,8	9,8	5,7	25,2	7,7	24 979
H1'2024	8,0	1,7	5,9	11,4	17,6	11,3	6,3	23,4	14,3	3 957

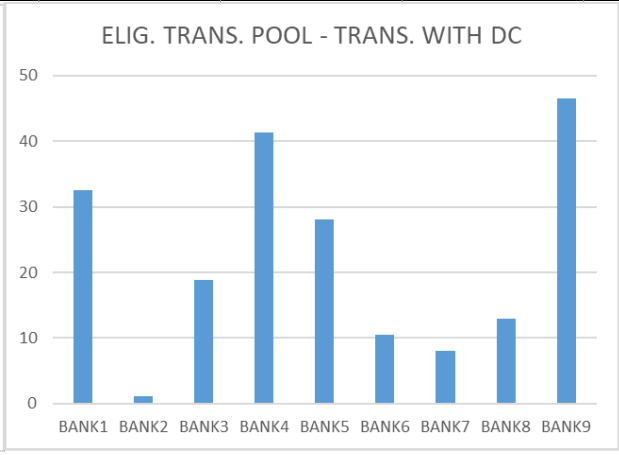


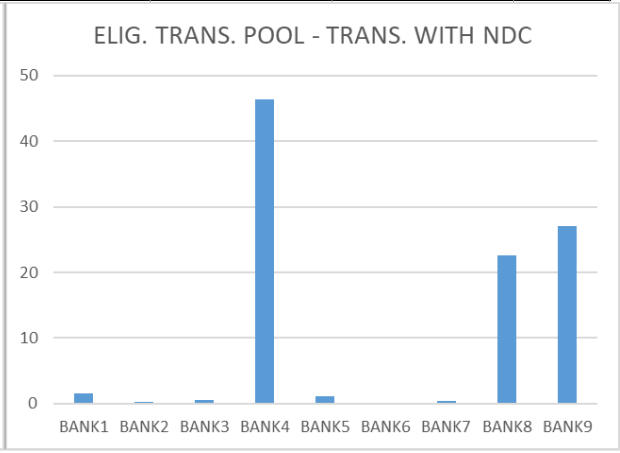




WRR ELIG. TRANS. POOL										
PERIOD	BANK1.ALL.SHARE	BANK2.ALL.SHARE	BANK3.ALL.SHARE	BANK4.ALL.SHARE	BANK5.ALL.SHARE	BANK6.ALL.SHARE	BANK7.ALL.SHARE	BANK8.ALL.SHARE	BANK9.ALL.SHARE	ALL.NUM
2021	4,9	0,7	2,9	57,5	4,6	1,3	1,3	11,0	28,0	16 901
2022	7,5	0,4	3,1	42,3	5,5	2,0	1,9	20,4	31,2	25 909
2023	3,4	0,1	2,5	41,4	3,2	1,0	0,9	29,3	28,6	25 574
2021-2023	5,3	0,4	2,8	45,7	4,4	1,4	1,4	21,4	29,4	68 384
H1'2024	2,2	0,2	1,6	44,4	1,9	0,5	0,5	31,1	24,6	14 445
ELIG. TRANS. POOL - TRANS. WITH DC										
2021	26,8	0,8	18,6	44,8	21,6	9,5	8,0	9,3	60,5	2 043
2022	40,7	1,6	18,3	37,5	32,3	12,6	10,0	11,4	35,5	3 717
2023	25,8	0,7	19,6	44,0	27,1	8,3	5,4	17,8	51,3	2 663
2021-2023	32,6	1,2	18,8	41,4	28,1	10,5	8,1	12,9	46,6	8 423
H1'2024	23,6	2,0	17,4	49,8	23,4	3,7	4,1	17,9	58,2	1 001
ELIG. TRANS. POOL - TRANS. WITH NDC										
2021	1,9	0,7	0,7	59,3	2,2	0,1	0,4	11,2	23,5	14 858
2022	2,0	0,2	0,6	43,1	1,0	0,2	0,5	22,0	30,5	22 192
2023	0,8	0,0	0,5	41,1	0,5	0,2	0,4	30,6	26,0	22 911
2021-2023	1,5	0,3	0,6	46,3	1,1	0,2	0,4	22,6	27,0	59 961
H1'2024	0,6	0,0	0,4	44,0	0,3	0,2	0,2	32,1	22,1	13 444







4.3.3. Analysis of the maximum shares of data contributors in the daily volume of the Eligible Transaction Pool of individual index proposals

Reminder of the methodological description

For each index date we show shares of volume of each of the contributors for any given index in the total index volume. Then, on the basis of these values the maximum volume was determined as well as the contributor to which this volume belongs[1]. The presentation showed in the document makes possible to gauge the impact of the Minimum Volume Threshold for the Minimum Volume Threshold set at the level of 0 and the Minimum Volume Threshold recommended for the given index.

The vertical axis of the columillion charts measures the quantity of the index dates, which were observed for a given value of the maximum share of a single contributor for which quantitative range is exemplified by the horizontal axis. The colours in every single columillion marks the share of each individual contributor.

For sake of transparency, percentage of days in which a single contributor had a maximum share is shown on the box chart. In order to avoid ambiguity it should be stressed that this is not a statistics of an average share but the statistics of frequency of the maximum share attributable to any given contributor.

There are also two statistics as additional information in the top right corner of the chart: one for the average and another for the mean of the daily maximum volume of share of any single contributor in the total volume of the index.

As in the previous consultation document, an extended concentration analysis was carried out by examining the frequency distribution and the structure of daily observations of the maximum contributor share in the total volume of the Eligible Transaction Pool of each of the index proposals (see Figure 16), i.e. for WIRF, WIRF+, WIRF- and WIRF+/- against the WRR. The analysis has been extended to include the presentation of information on the development of the distribution of observations of the maximum contributor share in the total volume of each index proposal in H1'2024, and in Annex 8 additional information is presented on the distribution of the analysed feature after the application of an adapted volume scaling-down procedure (i.e. extended to the case of segment 3.1.9, i.e. deposits of the so-called public institutions).

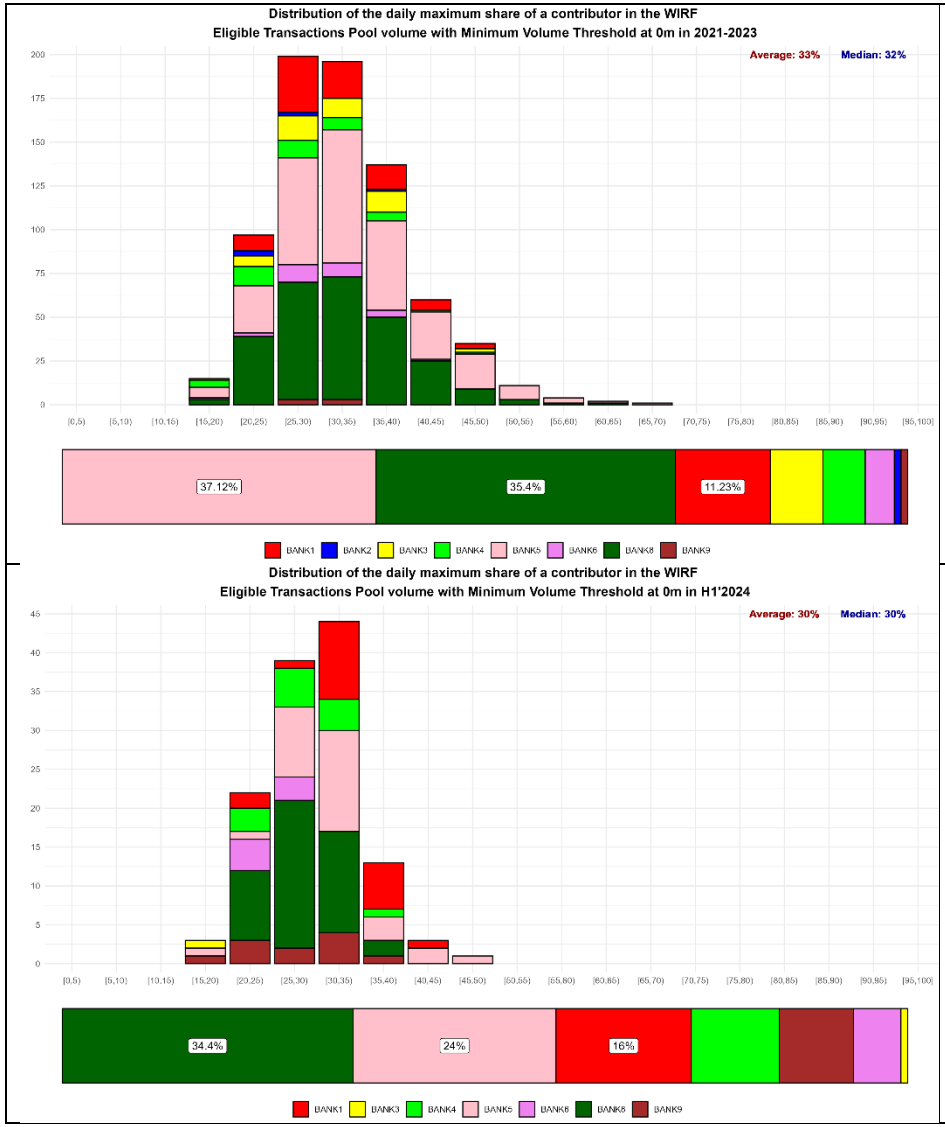
As with the previous round of consultation, it is pointed out that the impact of changing the Minimum Volume Threshold on the distribution of the daily maximum share of data-submitting entities in the volume of the Eligible Transactional Pool for index proposals remains quite limited. However, it is worth noting that for some index proposals from the WIRF group, there are observed increases in the averages or medians of this maximum share, as well as the occurrence of days with higher levels than those recorded without the application of the Minimum Volume Threshold. The impact on the distribution of the maximum share in volume is also visible in the case of reducing the WIRF Eligible Transactional Pool by the deposits of Other Financial Institutions (see: WIRF-), adding to it deposits of so-called public institutions (see: WIRF+), or introducing both of these modifications simultaneously

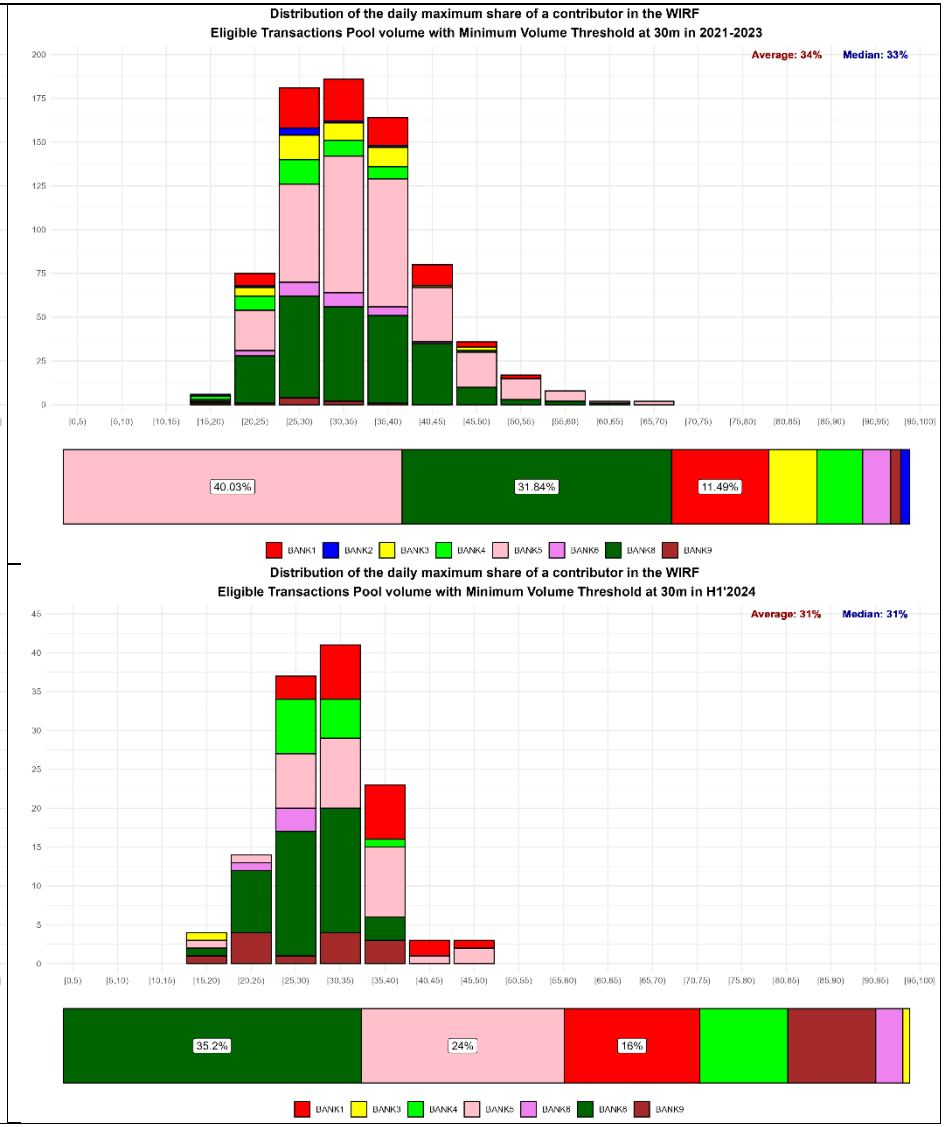
(see: WIRF+/-) – each of them shifts the analyzed distribution slightly to the right towards higher values.

At the same time, taking into account the results of the research and the need to ensure the resilience of the future reference index, the Administrator has introduced a volume scaling-down procedure for deposits from so-called public institutions. This has allowed for the limitation of the observed increases in the maximum share levels of data-submitting entities in the Transactional Resources of index proposals that include segment 3.1.9, especially after considering the impact of the Minimum Volume Threshold (see the charts in attachment 8, presenting similar distributions after applying the adjusted volume scaling-down procedure).

It is also noted that in the case of the proposed indices from the WIRF group, the maximum daily shares of contributors in the Eligible Transaction Pool, in accordance with the values of their central tendency measures (mean, median), are usually below 50%, which means that even if there are contributors who relatively often record the highest share in the index volume, this share rarely indicates the dominant role of these contributors. The above should be noted in comparison to the WRR, which has a much more dispersed distribution of the value of the maximum daily share of the contributor in relation to the index proposals from the WIRF group, noting the relatively thicker right sides of the distribution above the value of 50%, which can be considered as a relative dominance threshold of a given entity (e.g. such a threshold is used in the case of verification of the contributor's share in the supersegment as part of the volume scaling-down procedure).

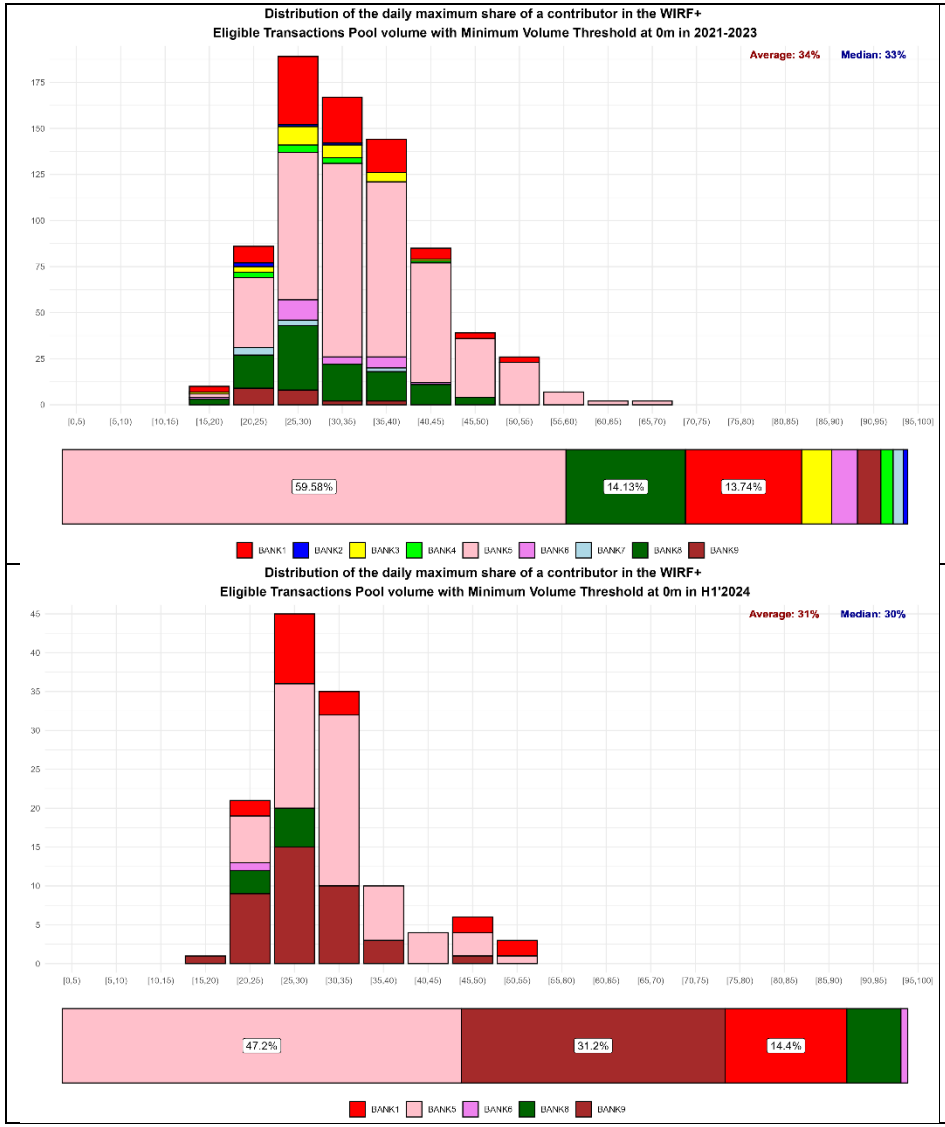
Figure 16 Distribution of the daily maximum share of a contributor in the Eligible Transactions Pool volume for the analyzed index proposals (including the impact of the Minimum Volume Threshold) in the analysis period and H1'2024

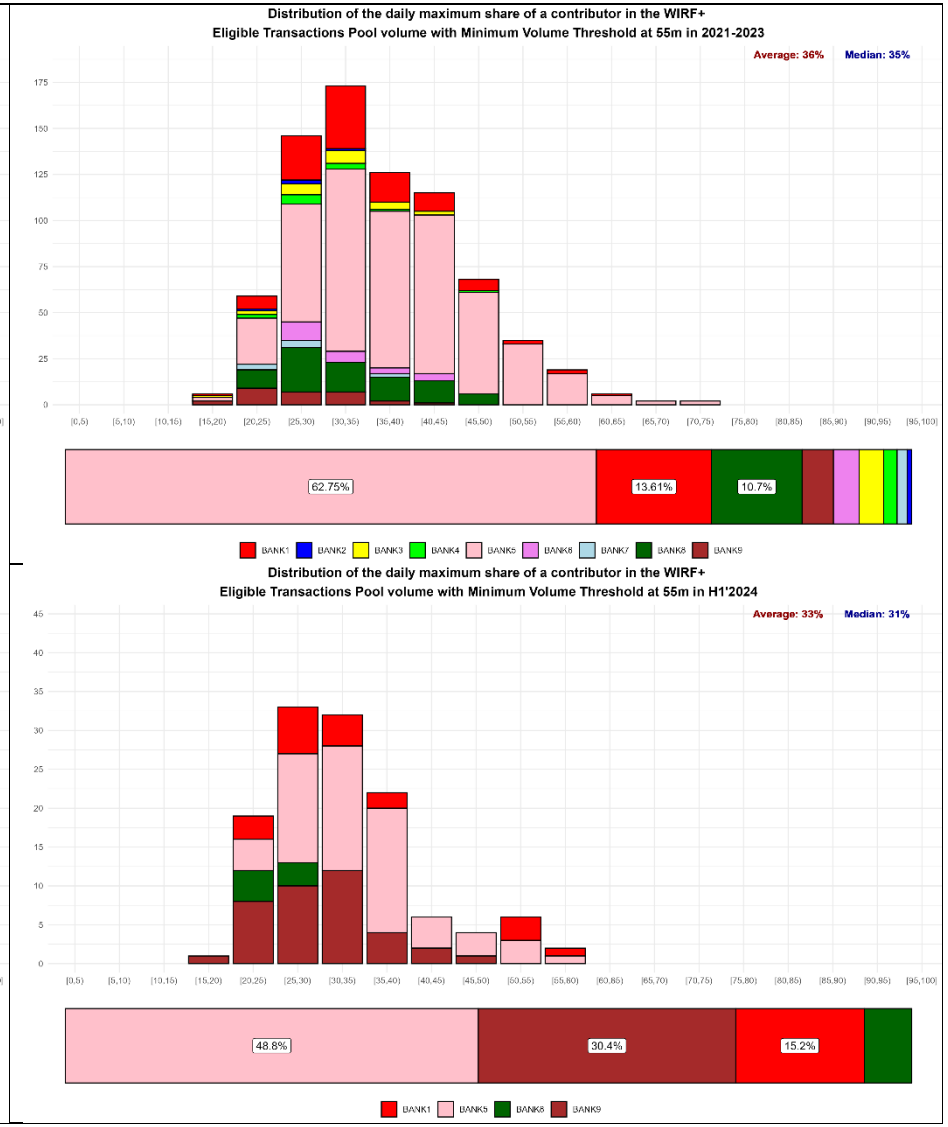

Distribution of the daily maximum share of a contributor in the WIRF
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in 2021-2023
Average: 33%
Median: 32%
37.12%
35.4%
11.23%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK6 BANK8 BANK9


Distribution of the daily maximum share of a contributor in the WIRF
Eligible Transactions Pool volume with Minimum Volume Threshold at 30m in 2021-2023
Average: 34%
Median: 33%
40.03%
31.84%
11.49%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK6 BANK8 BANK9

Distribution of the daily maximum share of a contributor in the WIRF
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in H1'2024
Average: 30%
Median: 30%
34.4%
24%
16%
BANK1 BANK3 BANK4 BANK5 BANK6 BANK8 BANK9

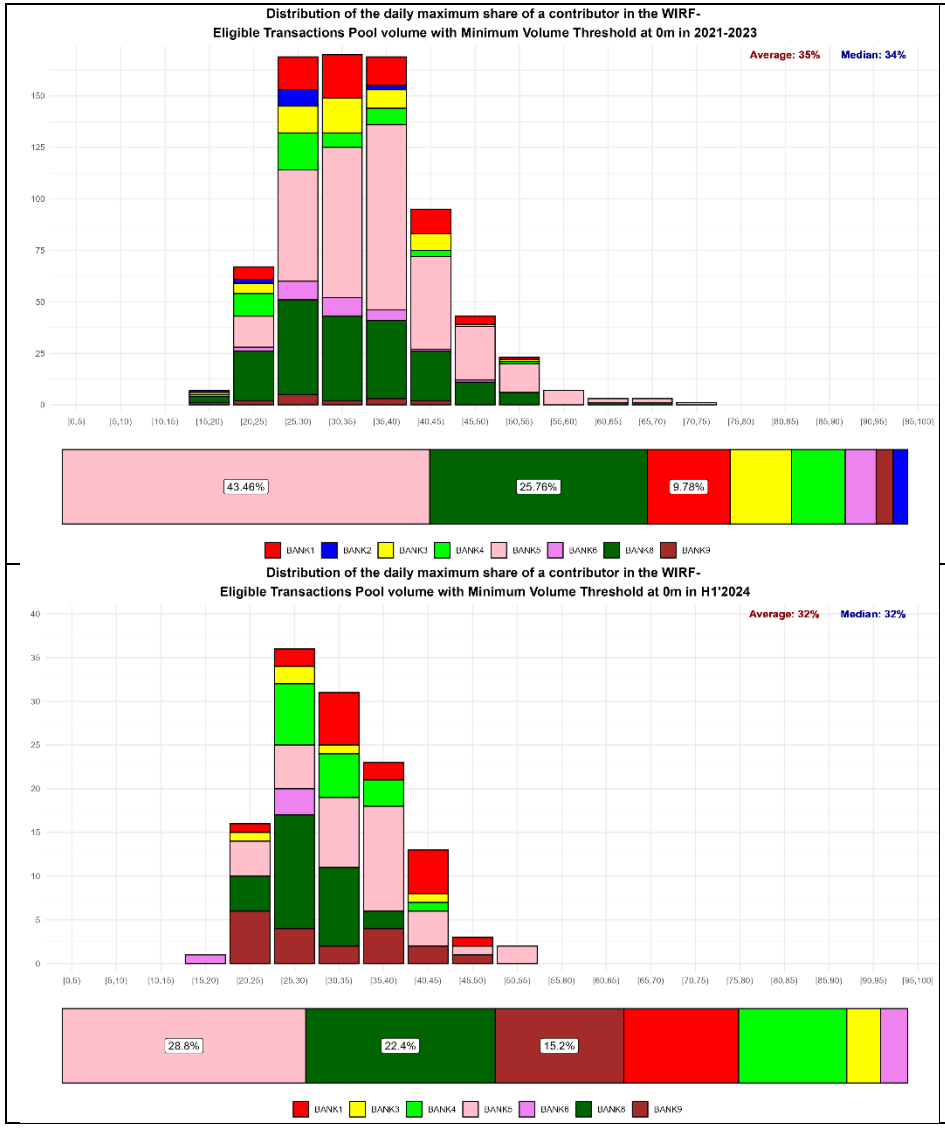
Distribution of the daily maximum share of a contributor in the WIRF
Eligible Transactions Pool volume with Minimum Volume Threshold at 30m in H1'2024
Average: 31%
Median: 31%
35.2%
24%
16%
BANK1 BANK3 BANK4 BANK5 BANK6 BANK8 BANK9

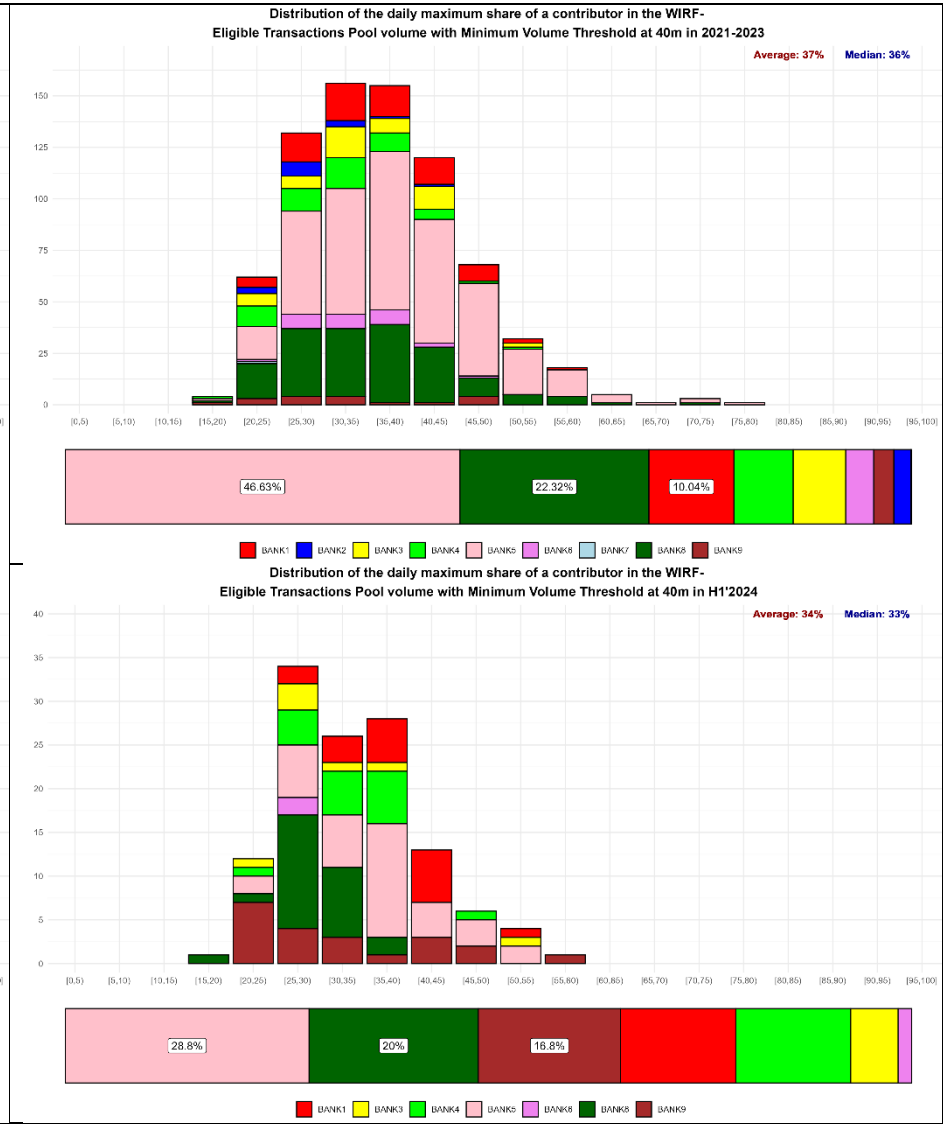

Distribution of the daily maximum share of a contributor in the WIRF+
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in 2021-2023
Average: 34%
Median: 33%
59.58%
14.13%
13.74%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK6 BANK7 BANK8 BANK9


Distribution of the daily maximum share of a contributor in the WIRF+
Eligible Transactions Pool volume with Minimum Volume Threshold at 55m in 2021-2023
Average: 36%
Median: 35%
62.75%
13.61%
10.7%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK6 BANK7 BANK8 BANK9

Distribution of the daily maximum share of a contributor in the WIRF+
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in H1'2024
Average: 31%
Median: 30%
47.2%
31.2%
14.4%
BANK1 BANK5 BANK6 BANK8 BANK9

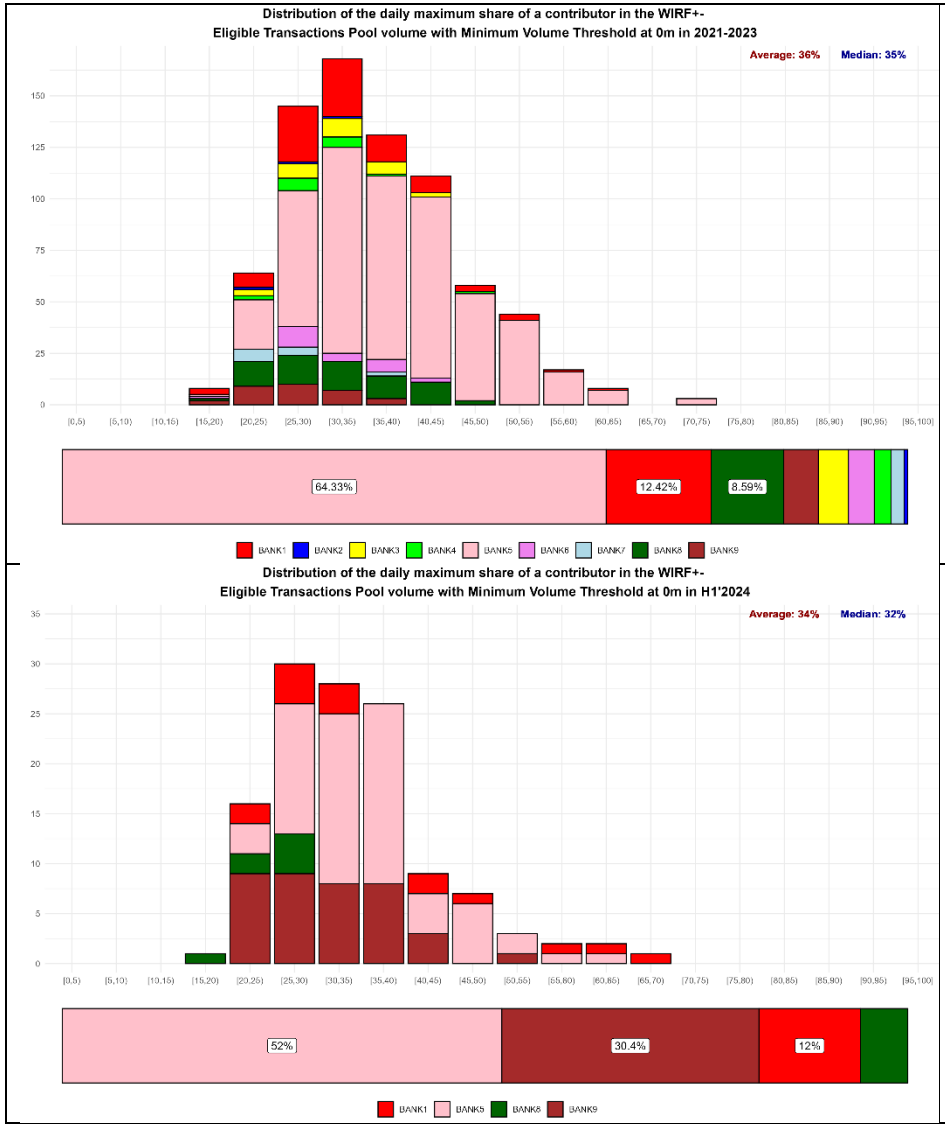
Distribution of the daily maximum share of a contributor in the WIRF+
Eligible Transactions Pool volume with Minimum Volume Threshold at 55m in H1'2024
Average: 33%
Median: 31%
48.8%
30.4%
15.2%
BANK1 BANK5 BANK6 BANK9

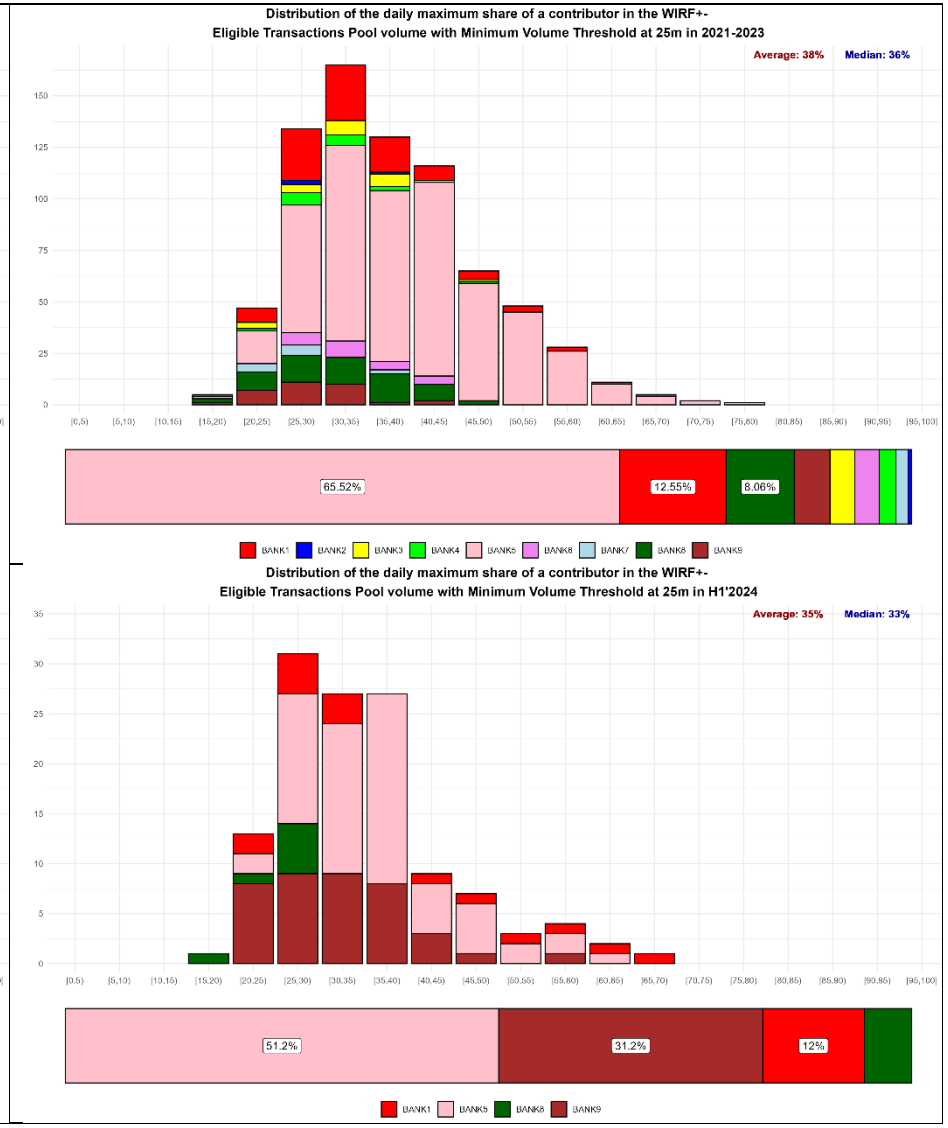

Distribution of the daily maximum share of a contributor in the WIRF-
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in 2021-2023
Average: 35%
Median: 34%
43.46%
25.76%
9.78%
BANK1
BANK2
BANK3
BANK4
BANK5
BANK6
BANK8
BANK9


Distribution of the daily maximum share of a contributor in the WIRF-
Eligible Transactions Pool volume with Minimum Volume Threshold at 40m in 2021-2023
Average: 37%
Median: 36%
46.63%
22.32%
10.04%
BANK1
BANK2
BANK3
BANK4
BANK5
BANK6
BANK7
BANK8
BANK9

Distribution of the daily maximum share of a contributor in the WIRF-
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in H1'2024
Average: 32%
Median: 32%
28.8%
22.4%
15.2%
BANK1
BANK3
BANK4
BANK5
BANK6
BANK8
BANK9

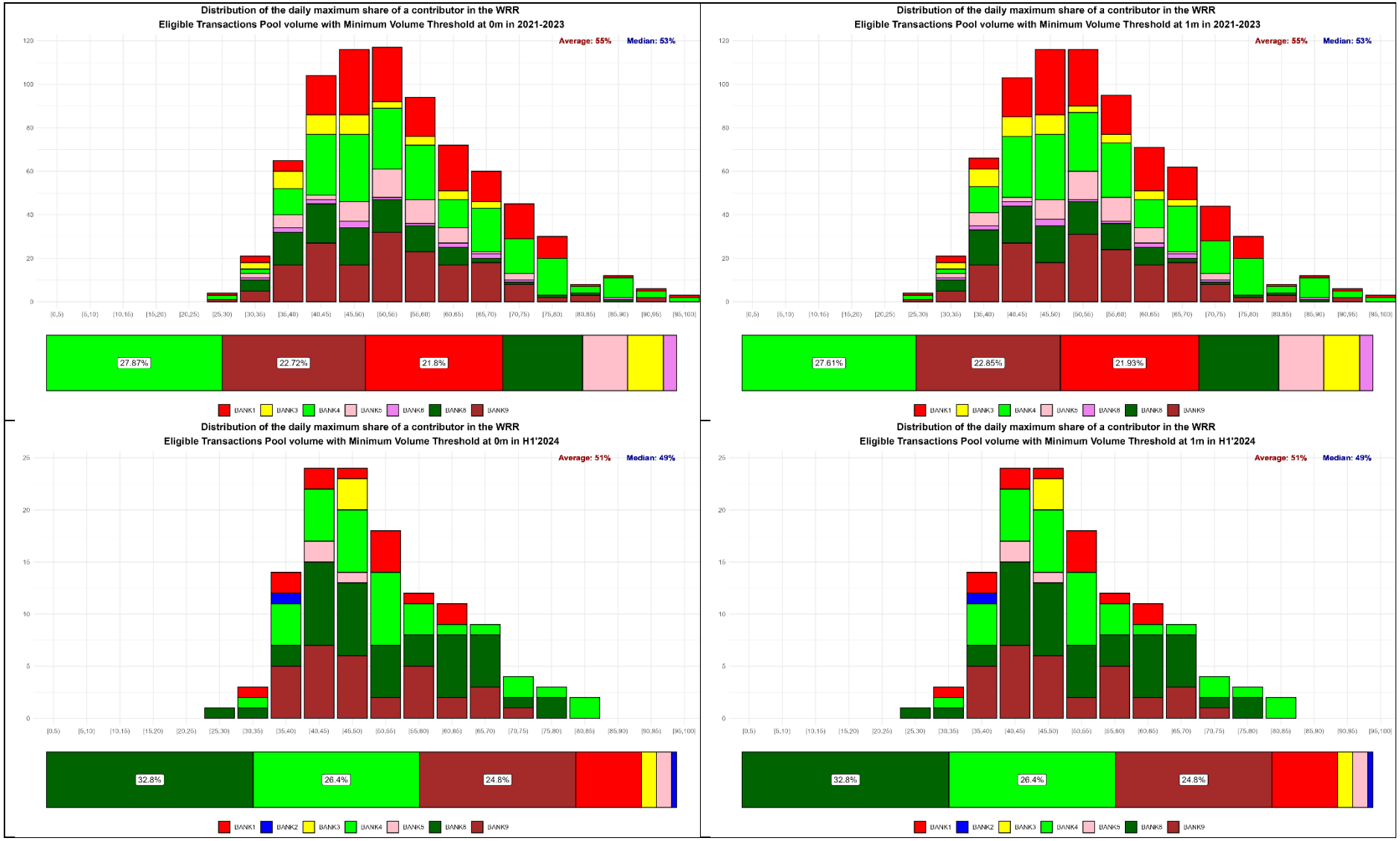
Distribution of the daily maximum share of a contributor in the WIRF-
Eligible Transactions Pool volume with Minimum Volume Threshold at 40m in H1'2024
Average: 34%
Median: 33%
28.8%
20%
16.8%
BANK1
BANK3
BANK4
BANK5
BANK6
BANK8
BANK9


Distribution of the daily maximum share of a contributor in the WIRF+-
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in 2021-2023
Average: 36%
Median: 35%
64.33%
12.42%
8.59%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK6 BANK7 BANK8 BANK9


Distribution of the daily maximum share of a contributor in the WIRF+-
Eligible Transactions Pool volume with Minimum Volume Threshold at 25m in 2021-2023
Average: 38%
Median: 36%
65.52%
12.55%
8.06%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK6 BANK7 BANK8 BANK9

Distribution of the daily maximum share of a contributor in the WIRF+-
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in H1'2024
Average: 34%
Median: 32%
52%
30.4%
12%
BANK1 BANK5 BANK6 BANK9

Distribution of the daily maximum share of a contributor in the WIRF+-
Eligible Transactions Pool volume with Minimum Volume Threshold at 25m in H1'2024
Average: 35%
Median: 33%
51.2%
31.2%
12%
BANK1 BANK5 BANK6 BANK9


Distribution of the daily maximum share of a contributor in the WRR
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in 2021-2023
Average: 55%
Median: 53%
27.87%
22.72%
21.8%
BANK1 BANK3 BANK4 BANK5 BANK6 BANK8 BANK9
Distribution of the daily maximum share of a contributor in the WRR
Eligible Transactions Pool volume with Minimum Volume Threshold at 1m in 2021-2023
Average: 55%
Median: 53%
27.61%
22.85%
21.93%
BANK1 BANK3 BANK4 BANK5 BANK8 BANK8 BANK9
Distribution of the daily maximum share of a contributor in the WRR
Eligible Transactions Pool volume with Minimum Volume Threshold at 0m in H1'2024
Average: 51%
Median: 49%
32.8%
26.4%
24.8%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK8 BANK9
Distribution of the daily maximum share of a contributor in the WRR
Eligible Transactions Pool volume with Minimum Volume Threshold at 1m in H1'2024
Average: 51%
Median: 49%
32.8%
26.4%
24.8%
BANK1 BANK2 BANK3 BANK4 BANK5 BANK8 BANK9

5. Index proposals volatility analysis

In this document, as in the previous round of consultations, two sets of charts are presented showing the short-term volatility of the surveyed index proposals, i.e. WIRF, WIRF+, WIRF- and WIRF+/- against the WRR and the POLONIA rate, using two variables:

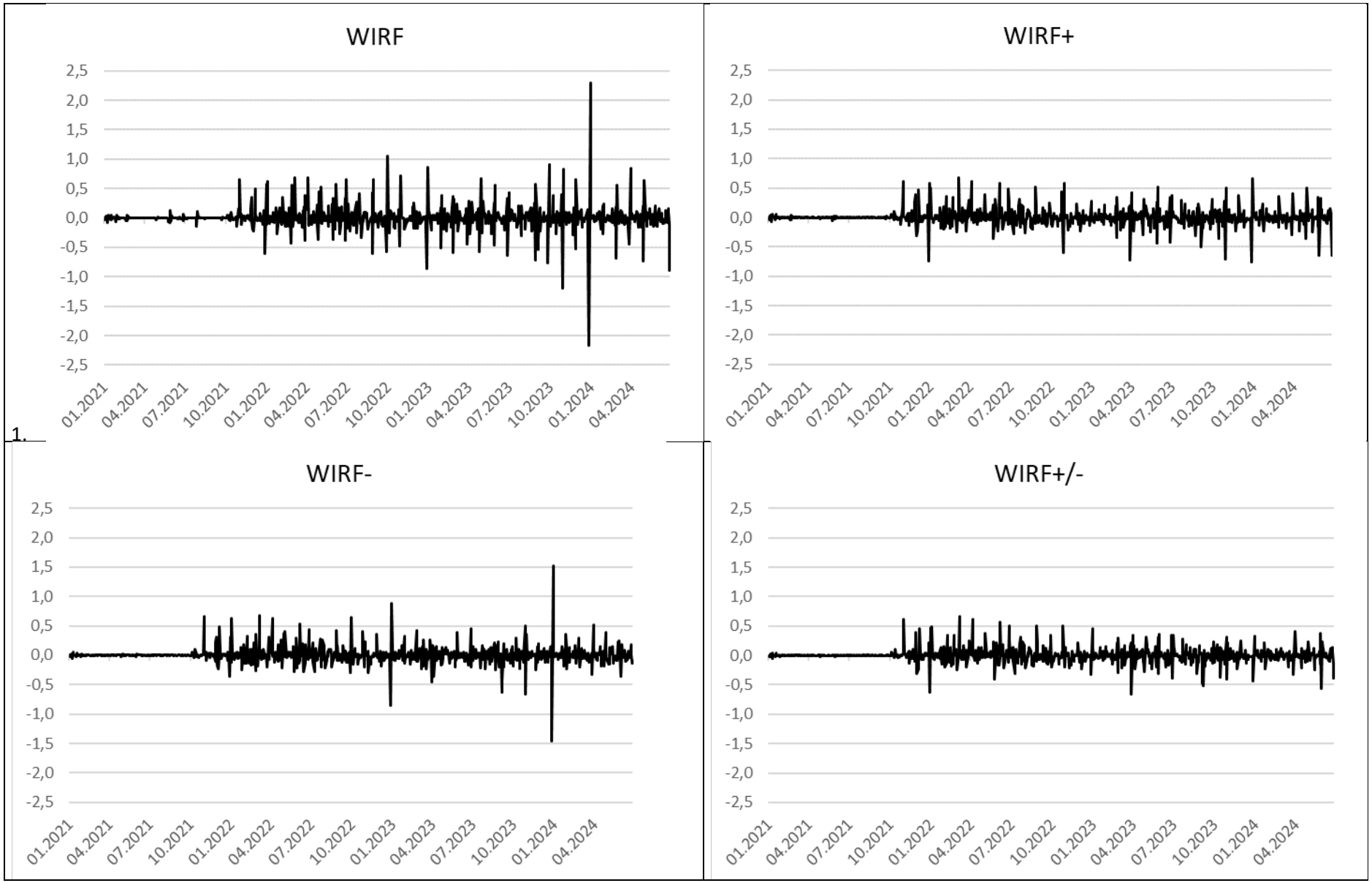
- first difference of index values,

- centered 5-day moving range of index values.

The analysis period has been extended compared to the previous consultation document by H1 2024. In the case of comparison between the WIRF index proposals, it should be noted that the WIRF modifications, i.e. WIRF+, WIRF- and above all WIRF+/- indicate lower levels of volatility than WIRF. Moreover, as indicated by other elements of the analysis presented in this document, it is worth noting that the scale of volatility, e.g. of the first differences in the index proposals, is largely "determined" on the charts by distinctive outliers reflecting the month-end effect or the year-end effect, which the Administrator has shown through the presentation of statistics including and excluding the last working days of the month in the above-mentioned tables and in the appendices presenting the data sensitivity analyses. At the same time, the intra-monthly volatility of the index proposals remains similar between the presented proposals (see Chapter 7).

The above is also reflected in the charts of the centered 5-day moving range of index values.

1.


WIRF
WIRF+
WIRF-
WIRF+/-
2,5
2,0
1,5
1,0
0,5
0,0
-0,5
-1,0
-1,5
-2,0
-2,5
01.2021
04.2021
07.2021
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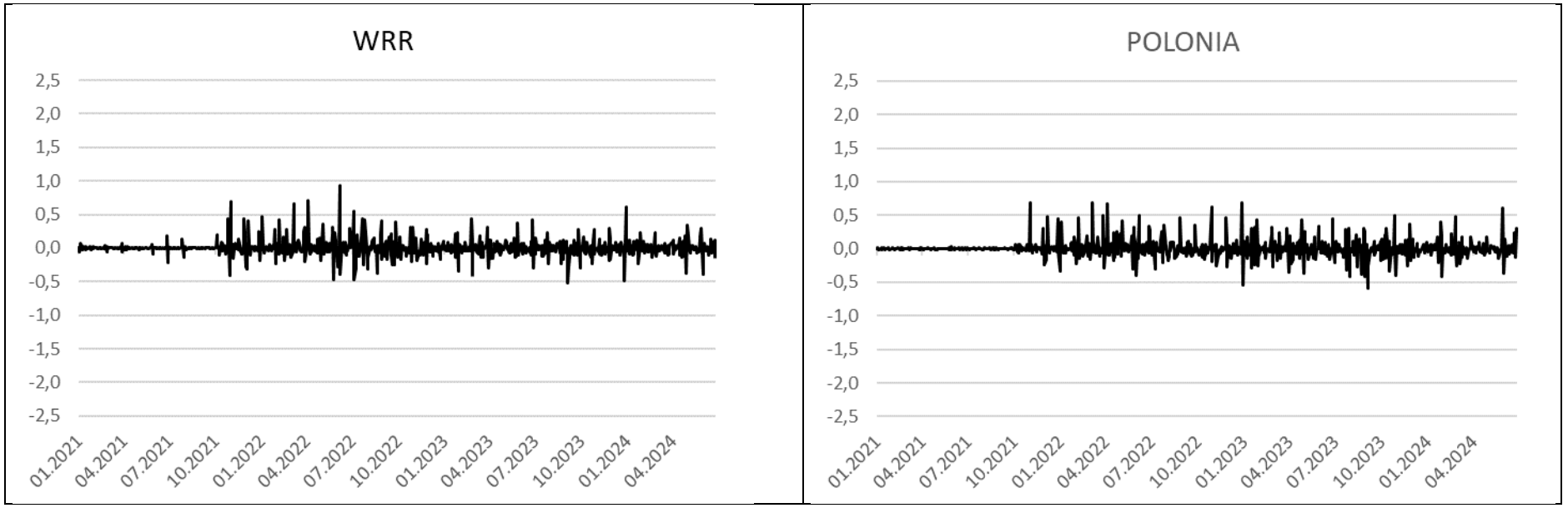
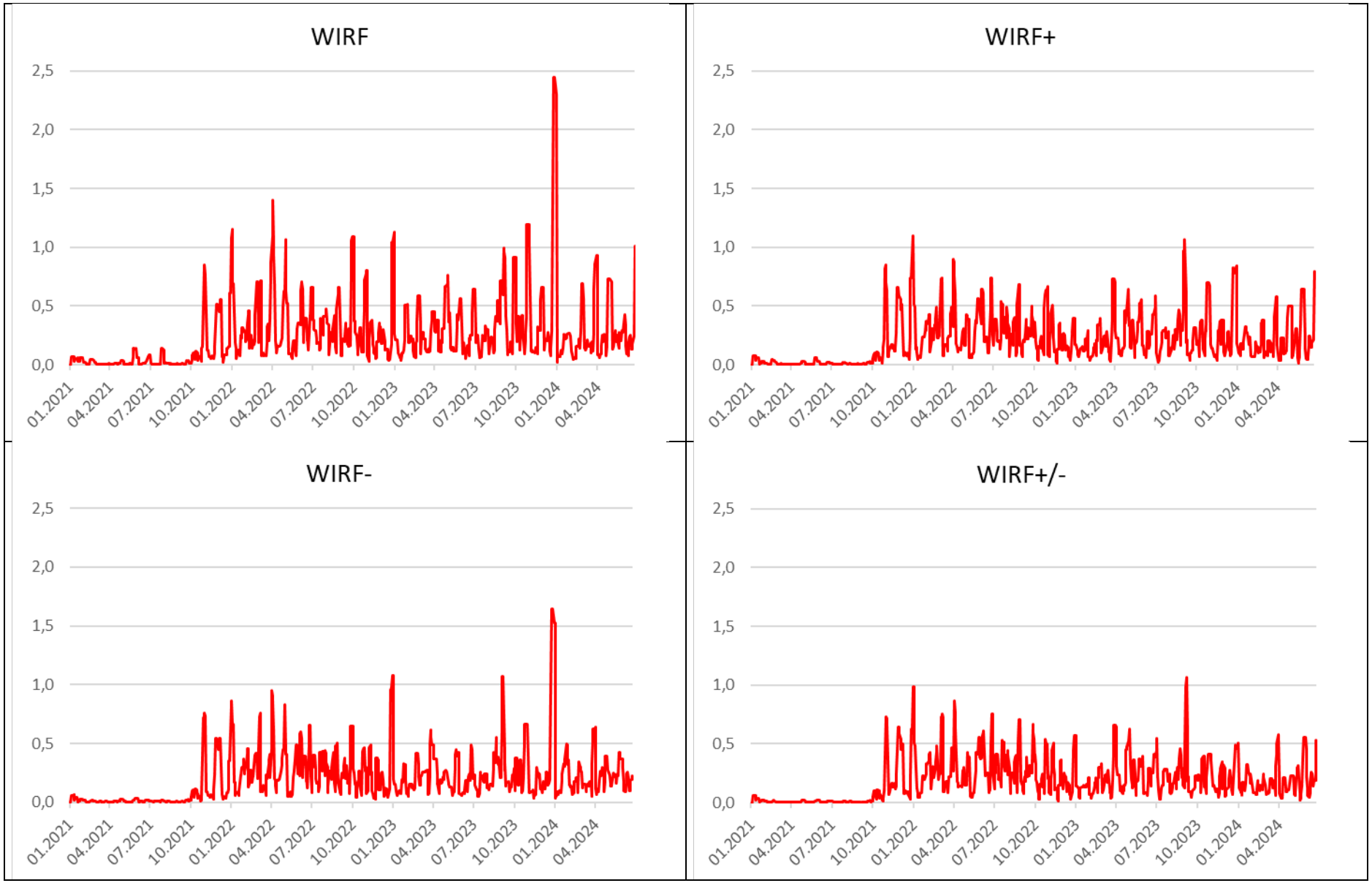


Figure 17 First differences of index proposals (pp.)


WIRF
WIRF+
WIRF-
WIRF+/-
2,5
2,0
1,5
1,0
0,5
0,0
01.2021
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07.2021
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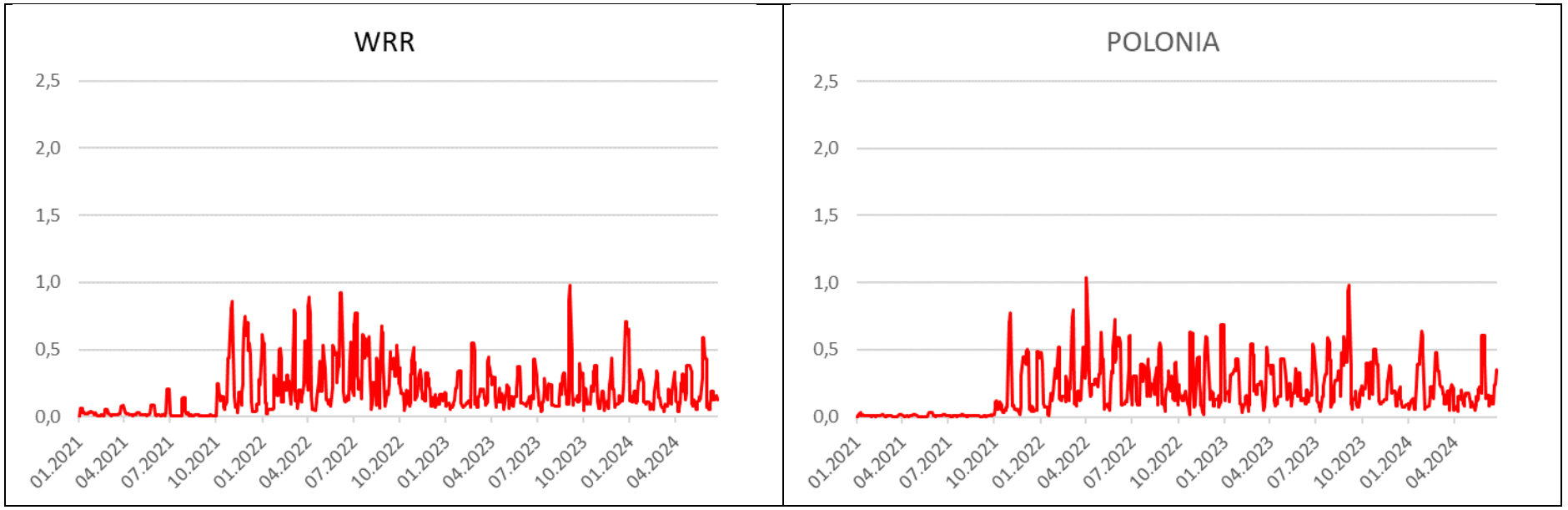


Figure 18 Centered 5-day moving range of index proposals (pp.)

6. Compound rates for 1M term

In accordance with the scope of information presented in the previous consultation document, also in this document are presented graphic presentations of the simulation of composite indices for the predefined term 1M (1 month) on the basis of index proposals presented for discussion. Time series of composite index simulations for terms 1M, 3M and 6M are presented in Annex 4. Again, bearing in mind the exceptional level of deviation of the WIRON benchmark at the turn of 2023 and 2024, Figure 20 presents the development of the course of the index proposals and the simulation of 1M composite indices based on these proposals. The results confirm that WIRF has the highest level of sensitivity to month-end effects among the presented index proposals, as for this proposal the difference between the standard deviation of the first difference, including and excluding the last day of the month in the analysis period, is 8 bps (see Table 4). For WIRF+ and WIRF- this is no more than 3 bps, and for WIRF+/- it is less than 2 bps. It should be noted that in H1'2024 this difference for WIRF reached 10 bps, for WIRF+ 6 bps, for WIRF - it was 2 bps, and for WIRF+/- about 3 bps (see Table 6).

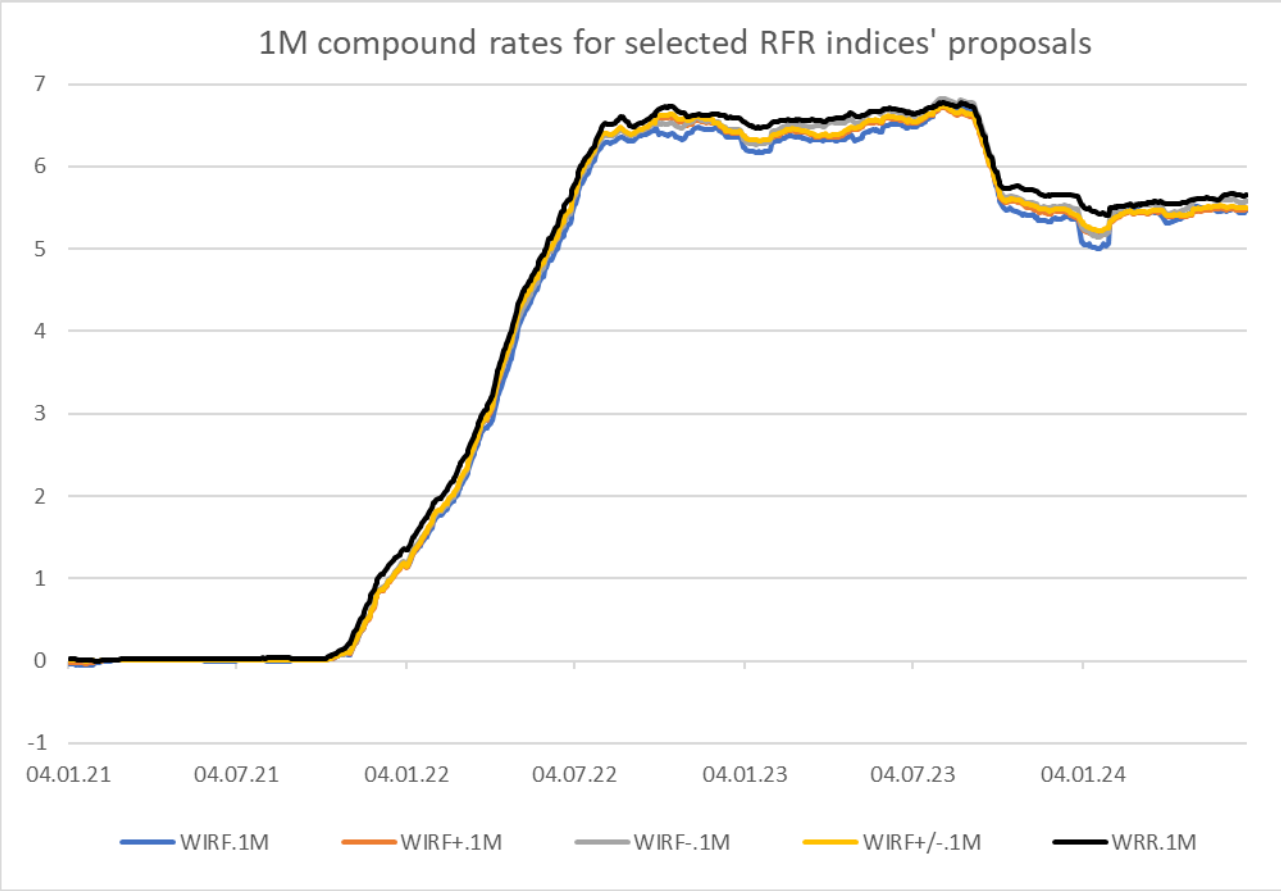


Figure *19 1M compound rates for RFR index proposals (1M after the index proposal name indicates a compound rate for the backward-looking predefined 1M period based on this index proposal)*

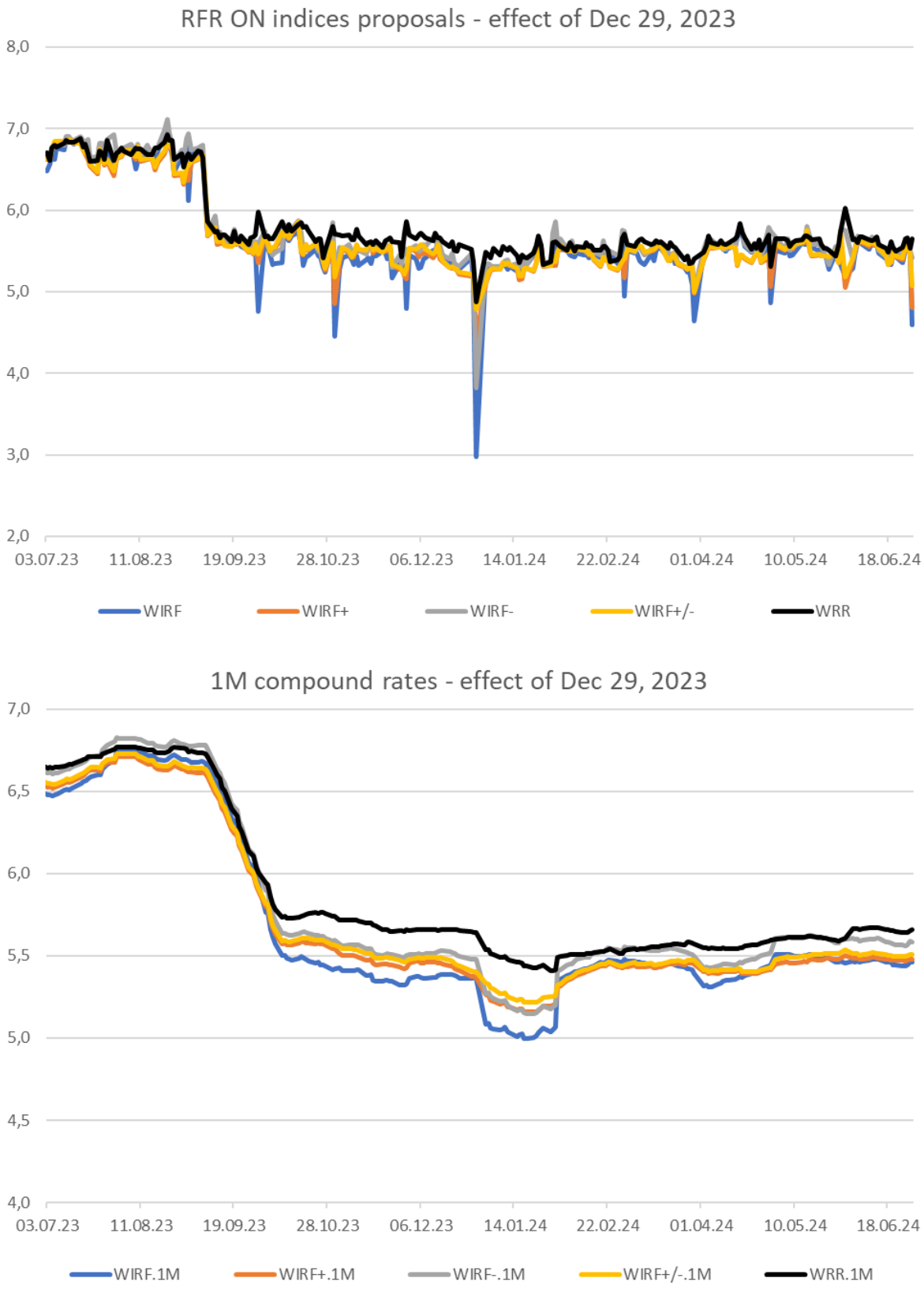


Figure *20 RFR index proposals and compound rates for the backward-looking predefined 1M period based on them at the turn of 2023/2024*

7. Analysis of relation between the RFR index proposals and WRR

Taking into account the comments and assessments made by the consultation participants that highly valued some features of WRR, especially those concerning its volatility and predictability, it was decided to conduct analyses verifying the level of similarity between the behaviour of the index proposals submitted for consultation in the current round and WRR. In addition to the analysis of relations, it is possible to attempt to draw conclusions based on the conducted research as to the existence of common statistical features of individual segments of the money market, which may allow for defining the best features of the desired reference indicator, the implementation of which may minimise the costs of implementation in financial products and instruments, but which can be developed based on the available information resources.

The analysis of relations between each of the 4 index proposals (i.e. WIRF, WIRF+, WIRF-, WIRF+/-) and WRR - due to the integration of order 1[17] in the case of each of these time series (see: subchapter 7.1 containing the analysis of stationarity) - was carried out in a two-track manner.

In subchapter 7.2 the analysis of the short-term relation is presented, i.e. the correlation between the first differences of individual index proposals and the first differences of WRR[18].

Then, in subchapter 7.3 the analysis of the long-term relation is presented in the form of analysis of cointegration[19] between individual index proposals and WRR.

7.1 Analysis of stationarity of time series

The first step in examining the relationship between the time series of individual index proposals and WRR was to analyze their stationarity. Table 7 shows the results of the ADF statistical tests for individual series – the period from January'2021 to June'2024 was adopted as the analysis period. The ADF test assumes the null hypothesis of non-stationarity of the time series under study, with the alternative hypothesis assuming its stationarity. If the p-value of the test, calculated on the basis of empirical data on the time series under study, is lower than the level of significance adopted within the test (in this analysis the commonly used significance level of 0.05 was adopted), the null hypothesis of non-stationarity of the time series is rejected in favour of the alternative hypothesis of its stationarity. Otherwise (i.e. p-value greater than 0.05), there is no basis for rejecting the null hypothesis of non-stationarity of the series.

As it may be seen in Table 7, all the examined time series (i.e. both the 4 index proposals and WRR) turned out to be non-stationary (p-values of the ADF test applied to the series of their levels were in each case higher than 0.05). In turn, the ADF test applied to the series of their first differences indicated their stationarity, which means that all the examined time series are integrated of order 1.

[17] A time series integrated of order 0 is a stationary series, i.e. a realization of a stochastic process with expected value and variance that are constant in time. In turn, a time series integrated of order 1 is a series the first differences of which (i.e. the differences between the value of the series for a given period and its value for the period directly preceding it) are a stationary series.

[18] Due to the time series' integration of order 1, which creates the risk of spurious regression (i.e. spurious dependence between variables despite the lack of actual causal relationship between them) in the modeling of relations between them, it was decided to examine the relations between their first differences, which are stationary, which eliminates the risk of spurious regression.

[19] See: subchapter 7.3.

Table 7 Analysis of stationarity of time series of the RFR index proposals (the ADF test results)

ADF test results (Jan'21-Jun'24)					
	WRR PLN 1 mn 12.5%	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
p-value (levels)	0,99	0,99	0,99	0,99	0,99
p-value (first differences)	0,01	0,01	0,01	0,01	0,01
Order of integration*	1	1	1	1	1
ADF test results (Jan'21-Jun'24; EOM removal**)					
	WRR PLN 1 mn 12.5%	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
p-value (levels)	0,99	0,99	0,99	0,99	0,99
p-value (first differences)	0,01	0,01	0,01	0,01	0,01
Order of integration*	1	1	1	1	1

* - ADF tests at the significance level of 0.05

** - end of month removal means removing the observations of the index proposal for the last business day of each month

Since the empirical analysis of all 4 index proposals from the WIRF group carried out in the consultation document indicates the occurrence of a seasonal phenomenon of a decline in their value on the last business day of each month, it was decided to examine the impact of this phenomenon on their relationship with WRR – such a study is an element of the analyses presented in subchapters 7.2 and 7.3. In order to conduct such an analysis, modified time series of each of the 4 index proposals from the WIRF group as well as WRR were constructed, in which the value for the last business day of each month was removed, which eliminated the above-mentioned seasonality and thus created a point of reference for identifying its impact on the relationship of individual index proposals with WRR[20].

It should be emphasized that the removal of the index proposal values for the last business day of the month used in this study is only a technical operation within this analysis and is not a proposal of change in the method of RFR index proposals. However, since there are a number of factors that specifically affect the behaviour of the unsecured deposit market on the last business day of the month, it was considered valuable to verify what the result of the analysis would look like if these factors were to disappear or were mitigated.

In order to use such modified time series of individual index proposals in the analyses of their relation with WRR, it was necessary to carry out a test of their stationarity, the results of which are presented in the lower part of Table 7. These results are the same as in the case of unmodified series, i.e. all the series examined turned out to be integrated of order 1.

7.2 Analysis of the short-term relation between index proposals of the WIRF group and WRR

Due to the integration of order 1 in the case of all the examined time series, i.e. both the 4 proposed indices from the WIRF group and WRR (also in the versions with removed month ends), which creates a risk of spurious regression when modelling the relations between them, it was decided to examine

[20] In the case of calculating the first differences of such a modified time series, the first difference for the first business day of the month is the difference between the series' value on that day and its value on the penultimate business day of the previous month (due to the lack of value for the last business day of the previous month).

the relations between their first differences, which demonstrate stationarity, which eliminates the risk of spurious regression.

Table 8 Analysis of correlation between first differences of the WIRF group index proposals and first differences of WRR

PERIOD	Coefficient of correlation with WRR (first diff.)			
	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
2021-H1	-0,296	0,058	0,091	0,124
2021-H2	0,576	0,637	0,750	0,718
2022-H1	0,505	0,819	0,701	0,826
2022-H2	0,167	0,623	0,404	0,642
2023-H1	0,124	0,190	0,660	0,263
2023-H2	0,265	0,412	0,564	0,486
2024-H1	0,248	0,113	0,467	0,115
Jan'21-Jun'24	0,326	0,516	0,582	0,563
PERIOD	Coefficient of correlation with WRR (first diff.) - EOM removal*			
	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
2021-H1	0,043	0,022	0,047	0,071
2021-H2	0,884	0,913	0,904	0,918
2022-H1	0,713	0,829	0,798	0,850
2022-H2	0,445	0,615	0,617	0,648
2023-H1	0,519	0,597	0,713	0,631
2023-H2	0,478	0,512	0,629	0,544
2024-H1	0,474	0,424	0,593	0,462
Jan'21-Jun'24	0,601	0,692	0,711	0,716
PERIOD	Change in coefficient of correl. with WRR (first diff.) due to EOM removal*			
	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
2021-H1	0,339	-0,036	-0,044	-0,053
2021-H2	0,308	0,277	0,154	0,199
2022-H1	0,208	0,010	0,097	0,024
2022-H2	0,278	-0,007	0,213	0,006
2023-H1	0,395	0,407	0,053	0,368
2023-H2	0,213	0,100	0,065	0,057
2024-H1	0,226	0,311	0,125	0,347
Jan'21-Jun'24	0,275	0,176	0,129	0,153

* - end of month removal means removing the observations of the index proposal for the last business day of each month

Table 8 presents the values of the linear correlation coefficient[21] between the first differences of individual index proposals from the WIRF group and WRR – both for the full analysis period (Jan'21 – Jun'24) and its semi-annual sub-periods.

Based on the results for the full analysis period, the RFR index proposal with the weakest correlation with WRR turned out to be WIRF (0.326), while the remaining RFR index proposals show a significantly higher degree of correlation with WRR (around 0.5-0.6), with WIRF- showing the strongest correlation with WRR (0.582). The results for semi-annual sub-periods indicate a particularly high level of correlation with WRR during the NBP interest rate hike cycle (i.e. H2'2021 and H1'2022), when the behaviour of all the index proposals from the WIRF group as well as WRR was significantly affected by the common factor of monetary policy. In turn, the half-years with stable NBP rates are characterized by significantly weaker correlation between index proposals from the WIRF group and WRR. WIRF- dominates the other index proposals in terms of correlation with WRR in the case of 4 out of 7 half-years examined.

Crucially, for each of the analyzed periods the narrowing of the scope of the Eligible Transactions Pool of WIRF or WIRF+ index proposal by removing the segment 3.1.10 (i.e. deposits of Other Financial Institutions) results in strengthening the correlation with WRR. This is certainly facilitated by the fact that after removing this segment the scope of counterparties in the Eligible Transactions Pool of a given RFR index proposal becomes similar to the scope of counterparties in the WRR Eligible Transactions Pool, which does not include Other Financial Institutions. As a result, the dominant position of WIRF- in the context of correlation with WRR may largely result from the fact that the scopes of counterparties in the Eligible Transactions Pool of WIRF- and WRR are the same (i.e. they consist of Credit Institutions and Financial Institutions).

The improvement of correlation with WRR also results in most periods (only except for H1'2024) from the extension of the scope of the Eligible Transactions Pool of WIRF by adding the 3.1.9 segment (i.e. deposits of the so-called public institutions). On the other hand, adding the same segment to the WIRF- Eligible Transactions Pool has a mixed effect depending on the analysis period (for the full analysis period it causes a slight decrease in correlation coefficient with WRR).

As for the level of the Minimum Volume Threshold used in the individual index proposals, it is not clear that the proximity of this parameter value to its value used in the case of WRR (i.e. PLN 1 mn) would favour a stronger correlation with WRR.

Table 8 also presents the impact of the removal of month ends (see: description in subchapter 7.1) on the coefficients of correlation of index proposals from the WIRF group with WRR[22]. For the full analysis period, removing month ends for each of the RFR index proposals improves its correlation with WRR – the effect is the largest in the case of WIRF, for which the end-of-month seasonality is the strongest. On the other hand, in the case of half-year periods the above effect is always positive only for WIRF, while for the other index proposals from the WIRF group most half-years show positive impact of this modification on the correlation with WRR, but there are also half-years with negative impact.

Figures 21-24 compare the levels and first differences of the individual RFR index proposals from the WIRF group and WRR (both without and with the removal of month ends).

[21] Pearson linear correlation coefficient – a coefficient measuring the strength of linear dependence between random variables. It assumes values from -1 to 1, where -1 means perfect negative correlation, 0 - no correlation, and 1 - perfect positive correlation.

[22] This impact is expressed as the difference between the value of the correlation coefficient amid month ends removal from the analysed series and the value of this coefficient without this modification.

Figure 21 Levels of index proposals from the WIRF group and WRR

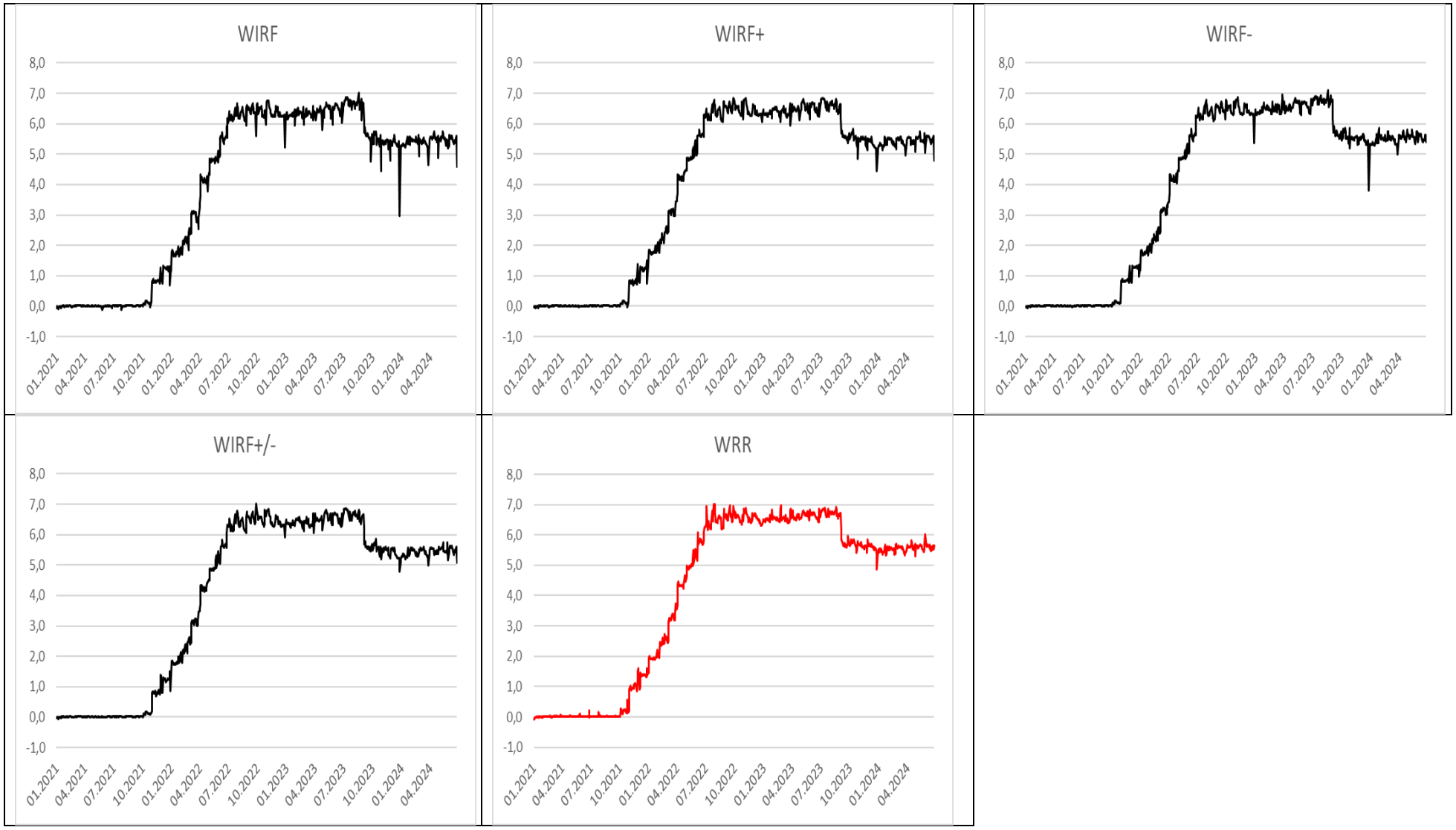


Figure 22 First differences of index proposals from the WIRF group and WRR

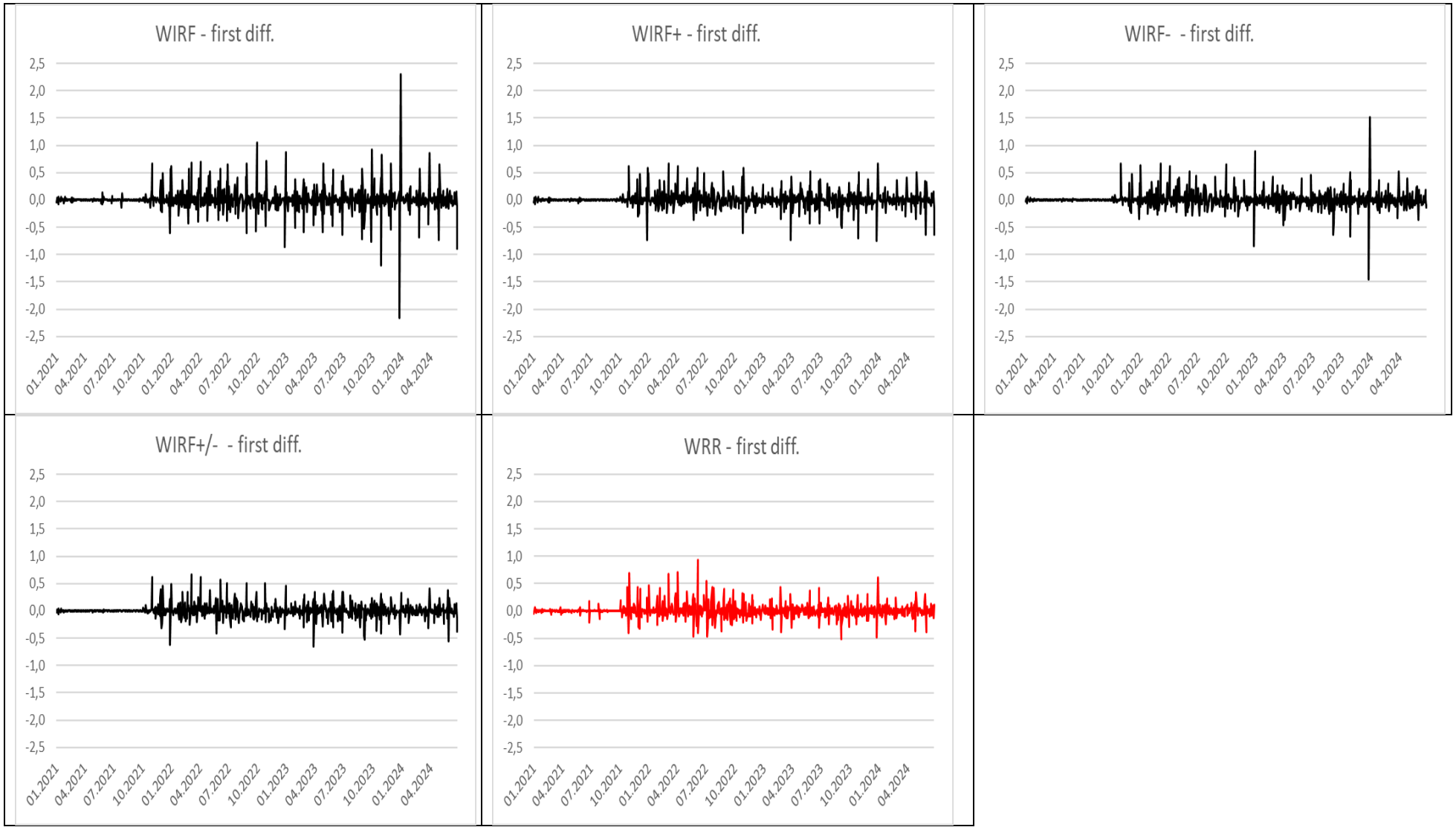


Figure 23 Levels of index proposals from the WIRF group and WRR (removed month ends)

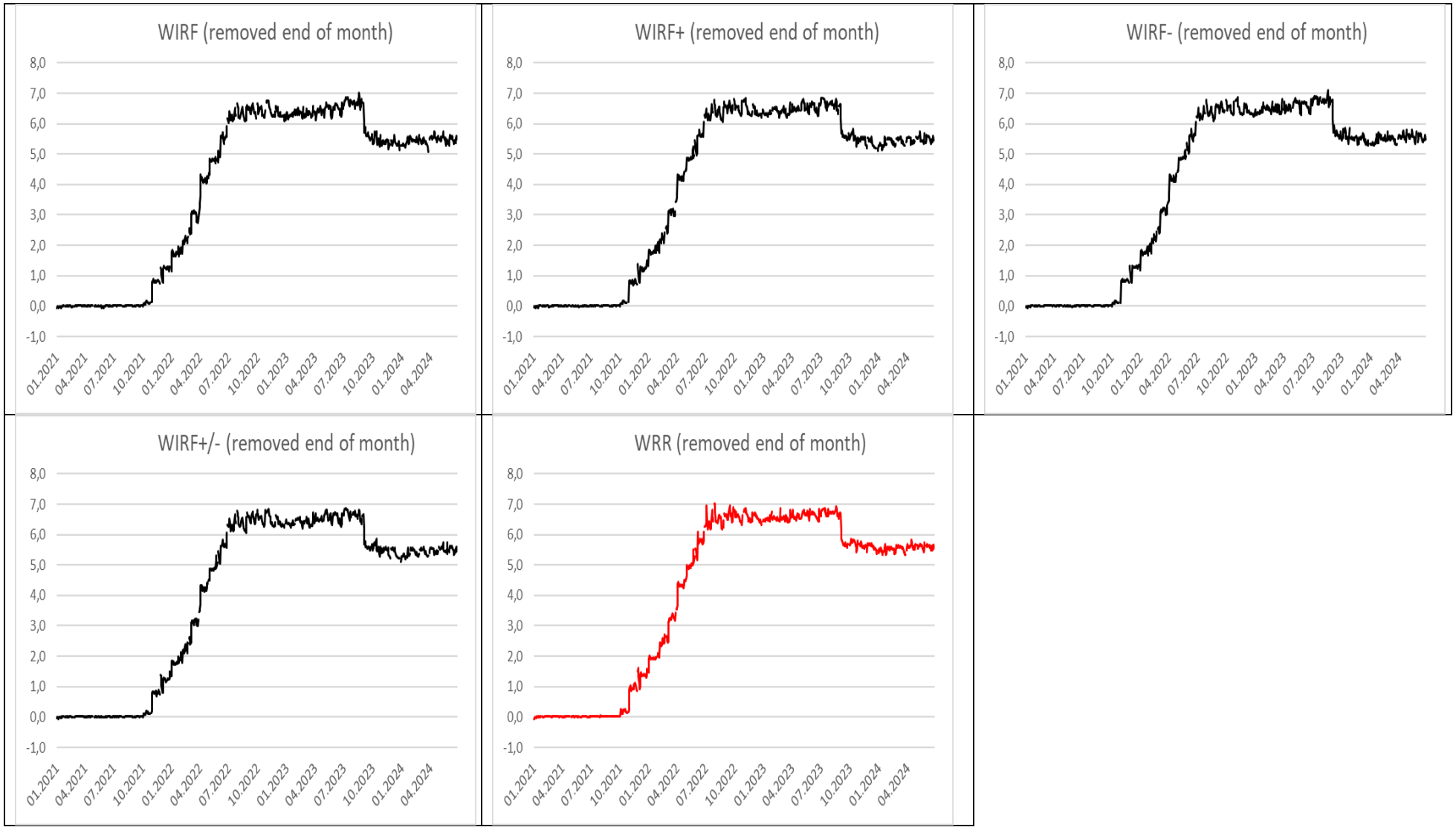
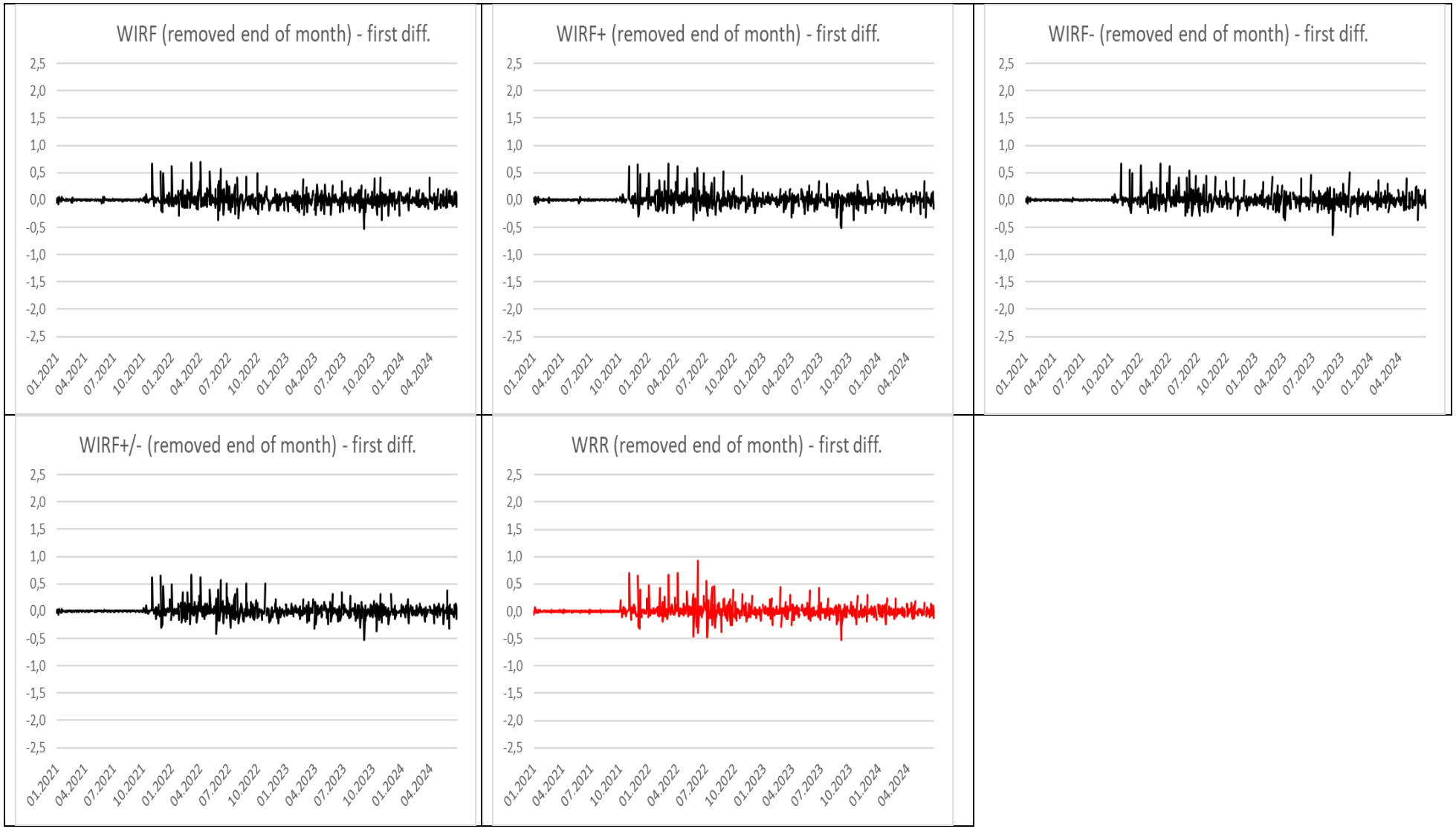


Figure 24 First differences of index proposals from the WIRF group and WRR (removed month ends)



7.3 Analysis of the long-term relation between index proposals from the WIRF group and WRR

In addition to the short-term relationship of the individual RFR index proposals with WRR (see: subchapter 7.2), their potential long-term relationship was also analyzed, which was done in the form of cointegration analysis. More precisely, the following hypothetical long-run relationship was verified:

$$WRR_t = spread + RFR_t + \varepsilon_t,$$

where:

WRR_t – WRR on the day t,

RFR_t – RFR index proposal on the day t,

$spread$ – average spread of the RFR index proposal to WRR[23],

ε_t – residual on the day t.

The above equation illustrates the existence of a relatively stable spread between RFR and WRR, the value of which deviates from its mean only due to purely random disturbances (i.e. residual ε_t assuming the value of 0 on average). Since both variables (i.e. RFR and WRR) are integrated of order 1, as shown in subchapter 7.1, the existence of the above relation (the so-called cointegrating relation) requires stationarity of the residuals ε_t. The results of the cointegration analysis are presented in Table 9.

Table 9 Analysis of cointegration of index proposals from the WIRF group with WRR

Analysis of cointegration with WRR (Jan'21-Jun'24)				
	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
ADF test p-value (residuals)	0,01	0,01	0,01	0,01
Cointegration with WRR*	YES	YES	YES	YES
Standard deviation of residuals (pp.)	0,188	0,125	0,118	0,111
Avg. spread to WRR (pp.)	0,155	0,113	0,072	0,096
Analysis of cointegration with WRR (Jan'21-Jun'24; EOM removal**)				
	WIRF PLN 30 mn 20%	WIRF+ PLN 55 mn 25%	WIRF- PLN 40 mn 25%	WIRF+/- PLN 25 mn 25%
ADF test p-value (residuals)	0,01	0,01	0,01	0,01
Cointegration with WRR*	YES	YES	YES	YES
Standard deviation of residuals (pp.)	0,125	0,096	0,094	0,091
Avg. spread to WRR (pp.)	0,130	0,101	0,066	0,088

* - ADF tests at the significance level of 0.05

** - end of month removal means removing the observations of the index proposal for the last business day of each month

As can be seen in Table 9, the postulated cointegrating relation with WRR is observed in the case of all 4 RFR index proposals from the WIRF group (also in the case of the month ends removal), as evidenced by the stationarity of residuals demonstrated by the ADF tests (p-values in each case are below the adopted significance level of 0.05).

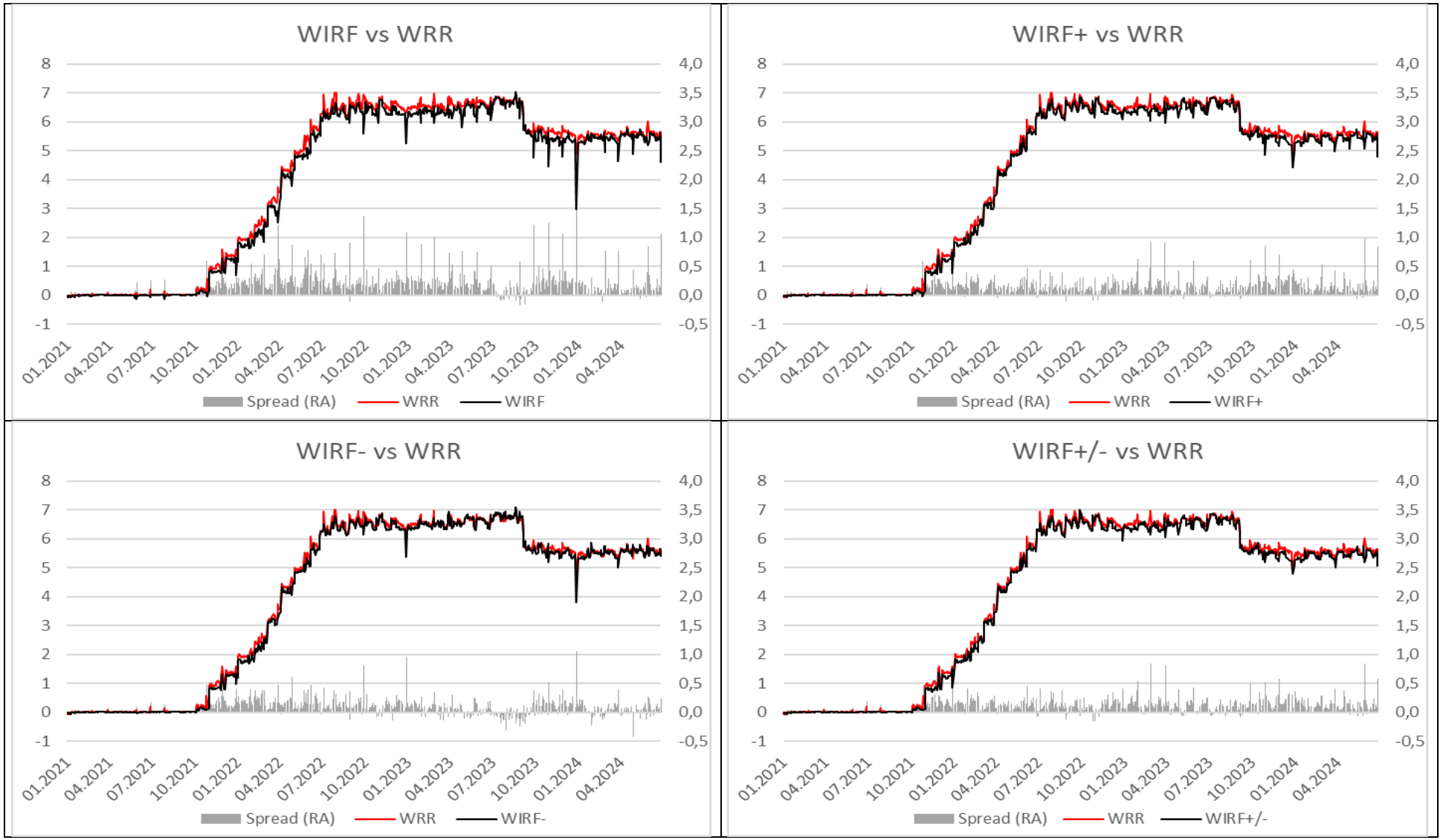
[23] Spread is defined here as the difference between WRR and RFR index proposal from the WIRF group.

The most stable long-term relationship is visible in the case of WIRF+/-, however the standard deviations of residuals (and thus the standard deviations of the empirical spread between a given RFR index proposal and WRR) are very similar for WIRF+/-, WIRF- and WIRF+, while the long-term relationship with WRR is clearly less stable in the case of WIRF. It is worth noting that removing month ends significantly improves the stability of the WIRF/WRR spread, while in the case of the other RFR index proposals this effect is much smaller, which is a consequence of much more pronounced end-of-month seasonality in the case of WIRF than in the case of the other RFR index proposals.

In terms of the average spread to WRR, its smallest value is registered by WIRF- (7.2 bp), a slightly larger one by WIRF+/- (9.6 bp), then by WIRF+ (11.3 bp) and definitely the largest spread is visible in the case of WIRF (15.5 bp). The ranking of RFR index proposals from the WIRF group in terms of the average spread to WRR does not change after the month ends removal, with the average spread decreasing significantly mainly in the case of WIRF (by 2.5 bp), while in the case of the other RFR index proposals its decline is significantly smaller (by ca. 1 bp).

Figure 25 compares the individual index proposals from the WIRF group with WRR and presents the spread between them.

Figure 25 Levels of index proposals from the WIRF group and WRR along with their spread to WRR



Attachments:

Appendix No. 1: „Questionnaire of assessment of the proposed RFR indices”
Appendix No. 2: "Trajectory and Eligible Transactions Pool features of RFR indices"
Appendix No. 3: "Sensitivity analysis"
Appendix No. 4: "Compound rates"
Appendix No. 5: "Structure of Eligible Transactions Pool daily"
Appendix No. 6: "Transaction aggregates by interest rate"
Appendix No. 7: "Interest rate distribution"
Appendix No. 8: "Distribution of the daily maximum share of a contributor in the Eligible Trans. Pool vol_adjusted"
Appendix No. 9 „Key Definitions”

Appendix No. 9 – Key definitions

Eligible Transaction Pool	Pool of input data qualified after the application of a the elements of the method within the framework of preliminary preparation of input data i.e. after having applied the Minimum Volume Threshold of a Single Transaction, the Maximum Volume Threshold of a Single Transaction, etc, before the application of a Volume Scaling-down Procedure and of the Main Adjustment. The information about the eligible Transaction Pool is different from the information about a total pool of transactions before the application of the procedures within the framework of the preliminary preparation of input data which aims to limit the impact of certain subgroups of data. The Eligible Transaction Pool determines the pool of input data which is base for the direct calculation of the index (see for WIRON procedures described at 2.5.1 of the WIRON Rules.
Minimum Volume Threshold for a single transaction	a threshold that determines the nominal volume of a single transaction, the transactions that do not reach that threshold volume are not qualified for the calculation of the index
Maximum Volume Threshold for a single transaction	a threshold that determines the nominal volume of a transaction, the volume that exceeds that threshold is not taken into account in the calculation, so the volume of that transaction is scaled down to the volume of the threshold
Credit Institution	shall mean: a) domestic banks, including affiliating banks, b) branches of Foreign Credit Institutions operating in Poland and branches of Foreign Banks operating in

	Poland, but excluding Foreign Banks and Foreign Credit Institutions themselves. The Credit Institution category for the purposes of this Code of Conduct shall not include: a) central banks, b) Cooperative Banks, c) Mortgage Banks, d) Cooperative Savings and Credit Unions, and e) entities in administration, or in relation to which the Bank Guarantee Fund has decided to initiate resolution or write-down or conversion of equity instruments
Financial Institution	means the following groups of entities: a) insurance institutions within the meaning of point I.2.1. FINREP Instruction, b) pension institutions within the meaning of point I.2.2 of the FINREP Instruction, c) investment institutions within the meaning of point I.1.2.2.2 (money market funds) and point I.2.3.1 (investment funds other than money market funds), within the meaning of the FINREP Instruction.
Other Financial Institution	entity belonging to the FINREP Instruction category point 'I.2. Other financial sector institutions', excluding the Financial Institutions