

# The Impact of Central Clearing and Bilateral Margin Requirements

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# **A Review of Regulatory Requirements**

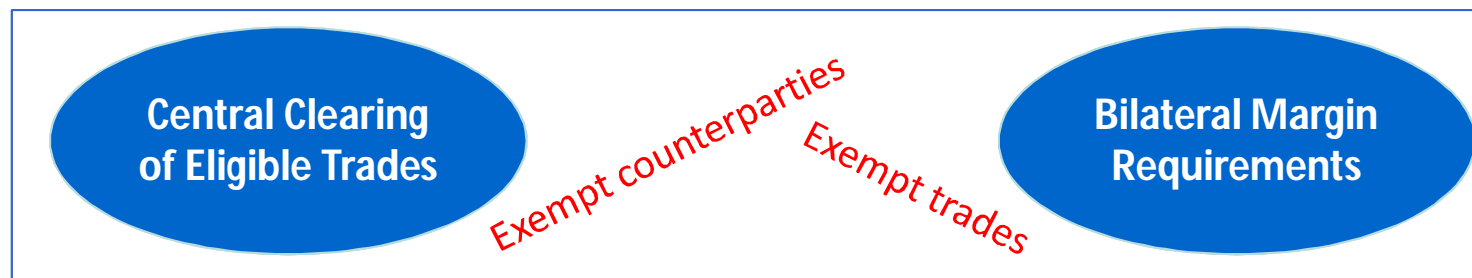
## **Initial and Variation Margins**

## **How CCPs Work**

## **The Risks of Clearing and Margin Requirements**

## **Conclusions**

- **Central clearing mandate**
  - The G20 agreed in 2009 to require central clearing of standardised OTC derivatives
  - This is done with the view that CCPs will reduce systemic risk
  - One of the main ways CCPs ensure safety in a Lehman like scenario is by taking margin
- **Bilateral margin rules**
  - In 2011, bilateral margin requirements for non-cleared derivatives were introduced
- **A very big change is the need for initial margins for OTC derivatives**
  - This has previously been uncommon in bilateral OTC markets (independent amount)
  - Initial margin needs to be segregated (protected) and of good credit quality and liquidity



- **Global regulation (e.g. Dodd-Frank, EMIR) is generally enforcing the clearing mandate and bilateral margin requirements**
  - Although there are differences in detail and timescales
- **Central clearing**
  - Standardised OTC derivatives must be cleared directly or indirectly
  - Exemptions for end-users and (strangely) FX transactions
- **Bilateral margin requirements**
  - Applies to bilateral (non-clearable) OTC derivatives
  - Variation margin (already quite common)
  - Initial margin (independent amount, uncommon in bilateral markets)
  - Again some exemptions for end-users and FX trades

## Bilateral Markets vs. Clearing and Mandatory Margining

	Bilateral clearing (no initial margin)	Central clearing (or bilateral clearing with initial margin)
Model	Survivor pays	Defaulter pays
Loss absorbency	Capital	Initial margin (and default funds and capital)
Risk horizon	~1-year	~5-days
View	Long-term (e.g. based on fundamental credit analysis and ratings)	Short-term (e.g. dependent on short-term market volatility)
Credit quality sensitivity	Strong	Weak
Market risk sensitivity / procyclicality	Small	Potentially large (although reduced by using stressed data, for example)
Incentive	Losses aligned to risks	Loss mutualisation and potential moral hazard
Default close out	Uncoordinated bilateral close out	Coordinated auctions
Margining	Variation margin or none	Variation and initial margin

# A Review of Regulatory Requirements

## Initial and Variation Margins

## How CCPs Work

## The Risks of Clearing and Margin Requirements

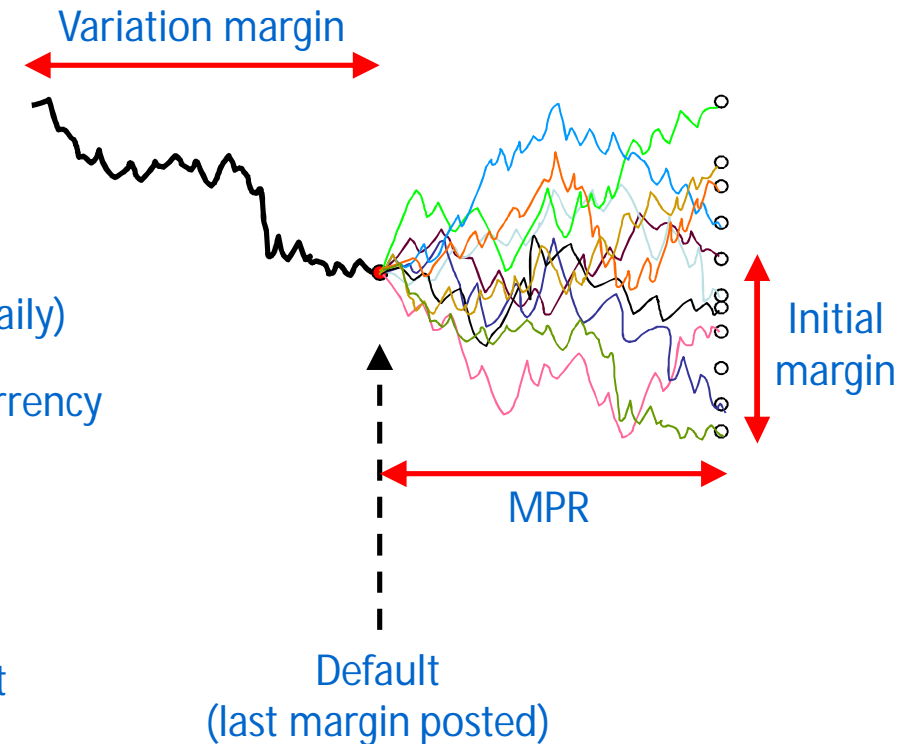
## Conclusions

- **Variation margin**

- Taken against the current market value of positions (calculated by CCP or bilaterally)
- Called for frequently (CCPs can call intra-daily)
- Typically must be in cash in transaction currency (CCPs or bilaterally via standard CSAs)

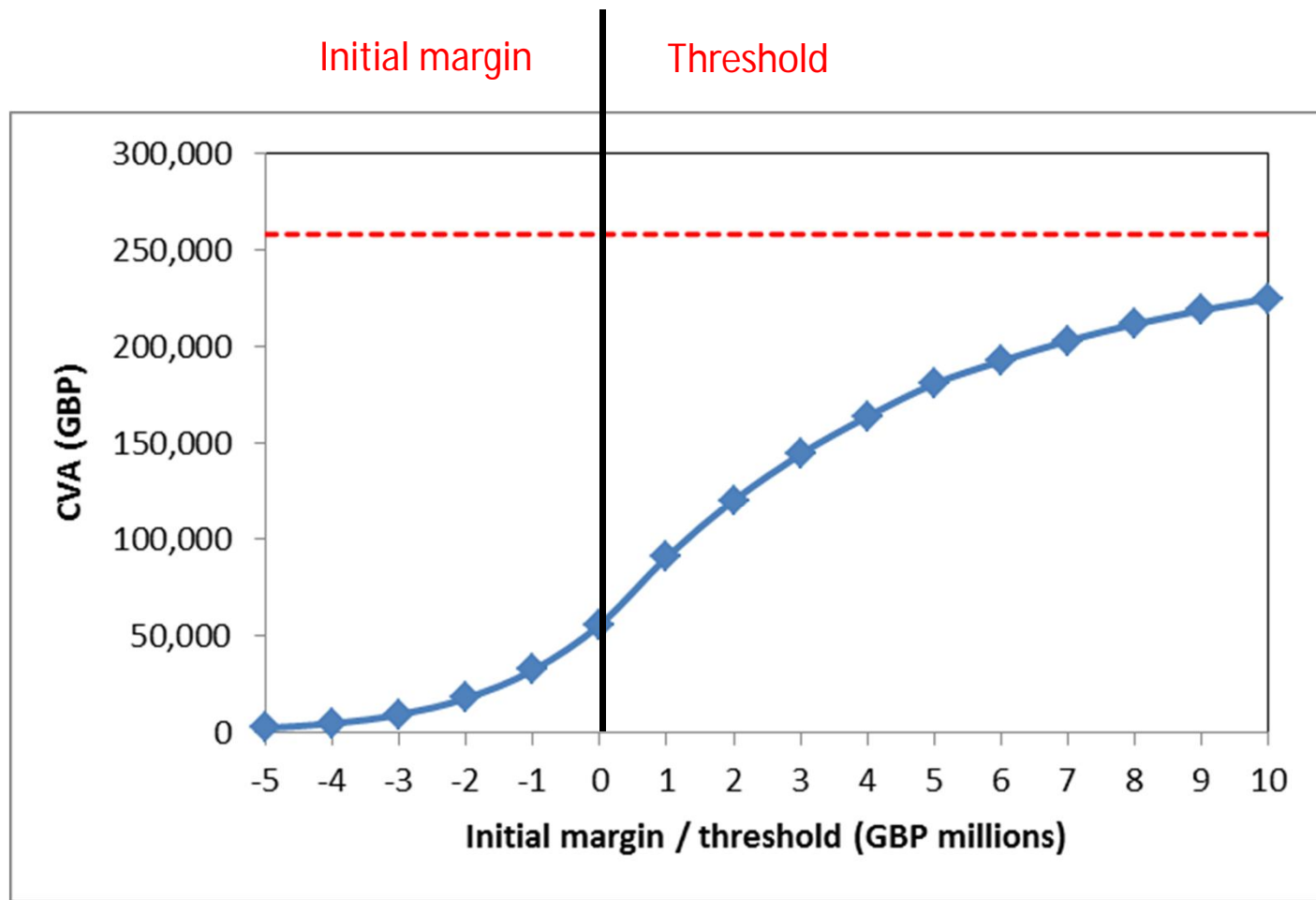
- **Initial margin**

- Accounts for a worst case move in default
- May be in other liquid securities (with haircuts)
- Margin period of risk (MPR) assumed to be approximate 5 days (CCPs) and 10 days (bilateral margin rules)
- Note : initial margins and haircuts may change through time



# CVA with Initial Margin / Threshold

10-day margin period of risk



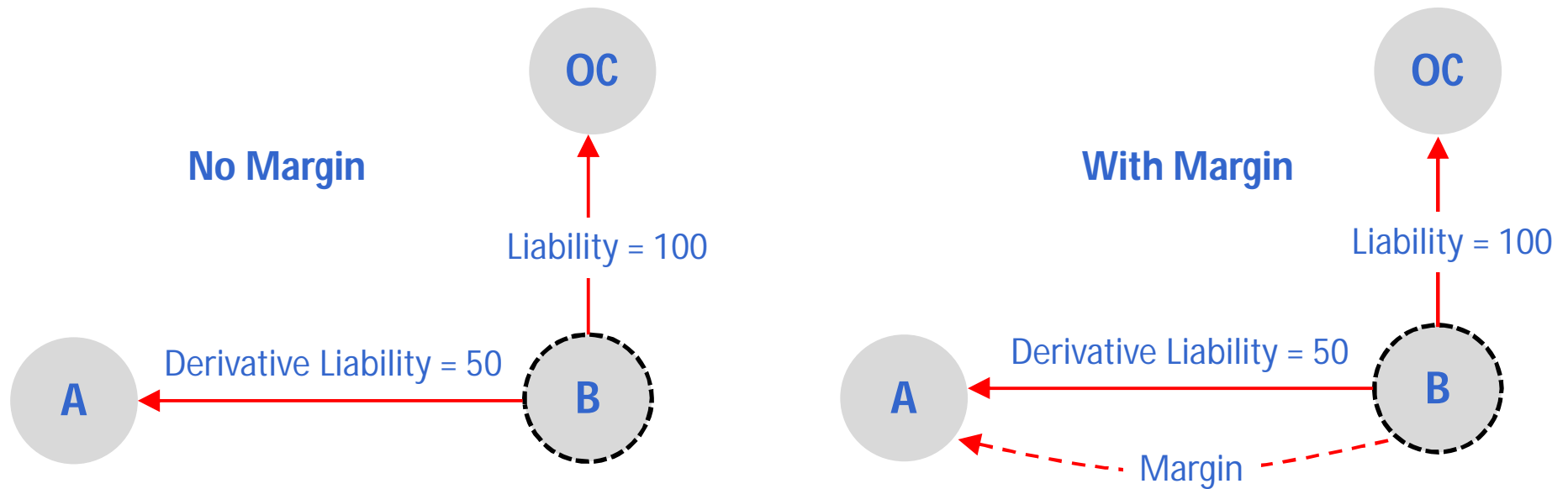


# Margin Reduces Reallocates Risk

- Suppose B has assets of 100

	Derivatives			Other creditors
	Margin	Recovery	Total recovery	Total recovery
No margin	0	33	33 (67%)	67 (67%)
+ Variation margin	50	0	50 (100%)	50 (50%)
+ Initial margin	75	0	75 (100%)	25 (25%)

*Assume all of the initial margin is used in closeout costs*



## Is Variation Margin Expensive?

*"The variation margin payments, on the contrary, should not have a first-order effect on the demand for collateral, as variation margin is a one-way payment and hence does not affect the net demand for collateral assets."  
CGFS (2013)*

*"In the case of variation margin, the BCBS and IOSCO recognise that the regular and timely exchange of variation margin represents the settlement of the running profit/loss of a derivative and has no net liquidity costs given that variation margin represents a transfer of resources from one party to another"  
BSBC-IOSCO (2013)*

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*"The following discussion of CME cash flows emphasizes variation margin payments because, as will be discussed, these payments placed the greatest stress on the financial system during the week of October 19."  
Brady (1988)*

*"Variation margin calls on G14 dealers from CCPs that cleared all of their IRS or CDS positions could cumulate over a few weeks to a substantial proportion of their current cash holdings, especially under high market volatility. These amounts are not incremental to potential variation margin calls under decentralised clearing arrangements, which could be equally significant."  
Heller and Vause (2012)*

- **The previous arguments are analogous to those on the existence of FVA**
  - Hull and White view can be seen as suggesting that variation margin has no funding cost or benefit because it represents only what it owed to/from another party
- **What about initial margin?**
  - This definitely has an FVA cost due to aspects such as segregation

Variation margin	Initial margin
Parties pay what they owe to each other	Parties pay more than what they owe
Calculation relatively straightforward and objective (for vanilla products certainly)	Calculation highly subjective and difficult (e.g. VAR models, confidence level and margin period of risk)
Perfect variation margining leads to standard pricing results (OIS discounting, Piterbarg 2010)	Initial margin is “imperfect” in this sense as all parties required to post will experience an FVA cost
Netting of offsetting margins is natural	Netting is not natural
No major problems with re-hypothecation and segregation	Major re-hypothecation and segregation issues have to be resolved

- **To reduce counterparty risk (CVA), collateral is ideally**
  - Not adversely correlated to credit quality of counterparty
  - (Good credit quality)
  - Segregated
- **To provide a funding benefit (FVA)**
  - Re-usable (re-hypothecation) and therefore not segregated
- **Traditionally, this is not a problem**
  - High quality variation margin in a typical CSA (only small risk due to non-segregation)
- **But there are some conflicts which are especially important going forward**
  - Segregation of initial margin (good for CVA, bad for FVA)
  - Sovereign posting own bonds (good for FVA, bad for CVA)

- **Normally we think of exposure for both counterparty risk and funding**
  - Counterparty risk exposure – what we lose when a counterparty defaults (CVA)
  - Funding exposure – what we have to fund (FVA)
- **Equivalent unless segregation is an issue (a requirement for initial margin)**

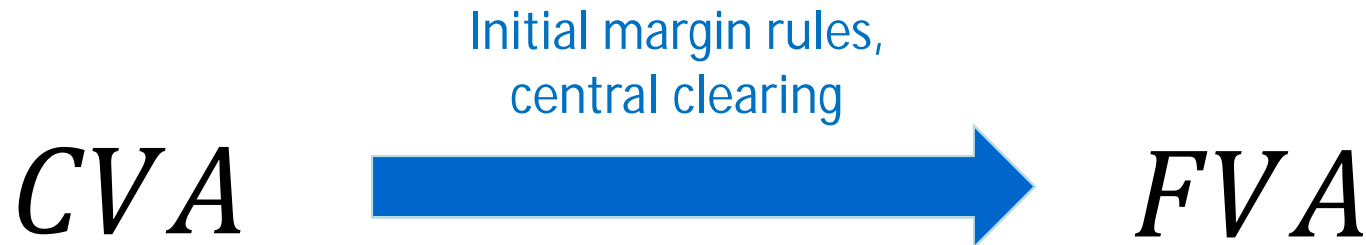
$$Exposure_{CVA} = (RC - VM - \underbrace{IM_c}_{\text{Initial margin held}})^+$$

*RC = replacement cost*

*VM = variation margin (assumed re-usable)*

$$Exposure_{FVA} = (RC - VM)^+ + \underbrace{IM_I}_{\text{Initial margin posted}}$$

*IM = initial margin (assumed segregated)*



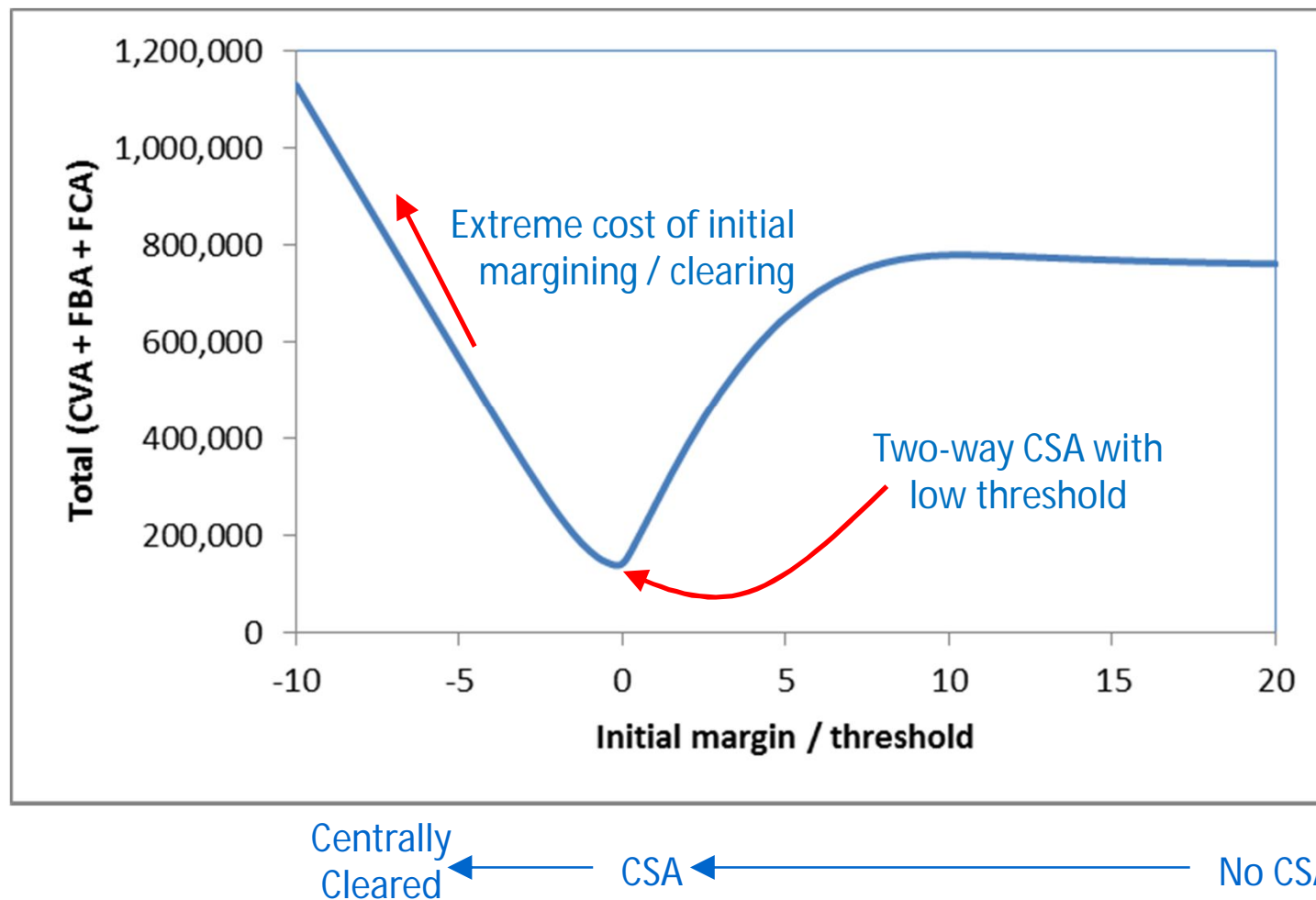
- Will regulatory change create additional dangers due to funding liquidity risk as a result of increased reliance on margin to reduce counterparty risk?

	Variation margin	Initial margin
Expensive	Moderately*	Very*
Re-hypothecation allowed	Yes	No
Segregation required	No	Yes
Pro-cyclical	No	Yes
Subjective calculation	No	Yes
Methodology for calculation	Relatively easy	Complex

\* This depends on the liquidity of margin required.

# Net Impact of CVA + FVA

Overall impact of CVA and FVA



# A Review of Regulatory Requirements

## Initial and Variation Margins

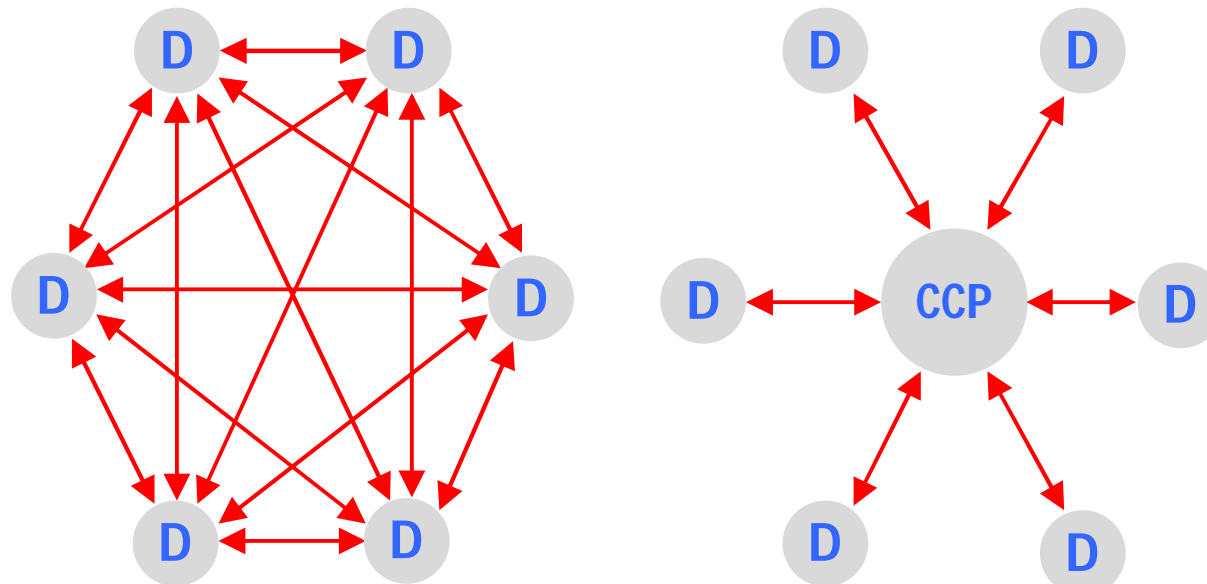
## How CCPs Work

## The Risks of Clearing and Margin Requirements

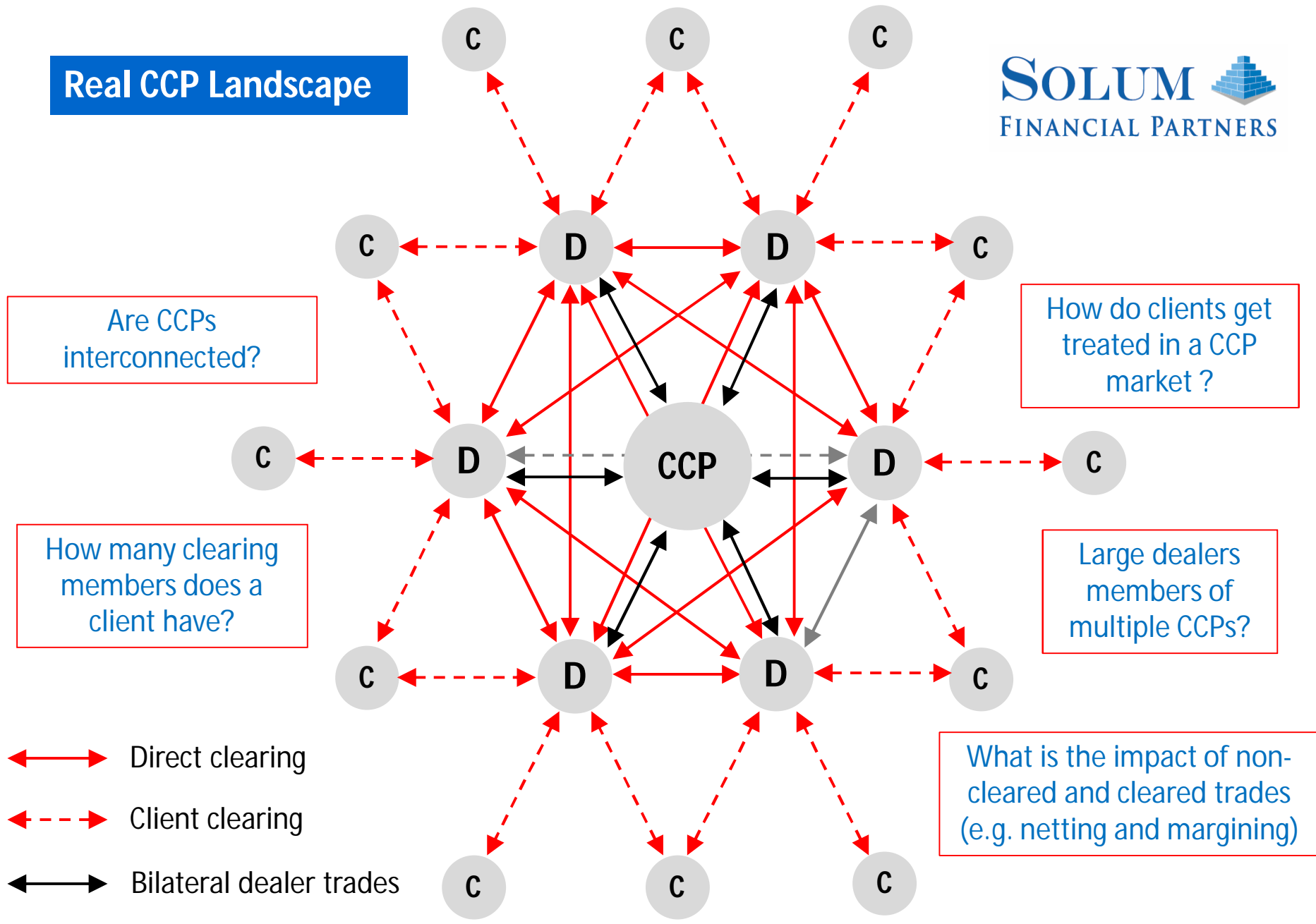
## Conclusions



- A CCP sets certain standard for its clearing members (CMs)
- Takes responsibility for closing out all the positions of a defaulting CM
- Maintains financial resources to cover losses in the event of a CM default:
  - Variation margin to closely track market movements
  - Initial margin to cover worst case closeout costs above the VM
  - Default fund to mutualise losses in the event of a severe default

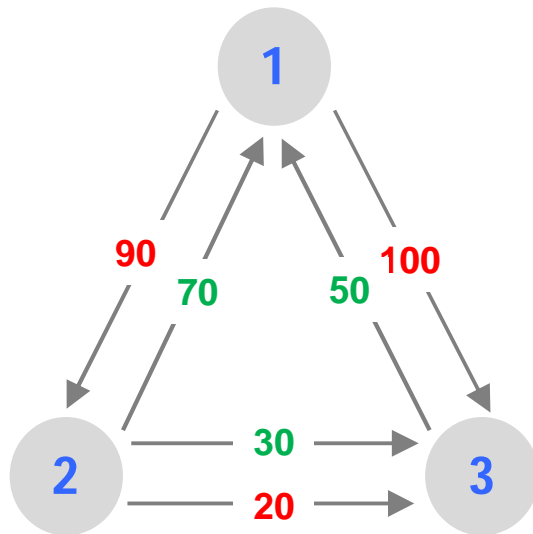


# Real CCP Landscape

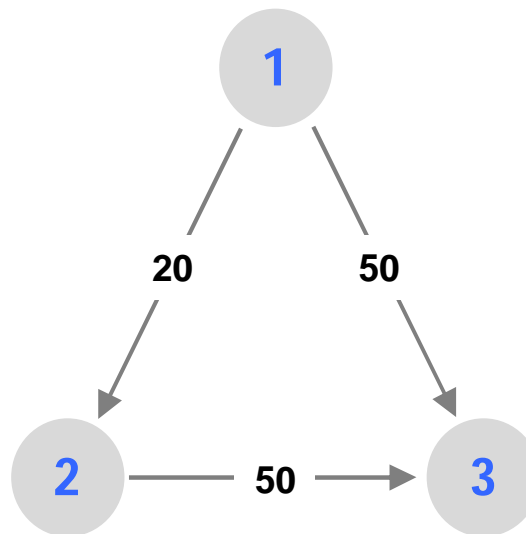


# CCPs Increasing Exposure

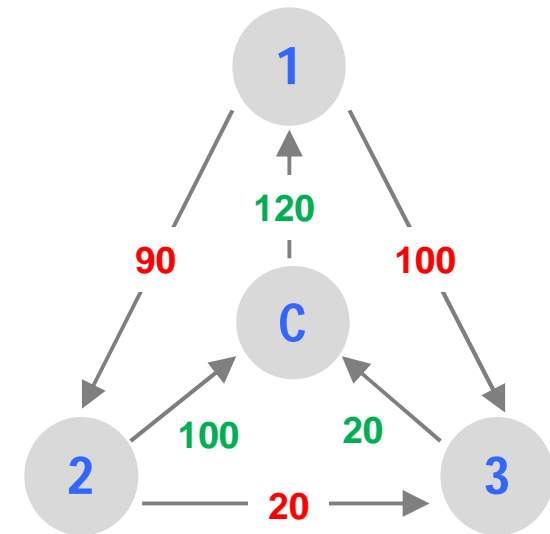
No Netting



Bilateral Netting

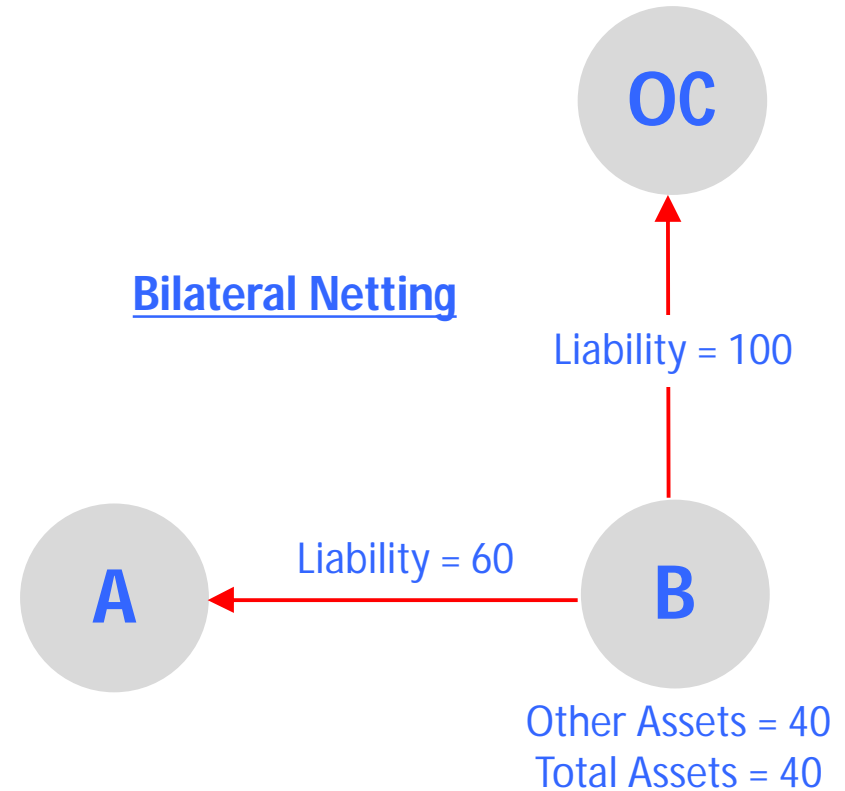
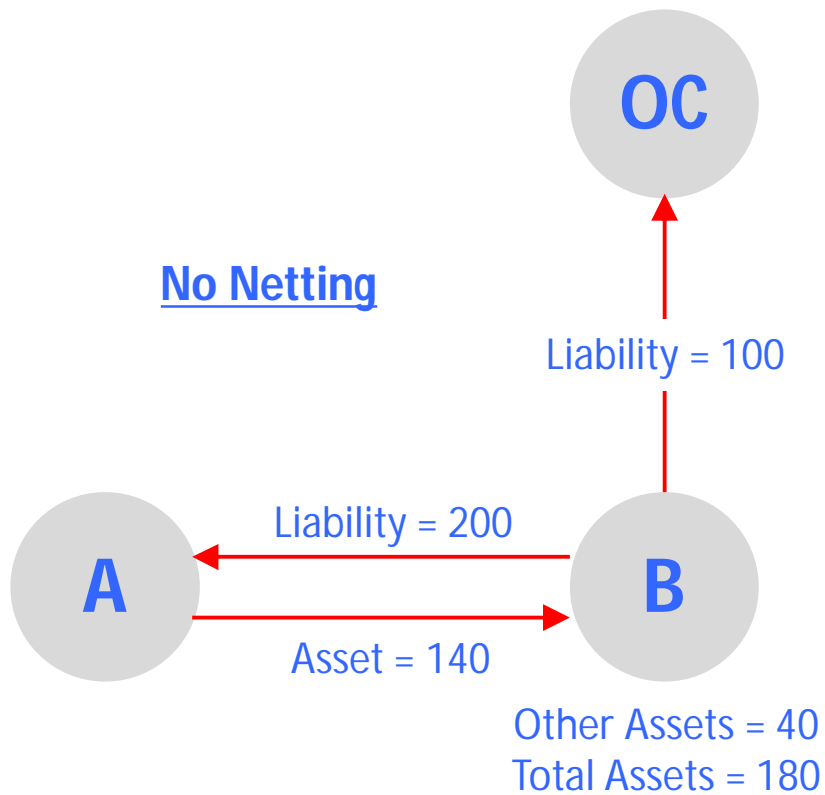


Central Clearing

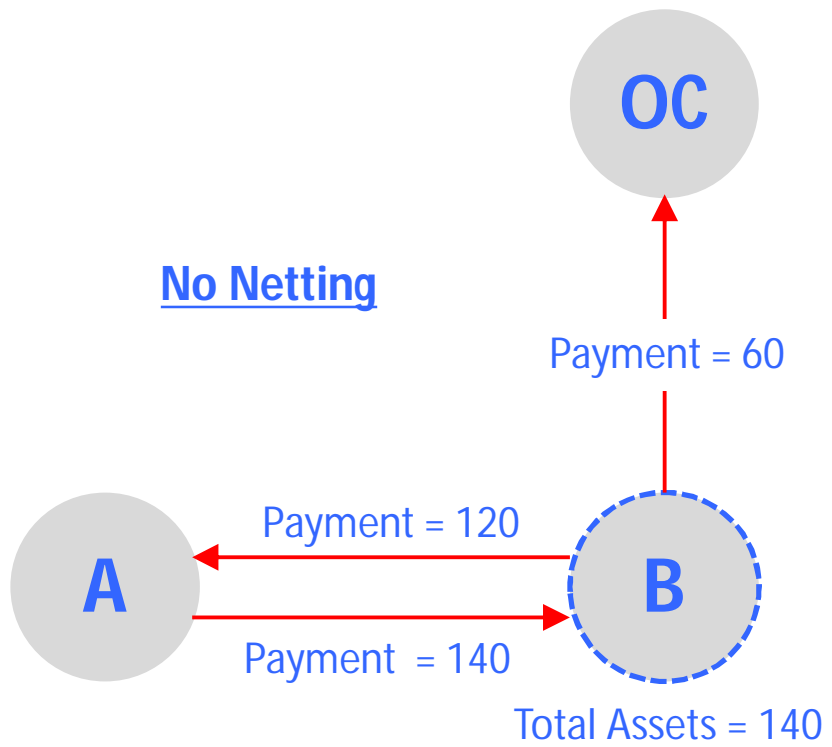


	No Netting	Bilateral Netting	Clearing (ex CCP)
Cntrpty 1	120	0	0
Cntrpty 2	90	20	90
Cntrpty 3	150	100	120
Average	120	40	70

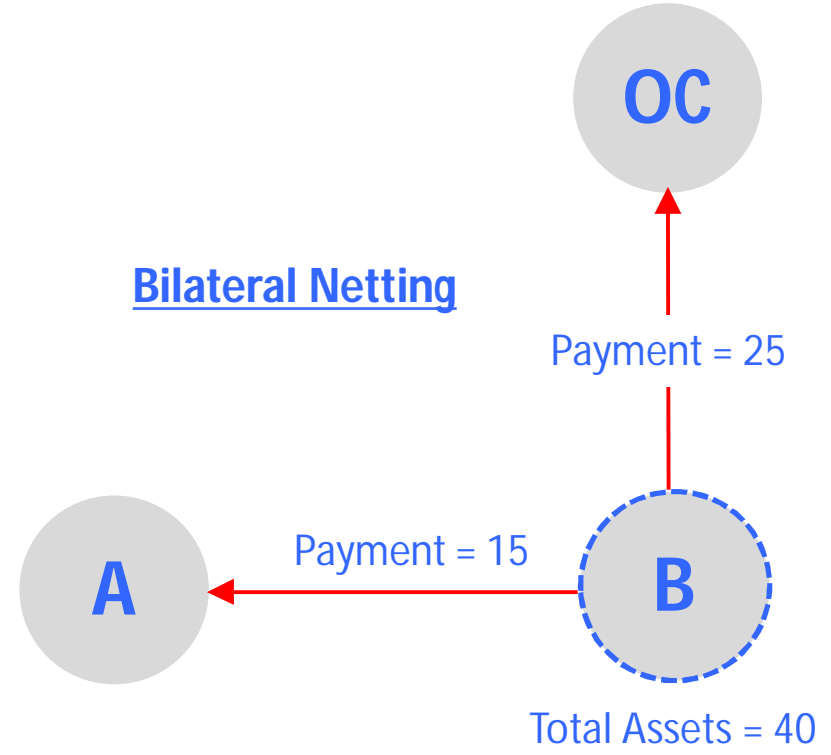
# CCP Multilateral Netting ~~Reduces~~ Reallocates Exposure (I)



# CCP Multilateral Netting ~~Reduces~~ Reallocates Exposure (II)

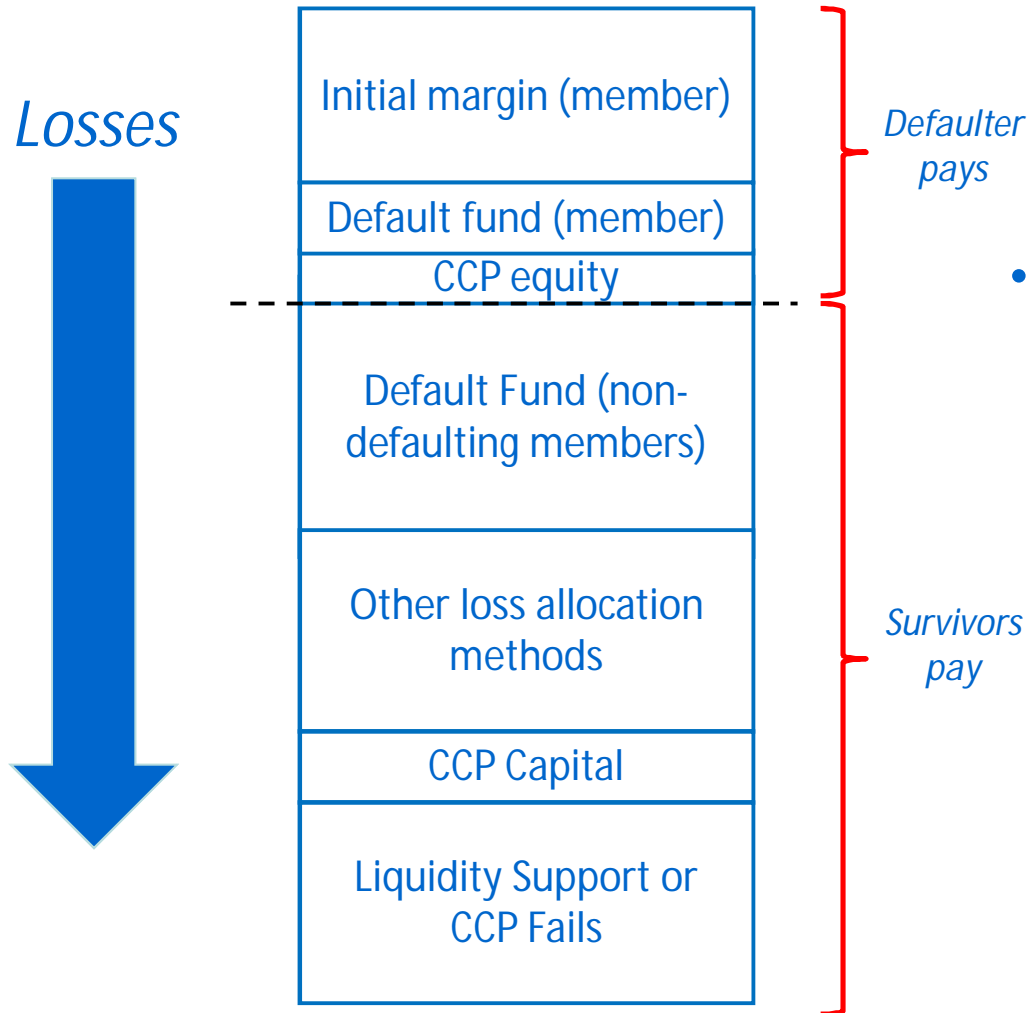


	Payment	Recovery
A	120	$120 / 200 = 60\%$
OC	60	$60 / 100 = 60\%$



	Netting	Payment	Recovery
A	140	15	$155 / 200 = 77.5\%$
OC	-	25	$25 / 100 = 25\%$

# CCP Loss Waterfall

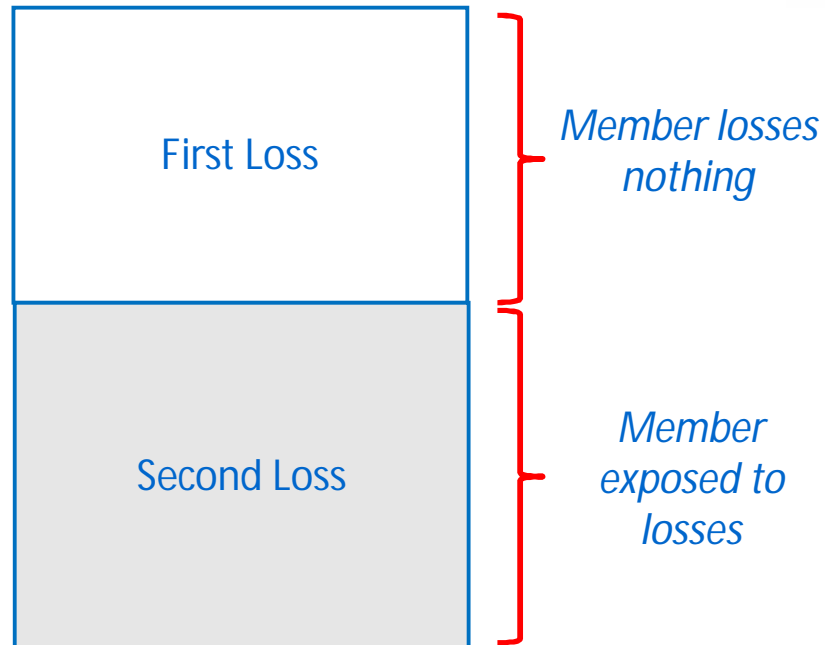


- **Potential problems**

1. How do the losses arise?
2. How to set initial margin?
3. How to size the default fund?
4. How to allocate losses if the default fund is too small
5. How to control moral hazard problems
6. Can a CCP fail?

## Default Funds and the Second Loss Effect

Initial margin (member)
Default fund (member)
CCP equity
Default Fund (non-defaulting members)
Other loss allocation methods
CCP Capital
Liquidity Support or CCP Fails



- **Impact of second loss**
  - Members incentivised to try and exactly hit the boundary between first and second losses
  - Practically this could allow gains to be taken in the auction
  - Some evidence of this at CME wrt Lehman default

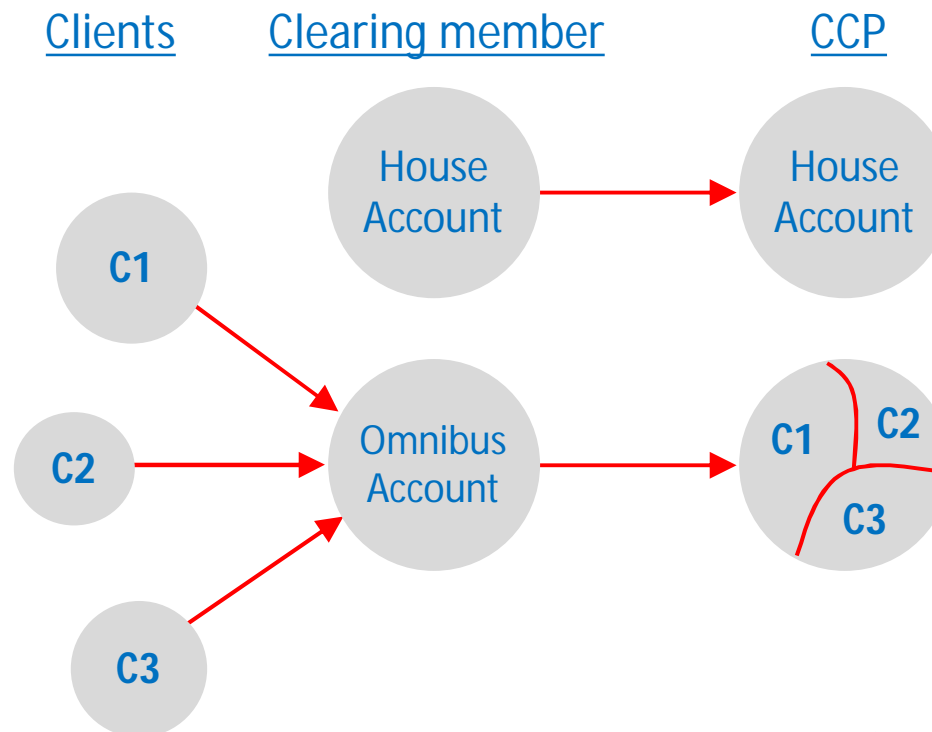
## Default Funds and the “Prisoner’s Dilemma”

- **Impact of Prisoner’s Dilemma**
  - Members may not bid competitively in the auction
  - Can participation be encouraged?
  - Examples include VMGH, partial tear-up and AIPs





- **Clients need segregation of their initial margins to protect them, issues:**
  - Net or gross margining for our clients?
  - Ability of clients to “port” to another clearing member in default (or other) scenario
  - Operational and legal segregation of client funds at CCP
- **Very significant cost**



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## **Initial and Variation Margins**

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### **Margin and Funding Liquidity Risk**

### British Petroleum

“In recent weeks, Moody’s, Standard & Poor’s, and Fitch lowered their credit ratings on the company, triggering **collateral demands** and raising concerns among some major investors.”

“Late last week, BP managed to **raise** a total of \$5 billion **from bank lenders** in a combination of secured and unsecured loans, say the people familiar with the matter.”

Source : CNBC (June 2010)

## Variation Margin and Funding : Example 2

"Ashanti Goldfields Co. Ltd. said it had won an agreement from its gold hedging counterparts that will exempt it from posting collateral on margin calls until Dec. 31, 2002. "

"Executives said in a statement that the agreement was intended to resolve the company's liquidity crisis. They said that under the agreement Ashanti's present margin limits totalling about \$280 million will double to about \$560 million in 2003 after the exemption expires"

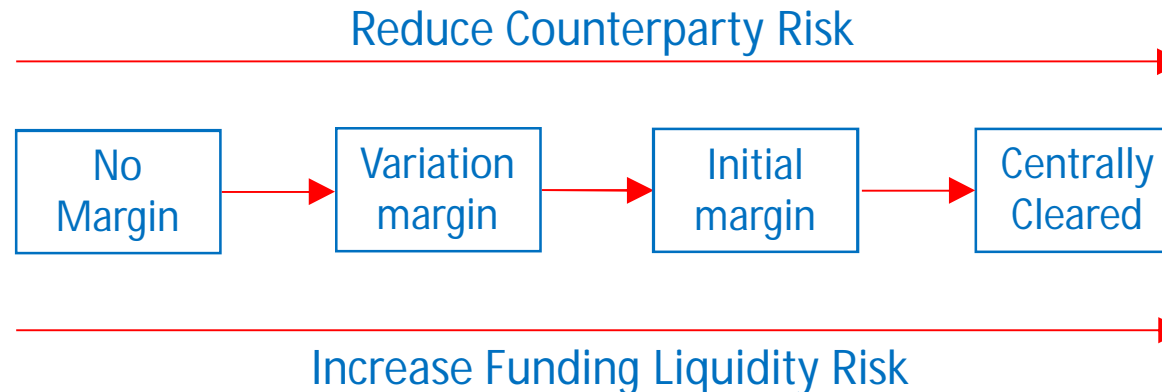


\$280 million cash

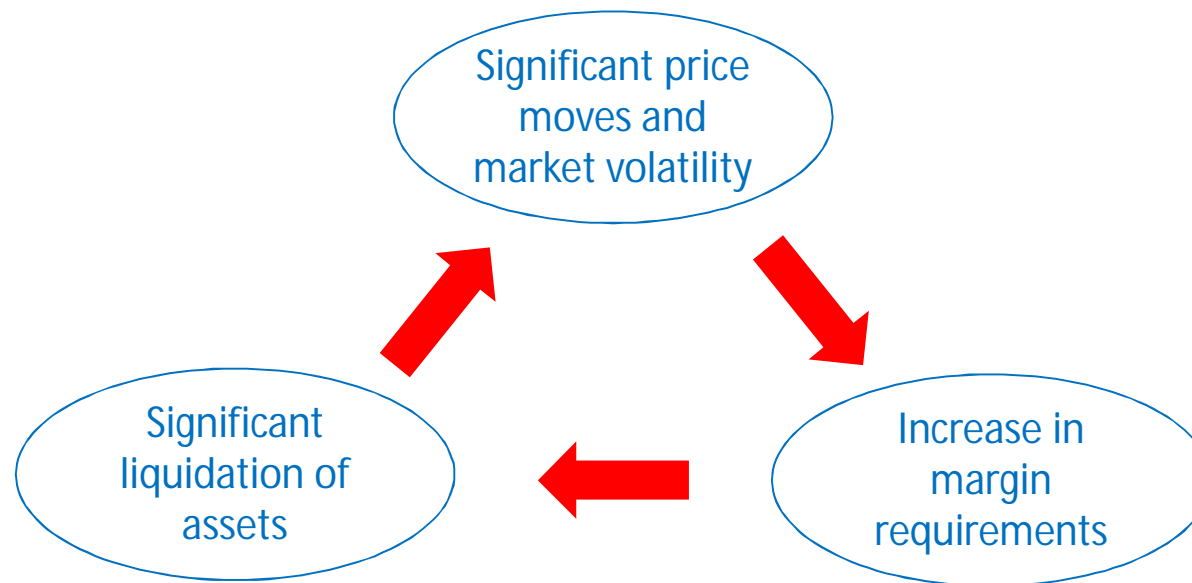
"I am prepared to concede that that we were reckless. We took a bet on the price of gold. We thought that it would go down and we took a position".

Ashanti wins three-year gold margin reprieve, GhanaWeb, 2<sup>nd</sup> November 1999,  
<http://www.ghanaweb.com/GhanaHomePage/economy/artikel.php?ID=8923>

- **1987 stockmarket crash**
- **CCPs failure**
  - Hong Kong Futures Exchange Clearing Corporation failed (needed to borrow about 100 times more than their default fund and cost the taxpayer around HK\$1 billion)
  - Failure of the CME was only averted due to its bank advancing the CCP US\$400 million prior to the market opening so that it could make variation margin payments totalling U.S. \$2.5 billion (IMF 2010)
- **CCPs and their members can interrupt flow of variation margin**
  - CCPs had difficulties in receiving variation margin payments (despite multiple intraday calls)
  - CCPs absorbed (thanks to their privileged position) significant amounts of liquidity by collecting variation margin payments but not always paying out in a timely manner
  - Members hedging options (OCC) with futures contracts (CME) did not have gains and losses offset and were therefore caught in a variation margin trap

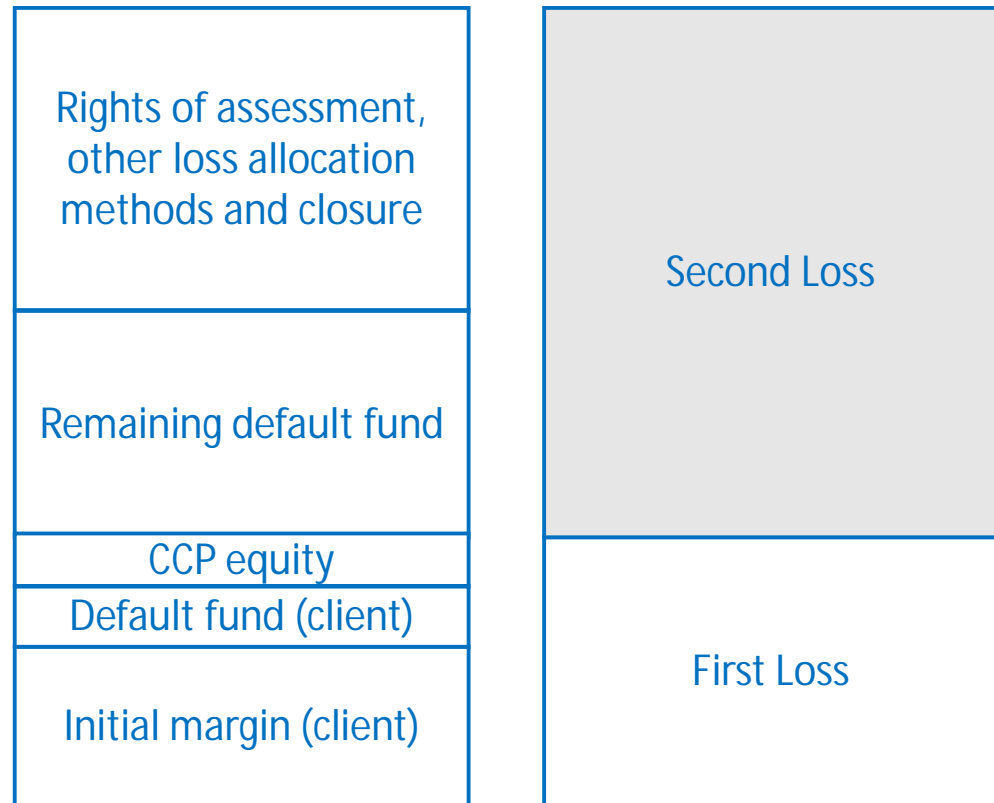


- **Important features of CCP margin rules and mandatory margin requirements**
  - Variation margin is required over tight and rigid timescales (often intradaily)
  - Initial margin is calculated at a high confidence level (99% or more) and may increase in more adverse market conditions
- **Variation margin problems**
  - Large price movements in a crisis will require large variation margin calls
  - Material risk that insufficient credit will be extended during such periods
  - Operational problems are greater in a high coupled system
  - Could create defaults out of “virtual defaults” (Kenyon and Green 2013)



- **Members face a risk to CCPs like a senior tranche of a CDO**

- Such senior tranches are well-known to be heavily concentrated in terms of their systemic risk exposure (see, for example, Gibson 2004, Coval et al. 2009 and Brennan et al. 2009).
- Also well-known that such structures are loaded with systemic risk and perform very badly during large, market-wide shocks
- A consequence of such structures is that they concentrate wrong-way risk
- Systemic risk insurance is a misnomer





# **A Review of Regulatory Requirements**

## **Initial and Variation Margins**

### **How CCPs Work**

## **The Risks of Increased Margin Requirements**

## **Conclusions**

- **Margin in general**
  - Is not a perfect risk mitigant – it may fail precisely when you need it
  - Increased margining also increases funding liquidity risk
  - It also elevates OTC derivatives creditors as the expense of other creditors
- **Variation margin**
  - A seemingly natural concept but is expensive (velocity is not infinite, especially in a crisis)
  - Difficulty of parties having sufficient liquid margin to post (especially during turbulent periods)
- **Initial margin**
  - Is definitely expensive and can be procyclical (may increase sharply in a crisis)
  - Creates legal and operational risks due to segregation needs
- **Central clearing**
  - Second loss exposure of default funds is very systemic and creates a prisoner's dilemma
  - CCPs privileged position causes problems (e.g. interrupting margin flow)
  - CCPs concentrate systemic risk through loss mutualisation (default fund)
- **Should we not be thinking about these issues a bit more?**