

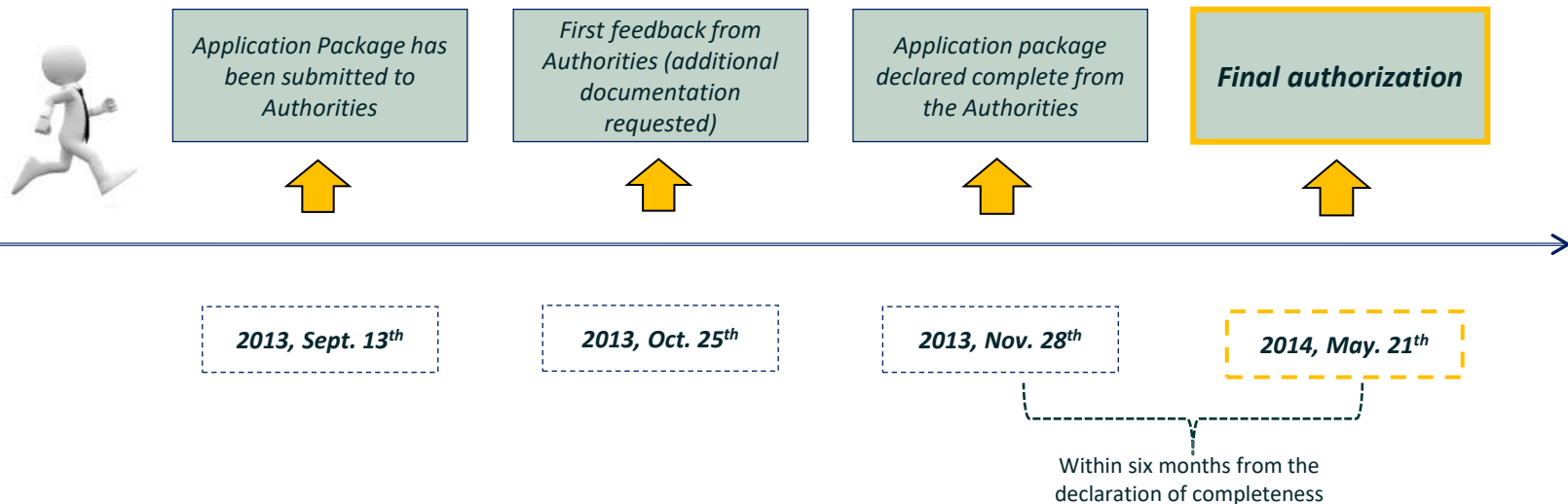
# CC&G Risk Disclosure



**CC&G**

A EURONEXT COMPANY

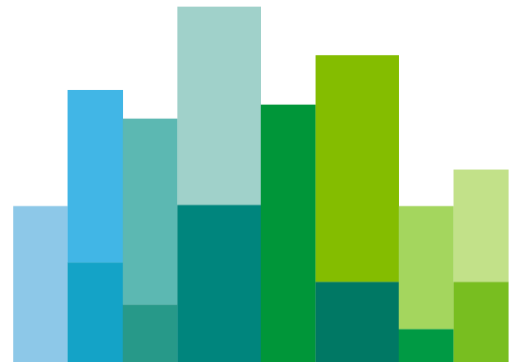
# Authorization under EMIR



The authorization was obtained with the **unanimous opinion of the College of Regulators** on full compliance by CC&G of the EMIR requirements to operate as a CCP

# Summary

- ❑ **Risks in CCPs**
- ❑ **Margins**
- ❑ **Default Funds**
- ❑ **Interoperability arrangement**



# Risk in CCPs (1/2)

| Risk                           | Definition                                                                                                                                                                                               |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Credit Risk</b>             | The risk that a counterparty, whether a participant or other entity, will be unable to meet fully its financial obligations when due, or at any time in the future                                       |
| - <b>Principal Risk</b>        | The risk that a counterparty will lose the full value involved in a transaction, for example, the risk that a seller of a financial asset will irrevocably deliver the asset, but not receive payment    |
| - <b>Replacement Cost Risk</b> | The risk of loss of unrealised gains on unsettled transactions with a counterparty. The resulting exposure is the cost of replacing the original transaction at current market prices                    |
| <b>Liquidity Risk</b>          | The risk that a counterparty, whether a participant or other entity, will have insufficient funds to meet its financial obligations as and when expected, although it may be able to do so in the future |
| <b>Custody Risk</b>            | The risk of loss on assets held in custody in the event of a custodian's (or subcustodian's) insolvency, negligence, fraud, poor administration, or inadequate recordkeeping                             |
| <b>Investment Risk</b>         | The risk of loss faced by an Financial Market Infrastructure when it invests its own or its participants' resources, such as collateral                                                                  |

# Risk in CCPs (2/2)

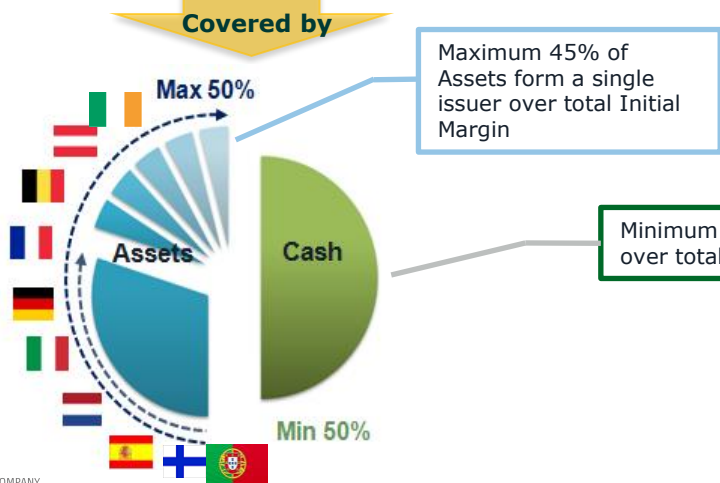
| Risk                         | Definition                                                                                                                                                                                                                                                  |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Legal Risk</b>            | The risk of the unexpected application of a law or regulation, usually resulting in a loss                                                                                                                                                                  |
| <b>Operational Risk</b>      | The risk that deficiencies in information systems or internal processes, human errors, management failures, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI                    |
| <b>General Business Risk</b> | Any potential impairment of the FMI's financial position (as a business concern) as a consequence of a decline in its revenues or an increase in its expenses, such that expenses exceed revenues and result in a loss that must be charged against capital |
| <b>Systemic Risk</b>         | The risk that the inability of one or more participants to perform as expected will cause other participants to be unable to meet their obligations when due                                                                                                |

(CPSS-IOSCO Principles for Financial Markets Infrastructures 2012)

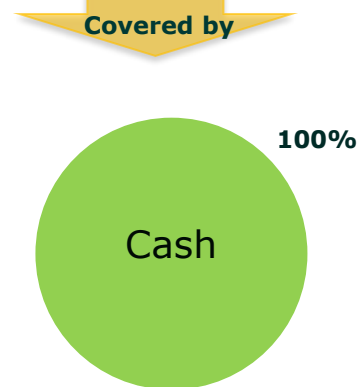
# Prudential requirements

Margins, Default Fund coverage, Collateral

| Topic                | Main Requirement                     |
|----------------------|--------------------------------------|
| <b>Margins</b>       |                                      |
| Confidence intervals | Minimum 99,00%                       |
| Holding period       | Minimum 2 days                       |
| Lookback period      | Minimum 1 year                       |
| Procyclicality       | 10 years time series or a 25% buffer |



| Topic                               | Main Requirement |
|-------------------------------------|------------------|
| <b>Default Fund</b>                 |                  |
| Minimum coverage (# of CMs covered) |                  |



# Initial Margins

Initial Margins are calculated using leading practices Risk Based Margining Methodologies:

Historical prices and yield curve analysis:

- ✓ Higher Confidence Level than the minimum regulatory requirements
- ✓ Time Horizon: 2-5 days (the time to manage the insolvency)
- ✓ Long Term Price Historical Analyses (more than 20 years)

Careful evaluation by the Internal Risk Committee of each parameter for each instrument/underlying on a monthly basis; no “automatic” approach

No Significant Changes to Margin calculation approach in last 12 months

Soundness and robustness of the model strongly proven during the recent crises

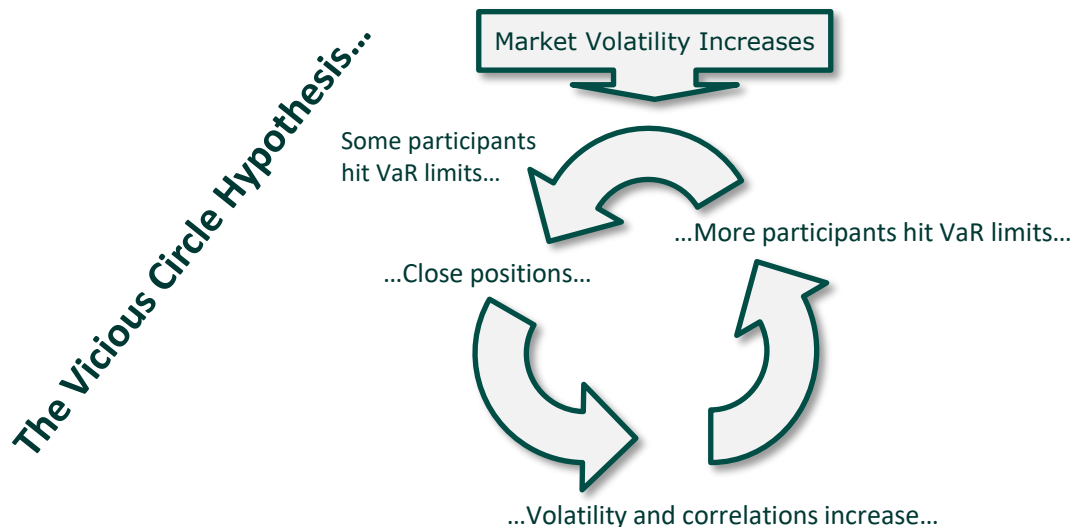
# Margins : Overview of methodologies

|                  |                                                                                                                                                                  | Model Type                                                                                                                                                                                                                                                                                                     | Distributional assumptions                                                                                                     | Confidence levels                                                                                                                                    | Lookback periods                                                                                                                | Holding periods                                                                                                                       | P&L methodology |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Market/ products | <b>Equity and Equity derivatives section:</b><br>EXM (shares, warrant, convertible bonds) MIV (closed-end fund, investment companies, REIC) , ETFplus (ETF, ETC) | <b>Mars (Margining System)</b><br><br>Industry Standard Scenario Based Analysis                                                                                                                                                                                                                                | The most conservative result obtained by assuming normal distribution and real distribution of price variations is considered. | 99,5% minimum for the minimum time horizon/holding period required by EMIR (1 year/2 days).                                                          | Look back periods ranging from 6 months to 10 years, plus one for the whole time series starting, where available, from 1991.   | <ul style="list-style-type: none"> <li>For equity cash: 1 day and 2-days;</li> <li>For derivatives: 1 day, 2-days, 3-days.</li> </ul> | Full valuation  |
|                  | <b>Bond section</b><br>MTS, MoT, EuroMot, Euro tlx                                                                                                               | <b>MVP (Method for Portfolio Valuation)</b><br><br>Industry Standard Scenario Based Analysis                                                                                                                                                                                                                   | The most conservative result obtained by assuming normal distribution and real distribution of yield variations is considered. | Levels of coverage for each time series/holding period analysed are defined by applying an internal model, namely "Sovereign Risk Framework" (SRF) . | Look back periods ranging from 6 months to 10 years, plus one for the whole time series starting, where available, from 1999.   | Ranging from 3 to 5 days, depending on the Band resulting from the SRF analysis.                                                      | Full valuation  |
|                  | <b>IDEX</b><br>Energy Futures                                                                                                                                    | <b>MMeL</b><br>The MMeL margining methodology has a structure of Classes which recognises contracts tradable on the market grouped by their specific characteristics (Delivery Period and type of supply: Baseload or Peakload). Specific classes are assigned to contracts during the delivery period.        | The most conservative result obtained by assuming normal distribution and real distribution of price variations is considered. | 99% confidence level                                                                                                                                 | 1-year time series                                                                                                              | 2-days holding period.                                                                                                                | Full valuation  |
|                  | <b>Agrex</b><br>Durum Wheat Futures                                                                                                                              | <b>MMeG</b><br>The margining methodology foresees a Class structure capable of classifying the contracts which are actually traded on the market plus additional Classes for managing Delivery Positions (Covered and Uncovered from a delivery certificate) and Matched (between seller and buyer) Positions. | The most conservative result obtained by assuming normal distribution and real distribution of price variations is considered  | Same as for Equity derivatives                                                                                                                       | Look back periods ranging from 6 months to 10 years, plus one for the whole time series referred to time series of comparables. | Same as for Equity derivatives.                                                                                                       | Full valuation  |



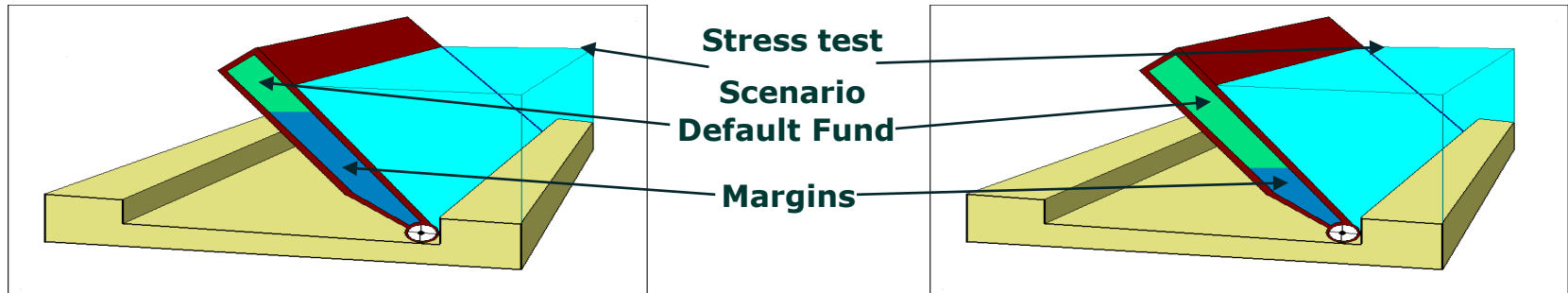
# Procyclicality

| Regulatory framework                    | Requirement                                                                                                                                           | CC&G approach                                                                        |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Procyclicality<br><i>(ESMA art. 28)</i> | One of the following options:<br>1. Look-back period of at least 10 years; or<br>2. Margin buffer of 25%; or<br>3. 25% weight to stressed observation | 1. Opt. 1. always applied, where available<br>2. Opt. 2. applied for new instruments |



# Default Funds

- The size of the Default Funds is gauged on Stress Tests results
- The Default Funds cover the losses in excess of margins for the pertinent market segment (i.e. equity cash & derivatives vs. bonds) in case of catastrophic events
- Four separate Default Funds
  - Equity/Derivatives
  - Bonds
  - Electricity
  - Agricultural
- Members contribute on a pro-rata basis
- The contribution to the Default Fund of each Member is adjusted on a monthly basis and is proportional to the average initial margin paid in the previous month
- Lines of Defense (Margins, Default Funds, etc) should not be seen in isolation, but to the contrary, they should be seen as different facets of the same entity



# Stress Test Scenarios

## Equity – Equity derivatives section

### Equity Section

It is assumed that each security has a downside / upside variation equal to the worst between the following events:

| Price Hypothesis | Downside / Double Volatility                                                     | Downside / Half Volatility | Upside / Double Volatility | Upside / Half Volatility | Real-life sign price change / Double Volatility | Real-life sign price change / Half volatility | Extra Stress                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------|----------------------------|----------------------------|--------------------------|-------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a.               | Largest 1d, 2d, 3d price variation occurred over the whole available time series |                            |                            |                          |                                                 |                                               |                                                                                                                                                             |
| b.               | 1.20 the value of the «Applicable Margin Interval»                               |                            |                            |                          |                                                 |                                               |                                                                                                                                                             |
| c.               | 4 times the standard deviation                                                   |                            |                            |                          |                                                 |                                               |                                                                                                                                                             |
| d.               | n.a.                                                                             |                            |                            |                          |                                                 |                                               | The shares of the two most exposed banking groups in the Downside Price Variation / Double volatility Scenario have a downside price variation equal to 90% |
| Sign Hypothesis  | -Decrease                                                                        |                            | Increase                   |                          | Real life sign                                  |                                               | Decrease                                                                                                                                                    |

### Equity Derivatives Section

It is assumed that each security has a downside / upside variation equal to the worst between the following events:

| Hypothesis                                        | Downside / Double Volatility                                                   | Downside / Half Volatility                                                   | Upside / Double Volatility                                                     | Upside / Half Volatility                                                     | Real-life sign price change / Double Volatility                                | Real-life sign price change / Half volatility                                | Extra Stress                                                                   |
|---------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| a. Futures, FTMIIB Index, SSDF                    | one-to-one price variation with their underlying                               |                                                                              |                                                                                |                                                                              |                                                                                |                                                                              |                                                                                |
| b. Equity Options prices and FTMIIB Index Options | Recalculated using stressed underlying price and double the implied volatility | Recalculated using stressed underlying price and half the implied volatility | Recalculated using stressed underlying price and double the implied volatility | Recalculated using stressed underlying price and half the implied volatility | Recalculated using stressed underlying price and double the implied volatility | Recalculated using stressed underlying price and half the implied volatility | Recalculated using stressed underlying price and double the implied volatility |

# Stress Test Scenarios

## Fixed Income Section

### Yield Increase and Decrease scenarios

It is assumed a increase / decrease of the Italian yield curve and Eurozone yield curve:

| Hypothesis                                                                                   | Yield Increase/Decrease                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. Fixed rate bonds (BTP), CTZ (Zero-coupon securities), Treasury bills (BOT)                | - Largest between the largest upside and downside, one-day, two-days, three-days, four-days and five-days yield variations;<br>- Yield Variations resulting of the linear interpolation of the largest variation for the previous and next vertices to the duration of the bond.<br>. |
| b. Inflation Indexed Bonds (BTPi and BTP Italia), Floating Rate Bonds (CCT), Corporate Bonds | 1.20 the size of the Margin Interval                                                                                                                                                                                                                                                  |

### Steepening and Flattening scenarios

It is assumed a non-parallel shift of the Italian yield curve and Eurozone yield curve:

| Steepening                                                                                                                    | Flattening                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| +/-n basis point on the vertex "x" and +/-m basis point on the vertex "y"<br>(ITGOV3YZ DELTA: 1,00% – ITGOV10YZ DELTA: 1,98%) | +/-n basis point on the vertex "x" and +/-m basis point on the vertex "y"<br>(ITGOV5YZ DELTA: 1,69% – ITGOV10YZ DELTA: 1,32%) |

# Review of Stress Test Scenarios

## Bond Stress Test Case

|             | 2004-2008                                                                                                                          | 2008-2012                                                                               |
|-------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Design      | CC&G designs a hypothetical stress test scenario as no historical stress scenario was available for the Eurozone countries in 2004 | Stress Test Scenario based on new model                                                 |
| Communicate | The Hypothetical Stress Test Scenario is communicated to stakeholders                                                              | The “Humpy” Stress Test Scenario is communicated to stakeholders                        |
| Implement   | CC&G executes Stress Tests based on above Scenarios                                                                                | CC&G executes Stress Tests based in “Humpy” Scenarios                                   |
| Monitor     | Late 2007: Consistent humps in the Euro curve which impact the significance of the Stress Test Scenario                            | Mid 2010: resurgence of Eurozone Crisis                                                 |
| Learn       | Stress Test Scenario needs to be flexible enough to manage the existence of large humps in the curve                               | New Stress Test Scenario now needs to incorporate actual events on each sovereign Curve |
| Design      | New Stress Test Scenario “with humps” (Svensson Model) which goes live in Feb 2008                                                 | New Stress Test Scenario based on actual yield variations of Italian Curve              |

# Risk Management Test

## Scope

## Details

### Stress test

Determining the Default Fund for each Section

At least the first 2 months of historical or hypothetical scenarios for each Section most exposed.

CC&G policy minimum:

- "Cover 4" → Bond Section
- "Cover 3" → Other Participant sections

## Scope

## Details

### Back test

Determining the Default Fund for each Section

- Performed both at instrument level and portfolio level.
- At a portfolio level, it is based on the comparison between the Initial margins and the profits and losses that would apply in case CC&G was to close out all positions of the portfolio over a hypothesised horizon of n days.

### Sensitivity test

Assess the adequacy of margining parameters

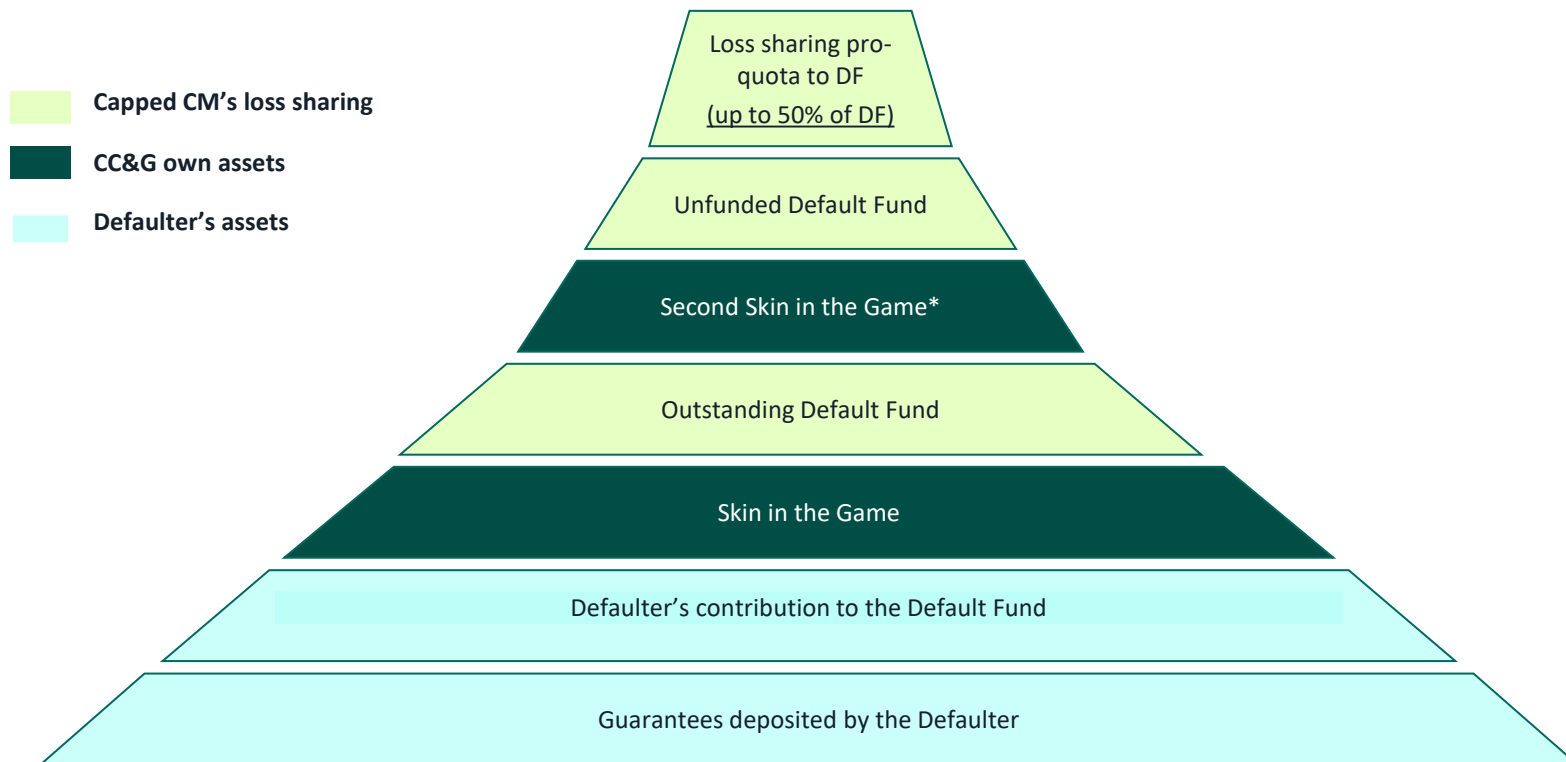
If a small change in the margin parameters (confidence level or holding period) results in a significant increment in Initial Margin value after sensitivity test, then it means that margin parameters have to be amended such as to produce more robust results.

### Reverse stress test

Determining the Default Fund for each Section

Reverse stress testing adopted by CC&G consists in a reprocessing of the stress tests using a "trial and error" approach up to identify the conditions where available resources are no longer sufficient to cover the Non-Collateralized Exposure of the two most exposed clearing members.

# Default Waterfall



\*Pursuant to article B.6.2.3 of CC&G's Regulation, CC&G has defined in € 1.500.000 the amount of own assets set out in comma 1, letter e) of the same article of the Regulation

# Default Procedures

In compliance with Article 61, par. 2 of Commission Delegated Regulation (EU) No 153/2013 (obligation to make available to the public key aspects CCP's default procedures), CC&G's Rulebook outlines the key aspects of CC&G Default Management Procedures (see Part B.6 of CC&G's Rulebook), available on CC&G website, including:

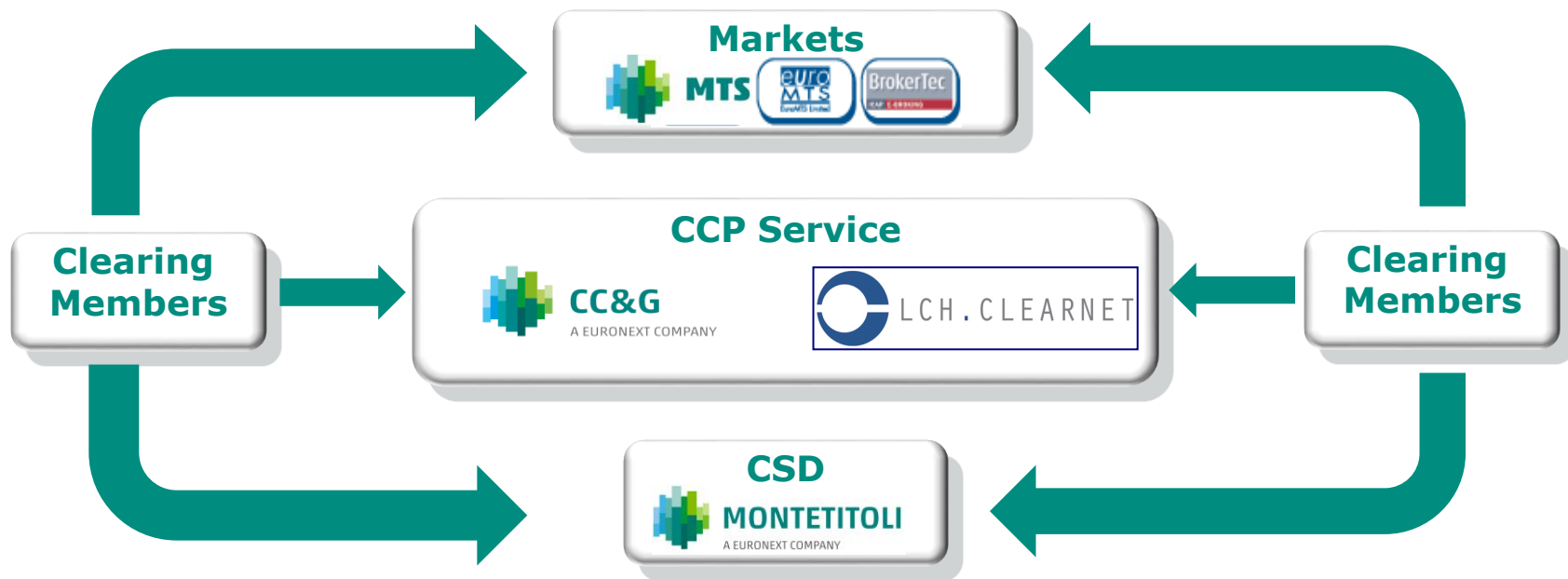
- the circumstances in which action may be taken;
  - the scope of the actions which may be taken, including the treatment of both proprietary and client positions, funds and assets;
  - the mechanisms to address a CCP's obligations to non-defaulting clearing members;
  - the mechanisms to help address the defaulting clearing member's obligations to its clients.
- 
- With reference to contractual default (Article B.6.1.1 par.1 letter a), the declaration of default is taken by CC&G's CEO whereas with respect to default arising from insolvency proceedings (Article B.6.1.1 par. 1 letter b), the declaration of the insolvency proceedings will be carried out by the competent authority. The consequent actions indicated in the Rulebook are taken by CEO or, in his absence, by the delegated people (as per CEO Delegation of Powers in force) upon advice of the Internal Risk Committee or of the CRO, if the Internal Risk Committee cannot be held. CC&G Top Management is involved in all the default management process. The Service Closure decision can be taken only by the CEO since this action was not delegated.
  - Additional aspects of treatment of both proprietary and client positions, funds and assets are indicated in the document "Levels of protection associated with the different levels of segregation" available on CC&G Website.



# Investments

- **There is strong regulatory guidance on how CCPs mitigate their investment risk through a number of reinforcing mechanisms, among which:**
  - CCP shall invest only in cash or **highly liquid financial instruments with minimal market and credit risk**
    - Cash balances with central banks
    - Max 5% with commercial banks
  - Highly Liquid Financial Instruments are debt instruments backed by:
    - A Government
    - Central Bank
    - Qualified Supranational Entities
    - Average Time to Maturity < 2yrs
  - Diversification by:
    - Issuer
    - Instruments
  - Own financial resources which are not invested as per above, do not concur to the CCP capital
- **CC&G has access to Central Bank Liquidity**
  - EMIR: “In assessing the adequacy of liquidity resources, especially in stress situations, a CCP should take into consideration the risks of obtaining the liquidity by only relying on commercial banks credit lines”

# Two CCPs, one Single Virtual Counterparty



# Interoperability Model

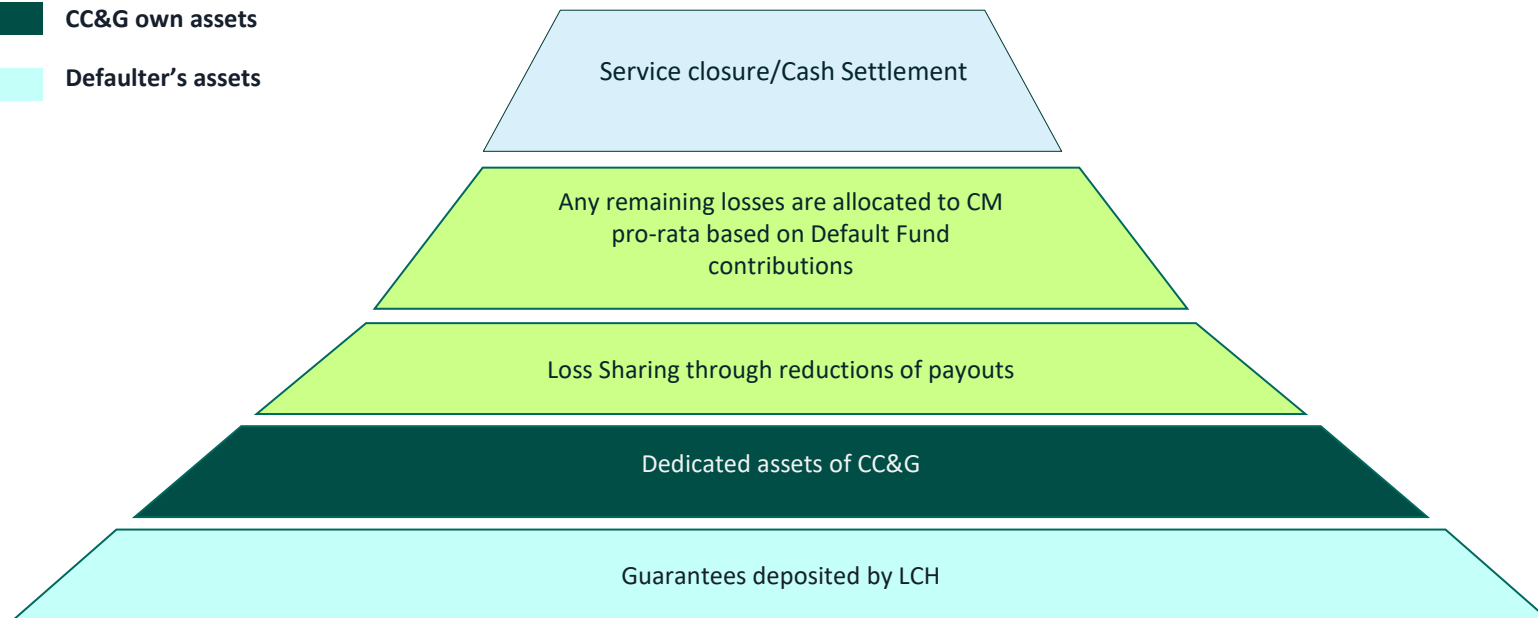
- in case of default the Service covers all Italian Government bonds traded on MTS, on EuroMTS and on BrokerTec cash and repo platforms
- CCP services jointly provided by CC&G and LCH.Clearnet SA through an interoperability model
- The terms of the CC&G-LCH.Clearnet SA agreement (December 2002) established that the two CCPs would set up an integrated Central Counterparty service which would be seen by users as a single service (that is: a “Virtual Single CCP”)
- One common Risk Margining Methodology using the same parameters (No competition on Risk Grounds with Members)
- If the 2 players are members of different CCPs, the 2 CCPs will face each other in acting as “Special Clearing Members/Allied Clearing House”
- In case of a member's default, its CCP will guarantee all its obligations without affecting the other CCP and the relative members → Each CCP would be exposed to losses exclusively of one of its own participant and not in the case of default of a participant of the other CCP (“no spillover”)

# Waterfall for LCH Clearnet SA Default

 Capped CM's loss sharing

 CC&G own assets

 Defaulter's assets



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