Package 'SACCR'

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Type Package

Title SA Counterparty Credit Risk under Basel III

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Description Computes the Exposure-At-Default based on standardized approach of the Basel III Regulatory framework (SA-CCR). For the generation of the trades an object-oriented solution has been created.

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Imports methods

URL www.openriskcalc.com

Collate 'CalcAddon.R' 'CalcEAD.R' 'CalcPFE.R' 'CalcRC.R' 'Trade.R' 'Commodity.R' 'Credit.R' 'ExampleComm.R' 'ExampleCredit.R' 'ExampleFX.R' 'ExampleIRD.R' 'ExampleIRDCredit.R' 'FX.R' 'IRD.R' 'LoadSupervisoryData.R' 'runExampleCalcs.R'

NeedsCompilation no

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R topics documented:

`CalcAddon` *Calculates the Addon amount*

Description

Calculates the aggregate amount of the addon after splitting per asset class and dividing the trades into the corresponding netting sets per currency, timebucket etc.

Usage

```
CalcAddon(trades)
```

Arguments

`trades`	The full list of the Trade Objects

Value

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

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

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

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

Examples

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

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)
```

Arguments

V_C	the difference between the sum of the MtMs and the collateral
Addon_Aggregate	the aggregate amount of the Addon

Value

The Projected Future Exposure (PFE)

Author(s)

Project team <info@openriskcalculator.com>

References

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

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CalcRC *Calculates the RC*

Description

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

Usage

```
CalcRC(trades)
```

Arguments

trades	The full list of the Trade Objects

Value

The replacement Cost and the sum of the MtMs

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

Commodity-class *Commodity Class*

Description

Creates a Commodity Object with the relevant info needed to calculate the Exposure-at-Default (EAD)

Arguments

Notional	The notional amount of the trade
MTM	The mark-to-market valuation of the trade
Currency	The currency set that the trade belongs to
Si	The number of years that the trade will take to start (zero if already started)
Ei	The number of years that the trade will expire
BuySell	Takes the values of either 'Buy' or 'Sell'
commodity_type	Takes the values of 'Oil/Gas','Silver','Electricity' etc.

Value

An object of type Commodity

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

Examples

```
## the Commodity trade given in the Basel regulation Credit example
tr1 = Commodity(Notional=10000,MtM=-50,Si=0,Ei=0.75,
BuySell='Buy',SubClass='Energy',commodity_type='Oil/Gas')
```

CreditIndex-class *Credit Index Class*

Description

Creates a Credit Index Object with the relevant info needed to calculate the Exposure-at-Default (EAD)

Arguments

Notional	The notional amount of the trade
MTM	The mark-to-market valuation of the trade
Currency	The currency set that the belongs
Si	The number of years after which the trade will start (zero if already started)
Ei	The number of years that the trade will expire
BuySell	Takes the values of either 'Buy' or 'Sell'

Value

An object of type CreditIndex

Examples

```
## the CreditIndex trade given in the Basel regulation Credit example
tr3 = CreditIndex(Notional=10000,MtM=0,Currency="USD",Si=0,Ei=5,
BuySell='Buy',SubClass='IG',RefEntity='CDX.IG')
```

CreditSingle-class *Credit Single Class*

Description

Creates a Credit Single Object with the relevant info needed to calculate the Exposure-at-Default (EAD)

Arguments

Notional	The notional amount of the trade
MTM	The mark-to-market valuation of the trade
Currency	The currency set that the trade belongs to
Si	The number of years that the trade will take to start (zero if already started)
Ei	The number of years that the trade will expire
BuySell	Takes the values of either 'Buy' or 'Sell'

Value

An object of type CreditSingle

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

Examples

```
## the CreditSingle trade given in the Basel regulation Credit example
tr1 = CreditSingle(Notional=10000,MtM=20,Currency="USD",Si=0,Ei=3,BuySell='Buy',
SubClass='AA',RefEntity='FirmA')
```

ExampleComm *Commodities Example*

Description

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

Usage

```
ExampleComm()
```

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

ExampleCredit *Credit Products Example*

Description

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

Usage

```
ExampleCredit()
```

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()
```

Value

The exposure at default (expected value is 364)

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()
```

Value

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

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()
```

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

FXSwap-class *FX Swap Class*

Description

Creates an FX Swap object with the relevant info needed to calculate the Exposure-at-Default (EAD)

Arguments

Notional	The notional amount of the trade
MTM	The mark-to-market valuation of the trade
Currency	The currency set that the trade belongs to
Si	The number of years that the trade will take to start (zero if already started)
Ei	The number of years that the trade will expire
BuySell	Takes the values of either 'Buy' or 'Sell'

Value

An object of type FXSwap

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

Examples

```
tr1 = FXSwap(Notional=10000,MtM=30,ccyPair="EUR/USD",Si=0,Ei=10,BuySell='Buy')
```

IRDSwap-class *IRD Swap Class*

Description

Creates an IRD Swap Object with the relevant info needed to calculate the Exposure-at-Default (EAD)

Arguments

Notional	The notional amount of the trade
MTM	The mark-to-market valuation of the trade
Currency	The currency set that the trade belongs to
Si	The number of years that the trade will take to start (zero if already started)
Ei	The number of years that the trade will expire
BuySell	Takes the values of either 'Buy' or 'Sell'

Value

An object of type IRDSwap

Examples

```
# the IRD Swap trade given in the Basel regulation IRD example
tr1 = IRDSwap(Notional=10000,MtM=30,Currency="USD",Si=0,Ei=10,BuySell='Buy')
```

IRDSwaption-class *IRD Swaption Class*

Description

Creates an IRD Swaption Object with the relevant info needed to calculate the Exposure-at-Default (EAD)

Arguments

Notional	The notional amount of the trade
MTM	The mark-to-market valuation of the trade
Currency	The currency set that the trade belongs to
Si	The number of years that the trade will take to start (zero if already started)
Ei	The number of years that the trade will expire
BuySell	Takes the values of either 'Buy' or 'Sell'
OptionType	Takes the values of either 'Put' or 'Call'
UnderlyingPrice	The current price of the underlying
StrikePrice	The strike price of the option

Value

An object of type IRDSwaption

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

Examples

```
# the Swaption trade given in the Basel regulation IRD example
tr3 = IRDSwaption(Notional=5000,MtM=50,Currency="EUR",Si=1,Ei=11,BuySell='Sell',
OptionType='Put',UnderlyingPrice=0.06,StrikePrice=0.05)
```

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

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

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