Package ‘SACCR’

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Type Package

Title SA Counterparty Credit Risk under CRR2

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Description Computes the Exposure-At-Default based on the standardized approach of CRR2 (SA-CCR). The simplified version of SA-CCR has been included, as well as the OEM methodology. Multiple trade types of all the five major asset classes are being supported including the 'Other' Exposure and, given the inheritance-based structure of the application, the addition of further trade types is straightforward. The application returns a list of trees per Counterparty and CSA after automatically separating the trades based on the Counterparty, the CSAs, the hedging sets, the netting sets and the risk factors. The basis and volatility transactions are also identified and treated in specific hedging sets whereby the corresponding penalty factors are applied. All the examples appearing on the regulatory papers (both for the margined and the un-margined workflow) have been implemented including the latest CRR2 developments.

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Imports methods, data.tree, jsonlite, Trading

URL https://openriskcalculator.com/

Collate 'CalcAddon.R' 'CalcEAD.R' 'CalcPFE.R' 'CalcRC.R'
    'ExampleBasisVol.R' 'ExampleComm.R' 'ExampleCredit.R'
    'ExampleFX.R' 'ExampleIRD.R' 'ExampleIRDCommMargined.R'
    'ExampleIRDCredit.R' 'HandleBasisVol.R' 'LoadSupervisoryData.R'
    'runExampleCalculs.R' 'CalculateFactorMult.R'
    'CreateTradeGraph.R' 'GroupCommTrades.R' 'GroupCreditTrades.R'
    'GroupEquityTrades.R' 'GroupFXTrades.R' 'GroupIRDTrades.R'
    'GroupTrades.R' 'SACCRCalculator.R' 'SingleTradeAddon.R'
    'onLoad.R' 'DetermineCCRMethodology.R' 'GroupOtherTrades.R'

NeedsCompilation no
CalcAddon  

Calculates the Addon amount

Description

Calculates the amount of the addon for each hedging/netting set

Usage

CalcAddon(trades_tree, MF, simplified = FALSE, OEM = FALSE)
CalcEAD

Arguments

trades_tree A tree structure with the input trades
MF (Optional) The Maturity Factor based on the collateral agreement
simplified (optional) When TRUE, the add-ons will be calculated as per the simplified SA-CCR
OEM (optional) When TRUE, the add-ons will be calculated as per the Original Exposure Method

Value

The aggregate amount of the addon summed up for all the asset classes

Author(s)

Tasos Grivas <tasos@openriskcalculator.com>

References


CalcEAD Calculates the EAD

Description

Calculates the Exposure at Default

Usage

CalcEAD(RC, PFE)

Arguments

RC the replacement cost
PFE the projected future exposure

Value

The Exposure-at-Default

Author(s)

Tasos Grivas <tasos@openriskcalculator.com>

References

Examples

#returns 1.4*(60+500) = 784
EAD <- CalcEAD(60,500)

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CalcPFE  Calculates the PFE

Description

Calculates the Projected Future Exposure (PFE) after applying the relevant multiplier. The purpose of this multiplier is to lessen the risk stemming from the addons in case of excess collateral.

Usage

CalcPFE(V_C, Addon_Aggregate, simplified)

Arguments

V_C          the difference between the sum of the MtMs and the collateral
Addon_Aggregate    the aggregate amount of the Addon
simplified      (optional) When TRUE, the multiplier will be set to 1 as per the simplified & OEM approach

Value

The Projected Future Exposure (PFE)

Author(s)

Tasos Grivas <info@openriskcalculator.com>

References

CalcRC

Calculates the RC

Description

Calculates the Replacement Cost (RC) and the sum of the MtMs for all the trades

Usage

CalcRC(trades, csa, collaterals, simplified)

Arguments

- trades: The full list of the Trade Objects
- csa: (Optional) The CSA objects
- collaterals: (Optional) The collaterals Objects
- simplified: (optional) When TRUE, collaterals will be ignored as per the simplified & OEM approach

Value

The replacement Cost and the sum of the MtMs

Author(s)

Tasos Grivas <tasos@openriskcalculator.com>

References


CreateTradeGraph

Creates a tree-like structure of a list of trades

Description

Creates a tree-like structure describing the various hedging sets / risk factors that that the input trades can be broken into

Usage

CreateTradeGraph(trades)

Arguments

- trades: The full list of the Trade Objects
DetermineCCRMethodology

**Value**

A tree structure based on hedging/netting sets and basis/volatility transactions

**Author(s)**

Tasos Grivas <tasos@openriskcalculator.com>

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**DetermineCCRMethodology**

*Specifies the CCR methodology*

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**Description**

Determines the CCR methodology that the institution is eligible to utilize. The regulator allows the institutions to select less complicated methodologies when the derivatives trading business is negligible.

**Usage**

```python
DetermineCCRMethodology(trades_filename, total_assets)
```

**Arguments**

- `trades_filename`  
  the file holding the trades of the portfolio

- `total_assets`  
  the total assets of the institution in mio EUR

**Value**

The CCR methodology that the institution is eligible to utilize

**Author(s)**

Tasos Grivas <info@openriskcalculator.com>

**References**

**ExampleBasisVol**  
*Basis+Volatility trades Example*

**Description**  
Calculates the Exposure at Default for a trade set containing basis and volatility transactions

**Usage**  
ExampleBasisVol(JSON = FALSE)

**Arguments**  
- JSON (optional) if TRUE it returns a json string

**Value**  
The exposure at default

**Author(s)**  
Tasos Grivas <tasos@openriskcalculator.com>

**References**  

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**ExampleComm**  
*Commodities Example*

**Description**  
Calculates the Exposure at Default for the Commodities example as given in the Basel III regulatory paper

**Usage**  
ExampleComm(JSON = FALSE)

**Arguments**  
- JSON (optional) if TRUE it returns a json string

**Value**  
The exposure at default (expected value based on the Basel paper is 5406)
Author(s)

Tasos Grivas <tasos@openriskcalculator.com>

References

Basel Committee: The standardised approach for measuring counterparty credit risk exposures
http://www.bis.org/publ/bcbs279.htm

Description

Calculates the Exposure at Default for the Credit example as given in the Basel III regulatory paper

Usage

ExampleCredit(JSON = FALSE)

Arguments

JSON (optional) if TRUE it returns a json string

Value

The exposure at default (expected value based on the Basel paper is 381)

Author(s)

Tasos Grivas <tasos@openriskcalculator.com>

References

Basel Committee: The standardised approach for measuring counterparty credit risk exposures
http://www.bis.org/publ/bcbs279.htm
ExampleFX

**FX Example**

**Description**
Calculates the Exposure at Default for the FX product type

**Usage**
ExampleFX(JSON = FALSE)

**Arguments**
- JSON (optional) if TRUE it returns a json string

**Value**
The exposure at default

**Author(s)**
Tasos Grivas <tasos@openriskcalculator.com>

**References**
Basel Committee: The standardised approach for measuring counterparty credit risk exposures http://www.bis.org/publ/bcbs279.htm

ExampleIRD

**IRDs Example**

**Description**
Calculates the Exposure at Default for the IRD example as given in the Basel III regulatory paper

**Usage**
ExampleIRD(JSON = FALSE)

**Arguments**
- JSON (optional) if TRUE it returns a json string

**Value**
The exposure at default (expected value based on the Basel paper is 569)
ExampleIRDCommMargined

**Margined IRDs+Commodity Example**

**Description**
Calculates the Exposure at Default for the margined IRDs + Commodity example as given in the Basel III regulatory paper

**Usage**
ExampleIRDCommMargined(JSON = FALSE)

**Arguments**
- **JSON** (optional) if TRUE it returns a json string

**Value**
The exposure at default (expected value based on the Basel paper is 1879)

**Author(s)**
Tasos Grivas <tasos@openriskcalculator.com>

**References**
Basel Committee: The standardised approach for measuring counterparty credit risk exposures http://www.bis.org/publ/bcbs279.htm
**ExampleIRDCredit**

**IRDs+Commodity Example**

**Description**
Calculates the Exposure at Default for the IRDs + Commodity example as given in the Basel III regulatory paper.

**Usage**
ExampleIRDCredit(JSON = FALSE)

**Arguments**
- **JSON** (optional) if TRUE it returns a json string

**Value**
The exposure at default (expected value based on the Basel paper is 936)

**Author(s)**
Tasos Grivas <tasos@openriskcalculator.com>

**References**
Basel Committee: The standardised approach for measuring counterparty credit risk exposures
http://www.bis.org/publ/bcbs279.htm

**HandleBasisVol**
*Splits trades in being basis, volatility or 'normal' transactions*

**Description**
Receives a list of trades and splits them according to being basis, volatility or 'normal' transactions.

**Usage**
HandleBasisVol(trades)

**Arguments**
- **trades** The full list of the Trade Objects

**Value**
A list depicting which trade IDs fall under each hedging set.
**LoadSupervisoryData**  
*Supervisory Data Loading*

**Description**
Loads the supervisory data (factors, correlation and option volatility) for each Asset Class and SubClass

**Usage**
```
LoadSupervisoryData()
```

**Value**
A data frame with the required data

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**SACCRCalculator**  
*SA-CCR Calculator*

**Description**
Returns a tree structure depicting the add-on calculations on different hedging/netting sets

**Usage**
```
SACCRCalculator(
    trades_filename,
    csa_filename,
    coll_filename,
    JSON = FALSE,
    simplified = FALSE,
    OEM = FALSE,
    export_results = FALSE
)
```
Arguments

trades_filename  a .csv file containing the trades
csa_filename    a .csv file containing CSAs
coll_filename   a .csv file containing collaterals
JSON            (optional) if TRUE it returns a json string
simplified      (optional) if TRUE, the simplified SA-CCR is being calculated
OEM             (optional) if TRUE, the Original Exposure Method is being calculated
export_results  (optional) if TRUE, a csv with the exposure at the top level will be exported

Value

The relevant exposure trees

Author(s)

Tasos Grivas <tasos@openriskcalculator.com>

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