ActiveViam

Interpretation and Implementation of BCBS 457 - DRC Sec non-CTP

Atoti FRTB

6.0

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DRC Sec non-CTP

This section describes how the DRC Sec non-CTP risk-class is implemented and how the MAR standard is interpreted.

Also covered here is the specialization of the data, calculations, and configuration for the DRC Sec non-CTP risk-class, including:

- The data model, which describes the data used for the calculations and how it is structured, and how the data model is represented in the input files, datastore, and cube.
- The calculations, both in the ETL and at query time
- The parameters used in the query time calculations

Data Model (Core)

This section describes the data used for the DRC Sec non-CTP calculations, including how the data is structured.

For DRC Sec non-CTP, each **Tranche** (Underlying) has a **Tranche Name**, **Bucket**, **Rating**, an optional **Risk Weight**, and fields to determine the risk weight and bucket (if not provided).

The **Risk Factor** is used (along with the trade ID and as-of date) to identify the **JTD Exposures**. However, this field is not used directly in the calculations, instead the **Tranche** and **Maturity** fields are used. This means that multiple **Risk Factor Names** may be used for the same risk-factor.

The Field Mappings table lists all the fields across the data model and where they appear in the input files, database, and cube.

JTD Exposure

The **JTD Exposure** captures the jump-to-default risk that may not be captured by credit spread shocks under the SBM.

Field	Key	Description
As-of Date	Y	Timestamp (at close of business) for the data (T-1)
Trade ID	Y	A unique identifier for the trade (or position)
Risk Factor Name	Y	A unique identifier for the risk-factor
Risk Class	Y	“DRC Sec non-CTP”
Risk Measure	Y	“DRC”

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Field	Key	Description
Direction		Is the exposure “long” or “short”
Market Value		The market value of the exposure (JTD)

Risk Factor

The **Risk Factor** is used (along with the trade ID and as-of date) to identify the **JTD Exposures**.

However, this field is not used directly in the calculations, instead the **Tranche** and **Maturity** fields are used. This means that multiple **Risk Factor Names** may be used for the same risk-factor.

Field	Key	Description
As-of Date	Y	Timestamp (at close of business) for the data (T-1)
Risk Factor Name	Y	A name for the risk-factor
Risk Class	Y	“DRC Sec non-CTP”
Risk Measure	Y	“DRC”
Tranche (Underlying)		Name of the tranche
Maturity		Maturity of the trade

Tranche

The **Tranche** (Underlying) object describes the tranche. A tranche is specific to an underlying asset pool.

Field	Key	Description
As-of Date	Y	Timestamp (at close of business) for the data (T-1)
Tranche (Underlying)	Y	Name of the tranche
Risk Class	Y	“DRC Sec non-CTP”
Bucket		“Corporates” or asset class and region
Seniority		“senior” or not, for calculating the SEC-ERBA risk-weight
Rating		Credit rating of the tranche

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Field	Key	Description
Rating Type		The rating type used alongside the rating to determine the SEC-ERBA risk-weight
Region		The region used to determine the bucket
Asset Class		The asset class used to determine the bucket
Attachment Point		Attachment point of the tranche within the pool
Detachment Point		Detachment point of the tranche within the pool
Risk Weight		Optional override of the obligor's risk-weight

Field Mappings

The following table lists the fields in the data model and how they are mapped to the input files, datastore schema, and cube levels.

Data Model	Input Files	Datastore	Cube Level	Notes
all.As-of Date	DRC Trade Level.AsOfDate	all.AsOfDate	AsOfDate	
JTD Exposure.Trade ID	DRC Trade Level.TradeId	DRCBase.TradeId	TradeId	
all.Risk Class	DRC Trade Level.RiskClass	DRCBase.RiskClass	Risk Class	"DRC Sec non-CTP"
JTD Exposure.Risk Measure Risk Factor.Risk Measure			Risk Measure	"DRC"
JTD Exposure.Risk Factor Name Risk Factor.Risk Factor Name	DRC Trade Level.RiskFactor	DRCBase.Risk Factor	Risk Factor	

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Data Model	Input Files	Datastore	Cube Level	Notes
Tranche.Tranche Risk Factor.Tranche	DRC Trade Level.Underlying	Tranche.Tranche	DRC Sec non-CTP Tranche	Also Underlying
Risk Factor.Maturity	DRC Trade Level.Maturity	RiskFactorDescription.Maturity	DRC Maturity	
Tranche.Bucket	DRC Trade Level.Bucket	Tranche.Bucket	DRC Sec non-CTP Bucket	
Tranche.Seniority	DRC Trade Level.Seniority	Tranche.Seniority	DRC Sec non-CTP Seniority	“senior”
Tranche.Rating	DRC Trade Level.Rating	Tranche.Rating	DRC Sec non-CTP Rating	
Tranche.Rating Type	DRC Trade Level.Rating type	Tranche.Type	DRC Sec non-CTP Rating Type	“STC”
Tranche.Region	DRC Trade Level.Region	Tranche.Region	DRC Sec non-CTP Region	
Tranche.Asset Class	DRC Trade Level.AssetClass	Tranche.Asset Class	DRC Sec non-CTP Asset Class	
Tranche.Attachment Point	DRC Trade Level.Attachment	Tranche.Attachment	DRC Sec non-CTP Attachment	
Tranche.Detachment Point	DRC Trade Level.Detachment	Tranche.Detachment	DRC Sec non-CTP Detachment	
Tranche.Risk Weight	DRC Trade Level.Risk Weight	Tranche.RiskWeight		

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Data Model	Input Files	Datastore	Cube Level	Notes
JTD Exposure.Direction	DRC Trade Level.Direction	DRCBase.Direction	DRC Direction	"long" or "short"
JTD Exposure.Market Value	DRC Trade Level.MarketValue	DRCBase.PresentValue		

Calculations

This section describes the data manipulation and calculations applied to the sensitivities from the input files.

First, the ETL (Extract, Transform, Load) layer will apply some transformations as the data is loaded from the input files into the datastore.

Once the data is loaded into the datastore, it is available in the cube. The Market Value and JTD values in the cube may be partially aggregated upon commit to the datastore for BITMAP and LEAF aggregate providers. The remainder of the aggregation is performed by Atoti Server at query time.

Then, also at query time, the post-processors calculate the capital requirements from these aggregated values.

ETL (Reference Implementation)

The ETL (Extract, Transform, Load) layer provided with the Atoti FRTB, using the default file format, will perform the following transformations when data is loaded from the input files into the datastore.

Risk Factor Name

If the risk-factor name is not included in the input file (using the default file format), a name is generated as Tranche Name + Maturity.

Normalisation

In the default file format, each row of the DRC sensitivities' files contains the JTD as well as a description of the risk factor and tranche. The data normalisation splits this information across three stores in the datastore, as described in the data model.

Query Time (Core)

The calculation steps for DRC Sec non-CTP are as follows:

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1. The Gross JTD is either provided directly or calculated from the Notional, PV, and LGD.
2. The Gross JTD values are scaled according to the exposure's maturity to calculate the Scaled Gross JTD.
3. Offsetting is applied to calculate the long and short Net JTD for each tranche.
4. The long and short Net JTD values are combined to calculate the Hedge Benefit Ratio (HBR).
5. The risk-weights may be either looked up by rating or provided directly per tranche. These are applied to the Net JTDs to get the long and short Weighted Net JTD.
6. The long and short Weighted Net JTDs are combined with the HBR to calculate the Default Risk Charge.

In the bookmarks folder "ActiveViam FRTB" -> "Basel Framework" -> "SA DRC" the "SA DRC Sec non-CTP" bookmark contains tabs that walk through these calculation steps and include the measures mentioned here.

Gross JTD

The **Gross JTD** measure is defined in [MAR22.27] as the Market Value.

If the configuration parameter `sa.drc.strict-long-short=true` is set, then the Gross JTD is floored/capped at 0 (according to the direction long/short) at the risk-factor level [MAR22.10].

Scaled Gross JTD

The **Scaled Gross JTD** measure is the **Gross JTD** scaled according to maturity.

The maturity scaling has a ceiling of 1 (`sa.drc.maturity.max`) and a floor of 0.25 (`sa.drc.maturity.min`). If no maturity is provided, the scale factor is set to 0.25 (`sa.drc.maturity.default`).

Net JTD

The **Net JTD Long**/**Short** measures are calculated from the **Scaled Gross JTD** according to [MAR22.29].

For each tranche, the Scaled Gross JTD is aggregated over all exposures to the tranche, then one of the Net JTD Long or Net JTD Short values are set to this aggregate according to whether it is positive or not.

HBR

The **Hedge Benefit Ratio** (or "WtS Ratio") is calculated for each bucket according to [MAR22.33] (via [MAR22.23]) from the net long and short JTD values.

Risk Weight

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The **Risk Weights** are defined in [MAR22.34]. They may be provided in the input files for each tranche. Otherwise the SEC-ERBA risk weights are determined for the tranche as specified in CRE42.

The risk weights are looked up from the SEC-ERBA risk weights store. They are looked up by **Rating**, **Rating Type** and **Seniority**. For non-senior tranches the **Attachment Point** and **Detachment Point** are used to determine the tranche thickness.

Weighted Net JTD

The **Weighted Net JTD Long**/**Short** measures are calculated by multiplying the **Net JTD Long/Short** by the **Risk Weight**.

Default Risk Charge

The **Default Risk Charge** is calculated according to [MAR22.33] (via [MAR22.25]) from the **Weighted Net JTD Long/Short** and **HBR** measures.

It is first calculated independently for each bucket, then summed over the buckets.

Configuration (Core)

This section describes how the calculations are configured for DRC Sec non-CTP.

SEC-ERBA risk weights

Specifies the default risk weights by rating.

The ERBA_Risk_Weight file is loaded into the ERBARiskWeight store.

Data Model Field	File Column	Datastore Column
Tranche.Rating	Rating	Rating
Tranche.Rating Type	Rating Type	Rating Type
Tranche.Seniority	Seniority	Seniority

Miscellaneous Parameters

The FRTBParameters file is loaded into the FRTBParameters store. store.

Parameter	Parameter Name	Default Value

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Parameter	Parameter Name	Default Value
Default maturity scaling when no maturity is provided	`sa.drc.maturity.default`	0.25
Floor for maturity scaling	`sa.drc.maturity.min`	0.25
Ceiling for maturity scaling	`sa.drc.maturity.max`	1

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