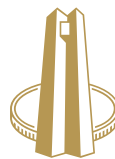# Addendum to market conventions for ZARONIA-based derivatives

prepared by
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SOUTH AFRICAN RESERVE BANK

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1. Overview

In July 2023, the Derivatives Workstream (DWS), which forms part of the South African Reserve Bank's Market Practitioners Group (MPG), published a paper titled "*Market conventions for ZARONIA-based derivatives*" that recommends market microstructure and conventions for the following linear interest rate derivatives that reference the South African Overnight Index Average (ZARONIA):

  (i) overnight indexed swaps (OISs); and

  (ii) cross-currency basis swaps (CCBSs).

These were defined first, as they are considered to be the fundamental contracts that form the foundation of overnight rate referencing derivatives markets. This paper may be downloaded via this hyperlink or via the hyperlink contained in this reference: [SARB-DWS, 2023]. As noted in the appendix of the aforementioned paper, conventions and market microstructure for ZARONIA versus the Johannesburg Interbank Average Rate (Jibar) tenor basis swaps would be required — this addendum provides this information, along with the same information for two other important swap contracts.

Therefore, the purpose of this addendum is to define basic market microstructure and conventions for three other important ZARONIA-based linear derivatives:

  (i) ZARONIA-Jibar tenor basis swaps;

  (ii) ZARONIA-Prime basis swaps; and

  (iii) ZARONIA-Inflation zero coupon swaps.

Since all of the features of the ZARONIA leg of these swap contracts are shared with the floating leg of ZARONIA-based OIS contracts, [SARB-DWS, 2023] is a key and base reference for the features that are recommended in this addendum. To facilitate seamless referencing, please ensure that the document [SARB-DWS, 2023] is downloaded from the SARB website and saved — without renaming — into the same directory as this addendum. Doing so will enable the section reference links within this document to operate dynamically.

As with the other convention papers, this addendum should serve as a resource for market participants to consider when using ZARONIA as a reference rate in the specification of any of the three swap contracts listed above. It is not meant to prescribe, mandate, or limit the ways in which they can transact — these features may be adapted based on the needs and requirements of bespoke transactions. The specific recommendations herein offer the standard conventions that will form the basis for the on-the-run interbank market for the above listed swap contracts, and will in future be quoted on screens and/or via interbank broking agents.

The derivative design principles that were articulated in section 5. of [SARB-DWS, 2023] are once again applicable here. The next section presents both recommendations for market microstructure and conventions for key contractual features in the same manner and style as section 7. in [SARB-DWS, 2023].

2. Market and convention recommendations

This section presents recommendations and suggestions for market microstructure and associated conventions for all three of the ZARONIA-based linear derivative contracts mentioned in the previous section. Please note that all subsequent references to section 8. below pertain specifically to the document [SARB-DWS, 2023][1].

2.1. ZARONIA-Jibar tenor basis swaps

Table 1: Market microstructure and conventions for ZARONIA-Jibar tenor basis swaps

Feature	Recommended Convention	Comment	Reference
Swap tenor	$\geq$ 3M	*Suggested standard quote tenors: 3M,6M,9M,1Y,2Y,3Y, 4Y,5Y,6Y,7Y,8Y,9Y,10Y,12Y,15Y,20Y,25Y and 30Y.*	8.1.
Accrual period	3M	*Aligning with standard Jibar interest rate swaps.*	8.1.
Business day calendar	ZAJO	*As published by the relevant providers, in accordance with the Public Holidays Act (Act No 36 of 1994).*	8.2.
Spot lag	0 bd	*Trade equals settlement and first accrual period start date. This is a common international settlement convention.*	8.2.
Business day convention	Modified Following	*Applied in accrual period date generation.*	8.2.
Accrual period date generation	Backward (EOM)	*Unadjusted backward generation from roll-day plus EOM, then adjusted by Modified Following.*	8.2.
Non-standard first period	Short-stub	*Shorter first accrual period, if necessary.*	8.2.
Accrual day count convention	ACT/365 Fixed	*Used in the calculation of interest cash flows for both floating legs.*	8.2.
Floating reference rates	ZARONIA & Jibar	*For ZARONIA, the final published rate as recommended by the SARB's MPG in Section 4 of [SARB-DWS, 2023].*	8.3.
Publication/ Calculation lag	1 bd	*Applicable to ZARONIA only, and calculated with the sub-accrual period start date as the anchor date.*	8.3.
ACFR calculation	Compounded, 0 bd lockout, 0 bd lookback, 0 bd obs shift	*Applicable to the ZARONIA-linked floating leg only. The ACFR is backward-looking without lockout, lookback or observation shift periods. A payment lag is used to resolve the settlement issue created by the calculation lag.*	8.4., 8.5.
ACFR convention	Simple, 6 decimal places	*Or 4 decimal places in % format.*	8.5.
Basis spread	Simple, additive post compounding	*Fixed simple rate added to the compounded ACFR post rounding for floating cash flow calculation.*	8.5.
Basis spread quotation	Simple, 6 decimal places	*Or 4 decimal places in % format.*	8.5.
Payment lag	2 bd	*Calculated with the last publication/calculation date within the respective accrual period as the anchor date.*	8.5.
Net cash flow rounding	2 decimal places	*Net unrounded floating cash flows from both legs, then round to the nearest ZAc.*	8.6.

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[1]To facilitate seamless referencing, please ensure that the document [SARB-DWS, 2023] is downloaded from the SARB website and saved — without renaming — into the same directory as this addendum. Doing so will enable the section reference links within this document to operate dynamically.

2.2. ZARONIA-Prime basis swaps

Table 2: Market microstructure and conventions for ZARONIA-Prime basis swaps

Feature	Recommended Convention	Comment	Reference
Swap tenor	$\geq$ 1Y	*Suggested standard quote tenors:* 1Y,2Y, . . . ,10Y,12Y,15Y,20Y,25Y *and* 30Y.	8.1.
Accrual period	3M	*Equivalent to Jibar-Prime basis swaps to enable simpler transition for market-makers, with similar economics.*	8.1.
Business day calendar	ZAJO	*As published by the relevant providers, in accordance with the Public Holidays Act (Act No 36 of 1994).*	8.2.
Spot lag	0 bd	*Trade equals settlement and first accrual period start date. This is a common international settlement convention.*	8.2.
Business day convention	Modified Following	*Applied in accrual period date generation.*	8.2.
Accrual period date generation	Backward (EOM)	*Unadjusted backward generation from roll-day plus EOM, then adjusted by Modified Following.*	8.2.
Non-Standard First Period	Short-Stub	*Shorter first accrual period, if necessary.*	8.2.
Accrual day count convention	ACT/365 Fixed	*Used in the calculation of interest cash flows for both floating legs.*	8.2.
Floating reference rates	ZARONIA & Prime	*For ZARONIA, the final published rate as recommended by the SARB's MPG in Section 4 of [SARB-DWS, 2023]. For Prime, this refers to the South African Prime lending rate, as published by the SARB.*	8.3.
Publication/ Calculation lag	1 bd	*Applicable to ZARONIA only, and calculated with the sub-accrual period start date as the anchor date.*	8.3.
ACFR calculation	Comp (ZARONIA), Simple (Prime)[2], 0 bd lockout, 0 bd lookback, 0 bd obs shift	*Both ACFRs are backward-looking without lockout, lookback or observation shift periods. A payment lag is used to resolve the settlement issue created by the calculation lag. The ACFRs for ZARONIA and Prime are compounded and simple, respectively.*	8.4., 8.5.
ACFR conventions	Simple, 6 decimal places	*Or 4 decimal places in % format, applicable to both the ZARONIA- and Prime-based ACFRs.*	8.5.
Basis spread	Simple, additive post averaging	*Fixed simple rate added to the Prime-based simple ACFR post rounding for floating cash flow calculation.*	8.5.
Basis spread quotation	Simple, 6 decimal places	*Or 4 decimal places in % format.*	8.5.
Payment lag	2 bd	*Calculated with the last publication/calculation date within the respective accrual period as the anchor date.*	8.5.
Net cash flow rounding	2 decimal places	*Net unrounded floating cash flows from both legs, then round to the nearest ZAc.*	8.6.

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[2]As described in section 8.4. of [SARB-DWS, 2023], the simple ACFR is an arithmetic average of the prevailing prime rates in each overnight sub-accrual period, in the accrual period under consideration, weighted by the length of each overnight sub-accrual period.

2.3. ZARONIA-Inflation zero coupon swaps

Table 3: Market microstructure and conventions for ZARONIA-Inflation zero coupon swaps

Feature	Recommended Convention	Comment	Reference
Swap tenor	$\geq 1Y$	*Suggested standard quote tenors:* $1Y, 2Y, \ldots, 10Y, 12Y, 15Y, 20Y, 25Y$ *and* $30Y$.	8.1.
Accrual period	Equal to swap tenor	*Equivalent to Jibar-Inflation swaps to enable simpler transition for market-makers, with similar economics.*	8.1.
Business day calendar	ZAJO	*As published by the relevant providers, in accordance with the Public Holidays Act (Act No 36 of 1994).*	8.2.
Spot lag	0 bd	*Trade equals settlement and first accrual period start date. This is a common international settlement convention.*	8.2.
Business day convention	Modified Following	*Applied in accrual period date generation.*	8.2.
Accrual period date generation	Backward (EOM)	*Unadjusted backward generation from roll-day plus EOM, then adjusted by Modified Following.*	8.2.
Non-Standard First Period	Short-Stub	*Shorter first accrual period, if necessary.*	8.2.
Accrual day count convention	ACT/365 Fixed	*Used in the calculation of interest cash flows for both floating legs.*	8.2.
Floating reference rate & index	ZARONIA & CPI	*For ZARONIA, the final published rate as recommended by the SARB's MPG in Section 4 of [SARB-DWS, 2023]. For CPI, this is the headline consumer price index, as published by Stats SA in the P0141 monthly release[3].*	8.3.
Publication/ Calculation lag	1 bd	*Applicable to ZARONIA only, and calculated with the sub-accrual period start date as the anchor date.*	8.3.
ACFR calculation	Compounded, 0 bd lockout, 0 bd lookback, 0 bd obs shift	*Applicable to the ZARONIA-linked floating leg only. The ACFR is backward-looking without lockout, lookback or observation shift periods. A payment lag is used to resolve the settlement issue created by the calculation lag.*	8.4., 8.5.
ACFR conventions	Simple, 6 decimal places	*Or 4 decimal places in % format, applicable to the ZARONIA-based ACFR.*	8.5.
Real fixed rate	RACS	*The key pricing variable that defines the inflation-linked cash flow of the swap, along with the inflation index ratio.*	3.1.
Real fixed rate quotation	RACS, 6 decimal places	*Or 4 decimal places in % format.*	3.1.
Inflation index ratio	$CPI(T_1)/CPI(T_0)$, lagged indexation	$CPI(T_0)$ *and* $CPI(T_1)$ *are referred to as the Base CPI and Reference CPI, respectively, subject to lagged indexation.*	3.2.
Inflation leg rate conventions	Simple, 6 decimal places	*Or 4 decimal places in % format.*	3.2.
Payment lag	2 bd	*Calculated with the last publication/calculation date within the respective accrual period as the anchor date.*	8.5.
Net cash flow rounding	2 decimal places	*Net unrounded floating cash flows from both legs, then round to the nearest ZAc.*	8.6.

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[3]More formally referred to as the headline consumer price index for all urban areas. See P0141_Feb_2025 for the most recent release at the time of writing, or P0141_History for a historical record.

3.   ZARONIA-Inflation zero coupon swap specific conventions

This section offers more detail about specific unique features of the inflation-defined leg of the ZARONIA-Inflation zero coupon swap. In particular, there are three key features that require definition: (i) the real fixed rate; (ii) the inflation index ratio; and (iii) the inflation leg rate. In defining these features, we make use of the notation and definitions that have already been developed in section 8. of [SARB-DWS, 2023].

3.1.   Real fixed rate

The key variable for the purposes of *market-making* which determines the fixed component of the inflation-defined leg of the swap is the *real fixed rate,* which is denoted here by R and is an annualised compounded semi-annual rate. Therefore, we refer to this interest rate convention as *real annual compounded semi-annually* (RACS).

The real fixed component of the inflation-defined leg is then calculated as

$$N \left(1 + \frac{R}{2} \right)^{2\delta_1} ,$$

where N denotes the swap nominal and δ_1 the interest accrual year fraction for the only accrual period $[T_0, T_1]$.

Moreover, R should be rounded to 6 decimal places in numerical format, or 4 decimal places in percentage format. For example, if $R = 0.0123456$, then round to 0.012346 or 1.2346%.

3.2.   Inflation index ratio and inflation leg rate

Firstly, we need to define *lagged indexation* and how it effects the computation of CPI in relation to statistical releases by Statistics South Africa (Stats SA).

Let x denote date $d/m/y$, then lagged CPI is standardly defined within South African financial markets as:

$$\text{CPI}(x) = (1 - w)\text{CPI}_{m-4} + w\text{CPI}_{m-3} , \tag{1}$$

where CPI_z is the relevant CPI level for calendar month z, as published by Stats SA, and $w = (d - 1)/D$ with D being the number of days in calendar month m. This standardised method of calculating lagged CPI may be corroborated via the terms and conditions of South African inflation-linked bonds — see, for example: I2050.

The lagged indexation equation (1) is used to calculate the:

- **Base CPI**: $\text{CPI}(T_0)$, which is the lagged CPI level at the start of the only accrual period; and

- **Reference CPI**: $\text{CPI}(T_1)$, which is the lagged CPI level at the end of the only accrual period;

which in turn enables the calculation of the *inflation index ratio*: $\text{CPI}(T_1)/\text{CPI}(T_0)$.

Finally, the *inflation leg rate*, which is denoted here by K, is implied by

$$K = \frac{1}{\delta_1} \left[\left(1 + \frac{R}{2} \right)^{2\delta_1} \frac{\text{CPI}(T_1)}{\text{CPI}(T_0)} - 1 \right] ,$$

and is also rounded to 6 decimal places in numerical format, or 4 decimal places in percentage format. The final cash flow associated with the inflation leg of the swap is then simply calculated as $NK\delta_1$.

Glossary

Abbreviations

ACFR annualised cumulative floating rate. 5, 6, 7

bd business day(s). 5, 6, 7

CCBS cross-currency basis swap. 4

CPI Consumer Price Inflation. 7, 8

DWS Derivatives Workstream. 4

EOM End-of-Month (business day convention). 5, 6, 7

Jibar Johannesburg Interbank Average Rate. 2, 3, 4, 5, 6, 7

MPG Market Practitioners Group. 4, 5, 6, 7

OIS overnight indexed swap. 4

RACS real annual compounded semi-annually. 7, 8

SARB South African Reserve Bank. 5, 6, 7

Stats SA Statistics South Africa. 7, 8

ZAJO South African calendar - Johannesburg Financial Center. 5, 6, 7

ZAc South African cent. 5, 6, 7

ZARONIA South African Overnight Index Average. 2, 3, 4, 5, 6, 7, 8

References

SARB-DWS (2023). "Market conventions for ZARONIA-based derivatives". In: URL: `https://www.resbank.co.za/content/dam/sarb/publications/media-releases/2023/zaronia-based-derivatives/Market%20conventions%20for%20ZARONIA-based%20derivatives.pdf` (cited on pages 4–8).