Mitigating Counterparty Risk

Eurex – The International Derivatives Exchange

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16 November 2016

Agenda

- **Introduction**
- Global Financial Crisis
- Regulatory reform after Global Financial Crisis
- How Central Counterparty (CCP) reduce systemic risk in the financial system
- Trends observed after Regulatory Reforms
- Case study on Futurization – MSCI derivatives on Eurex

Deutsche Börse Group: exchange organisation and provider of financial services infrastructure with comprehensive product range

Pre-IPO →	Trading →		Clearing →	Settlement and custody →	Collateral and liquidity management
▪ Networking platform for start-ups and investors ▪ Growth financing services ▪ Listing services	**Cash market** ▪ Connectivity to international trading participants ▪ Open electronic order books ▪ Trading in shares, ETFs, ETPs, warrants, funds, bonds	**Derivatives market** ▪ Connectivity to international trading participants ▪ Open electronic order books ▪ Trading in deri-vatives (equity, equitiy-index and interest-rate derivatives)	▪ Verification of trade-related information ▪ Central counter-party for on- and off-exchange transactions (cash and derivatives markets) ▪ Risk management	▪ New issuance services ▪ Delivery vs payment ▪ Safekeeping of securities ▪ Corporate actions ▪ Tax services	▪ Global securities financing ▪ Collateral management ▪ Investment fund services (order routing)

Market data and technology-based services

Data feeds, market data, reference data, reporting services, Indices, external IT services, trading infrastructure

Information technology

Internal IT services, software development, connectivity services

Eurex: one of the world's leading derivatives exchanges

> 1.5 billion

contracts annually trading volume

384

trading participants from over 30 countries

➢ **120**

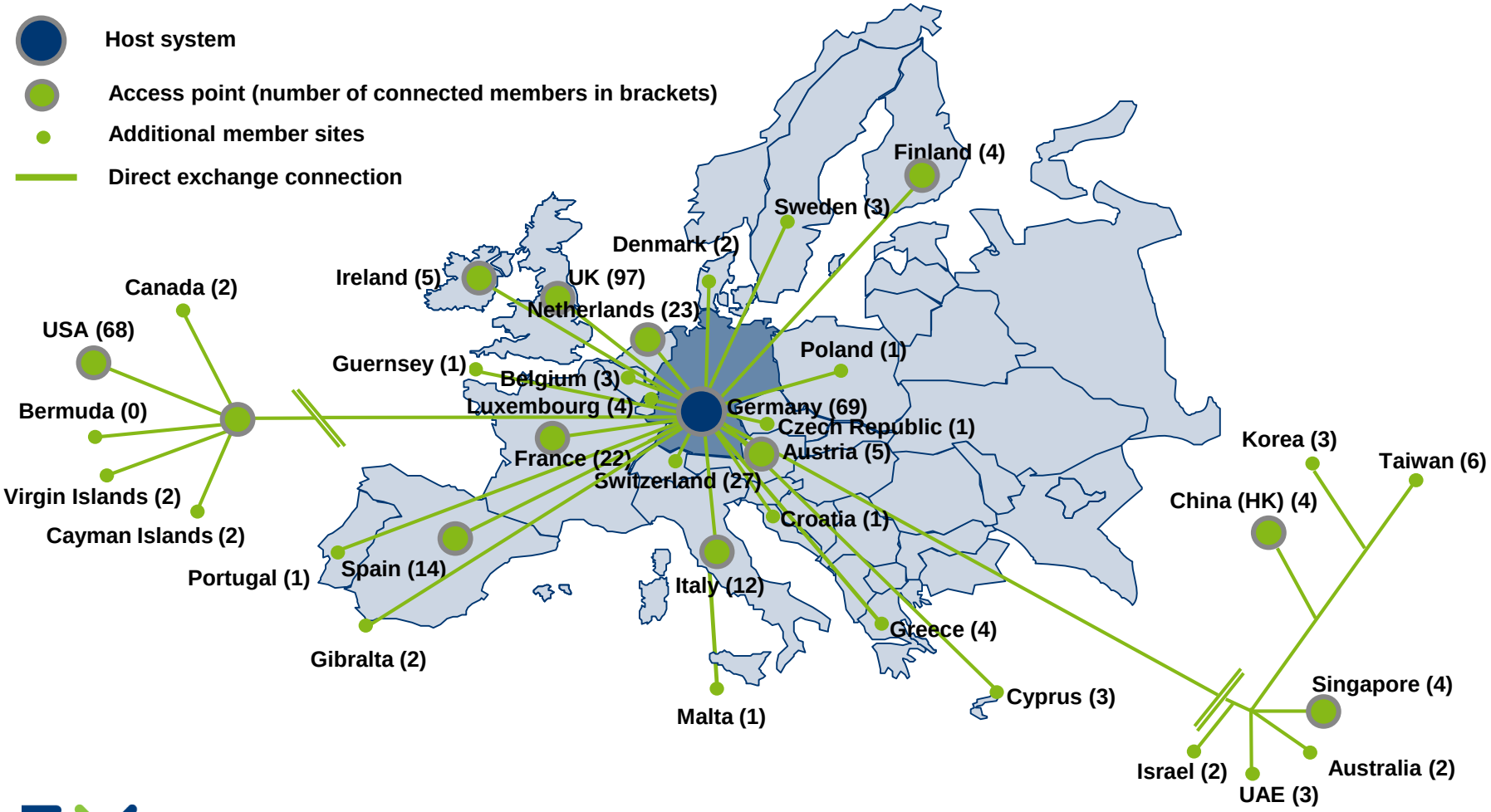
equity indices as underlying for futures and options, including European benchmark indices such as EURO STOXX 50® or DAX®

➢ **2,000**

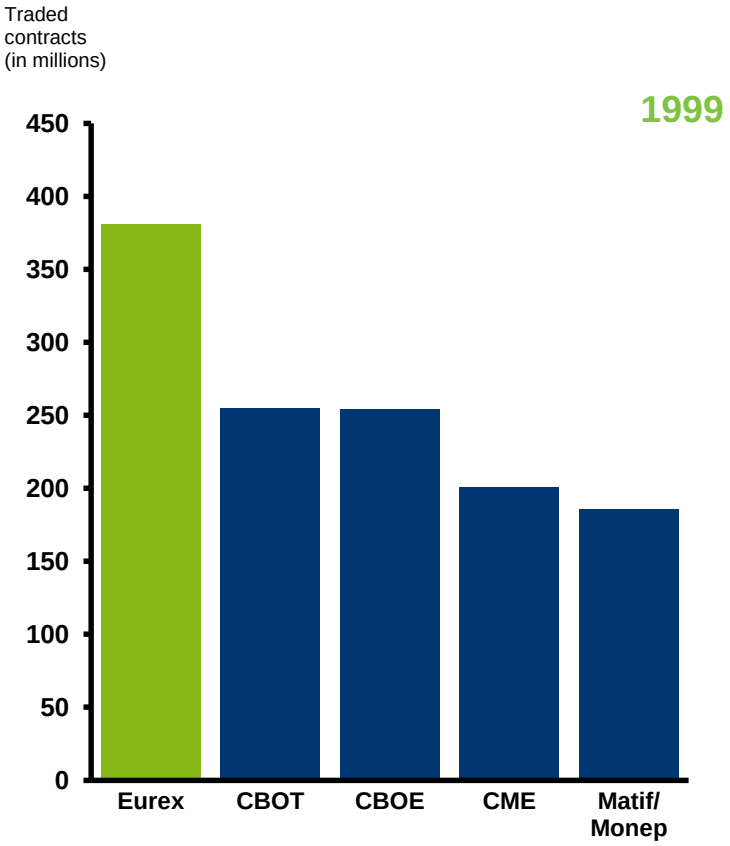
futures and options in 9 asset classes, according to revenue and number of traded contracts, equity index derivatives are the biggest asset class

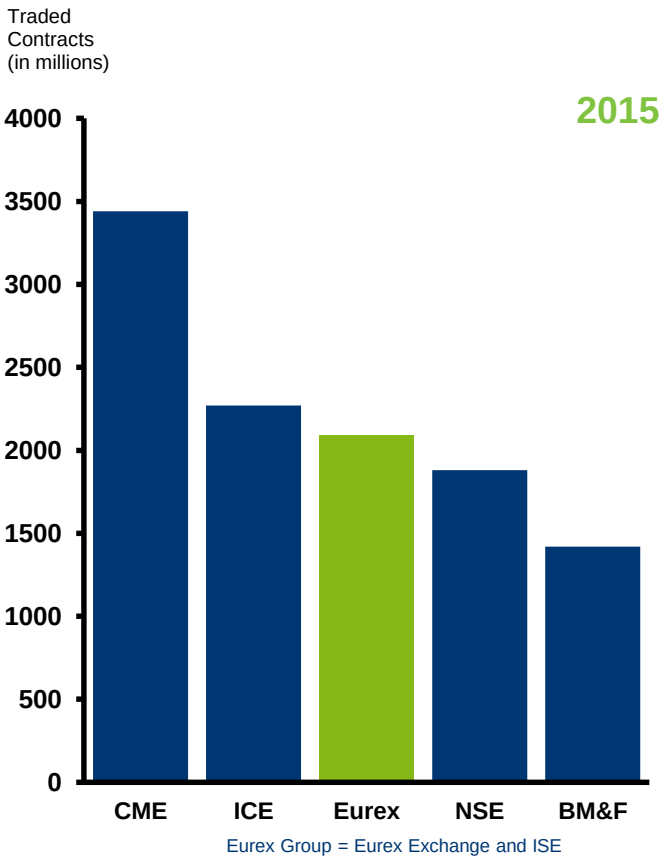
As at 30 June 2016

384 Eurex members in 34 countries
7,186 registered traders



Eurex global positioning





Eurex Group = Eurex Exchange and ISE

Eurex Clearing at a glance

> 190

Clearing members from 19 countries connected

> 50

EurexOTC Clear IRS clearing members

24/7

risk management in real-time

933,516,912

contracts cleared on Eurex derivatives platforms in H1/2016

€699 billion

cleared revenue on Deutsche Börse Group‘s cash market platforms

€15,666 billion

of market risk cleared via Eurex Clearing (gross monthly average) in H1/2016

As at 30.June 2016

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Global Financial Crisis (1/2)

Highlights

- The financial crisis in 2008 unearthed three root causes of systemic risk; excessive risk taking, inter-connectedness of market participants and insufficient collateralization
- Since 2009, a new regulatory regime is being progressively introduced. Its overarching goals are increasing the stability of financial markets, in particular by reducing systemic risk
- The implementation of these regulations, especially the clearing obligation for over-the-counter (OTC) derivatives, increases the importance of central counterparties (CCPs) in financial markets
- Essentially, a CCP's role is to handle counterparty credit risk. By making the default management and loss allocation explicit, a CCP creates the system through which contagion and uncertainty can be mitigated
- In addition, a centrally cleared market structure reduces interconnectedness of market participants

Global Financial Crisis (2/2)

Root cause of systemic risk :

- **Excessive risk taking**
  - ✓ Counterparty is unable to absorb the potential losses of its activities
  - ✓ Reasons for excessive risk taking is due to misaligned incentives and deficiencies in controlling and pricing risk
  - ✓ Inadequate transparency on the magnitude and location of risk hinder any attempts to control and value risk

- **Interconnectedness of market participants**
  - ✓ Causes the threat of domino effect among market participants when one market participant defaults
  - ✓ Threats are compounded if the exposures and loss transmission between counterparts are not transparent
  - ✓ During the Global Financial Crisis, uncertainty and loss of confidence was amplified by OTC derivatives and the lack of readily available information on the actual counterparty credit risk exposure intensified concerns about the major counterparties' potential defaults on each other

- **Insufficient collateralisation of market and credit risk**
  - ✓ Many risk models did not adequately consider worst case scenarios
  - ✓ Capital and liquidity requirements determined by these risk models were not sufficient to buffer losses from Global Financial Crisis which caused some companies to default

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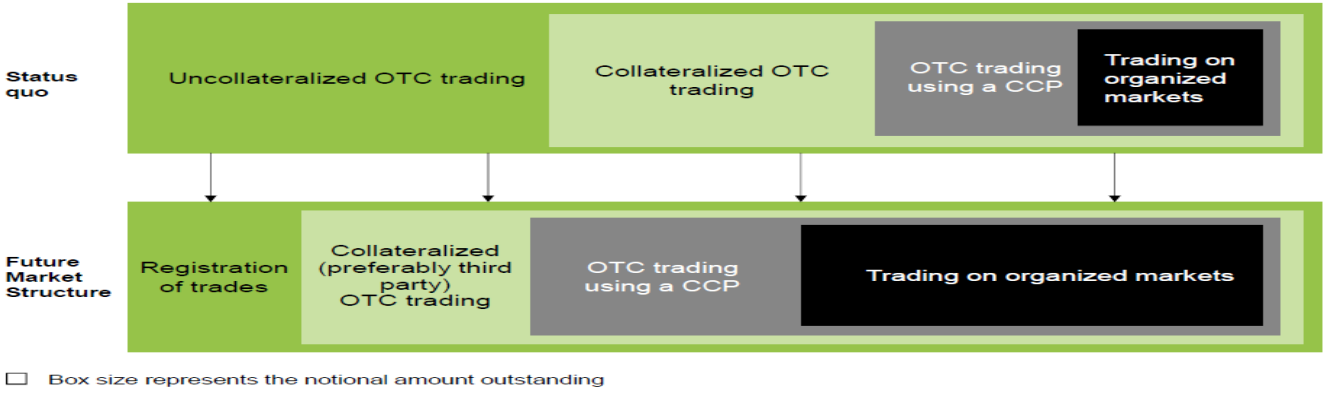
Regulatory reform after Global Financial Crisis (1/3)

Summary

- The collapse of Lehman Brothers, AIG and Bear Stearns in 2008 exposed the fundamental weaknesses in the regulation of the USD 800 trillion Over-The-Counter (OTC) derivatives market
- A review of the OTC derivatives market revealed weakness in risk mitigation and bilateral clearing
- G20 leaders stated in the Pittsburgh summit in 2009 that they want to improve the OTC derivatives market by central clearing with regulatory implementation aiming to 'improve transparency in the derivatives market, mitigate systemic risk and protect against market abuse'
- Regulatory reform objective for future market structure :



Regulatory reform after Global Financial Crisis (2/3)

Global regulatory reform overview :

	Rule Set	Scope
Global	Basel III	• Strengthen banking sector regulation, supervision and risk management • Improve shock absorption, risk management, governance and banks' transparency and disclosures
Global	CPSS - IOSCO	• Review of existing standards for financial market infrastructures/FMIs (CCPs, SSSs, CSDs and TRs) • New and more demanding international standards for FMIs to be more robust & better placed to withstand financial shocks
Europe	EMIR	• Reporting and clearing obligation for OTC derivatives, and defining measures reducing risks of bilaterally cleared OTC derivatives • Common rule setting for CCPs and trade repositories
Europe	CRD IV	• The Capital Requirements Directive transposes Basel III requirements into European Regulation
Europe	MiFID	• Creating a robust common regulatory framework for Europe's securities markets • Leading to greater market transparency and efficiency, as well as investor protection
US	Dodd-Frank	• Promote financial stability of the US by improving accountability and transparency in the financial system • Protect American taxpayer by ending bailouts, to protect consumers from abusive financial services practices

Regulatory reform after Global Financial Crisis (3/3)

Implementation highlights based on Financial Stability Board Aug 2016 report :

- OTC derivatives contracts are increasingly cleared by central counterparties (CCPs) to reduce contagion risk among market participants
- Increased risk awareness and stronger regulation have curtailed opaque and complex securitisation
- Implementation of Basel III capital and liquidity standards has generally been timely, and banks remain on track to meet these standards. However, some major advanced economies have not addressed deviations in their rules from the Basel framework
- Implementation of over-the-counter (OTC) derivatives reforms is well underway, but progress remains uneven :
  - ✓ Margin requirements are behind schedule
  - ✓ Platform trading frameworks are relatively undeveloped in many jurisdictions
  - ✓ The availability and use of trade repositories (TRs) continues to expand, but significant work is still needed to ensure trade reporting is effective
- Banks have built larger and better quality capital buffers, mainly through retained earnings. They now have significantly lower leverage and many have improved their funding profiles

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How CCP reduce systemic risk in the financial system (1/9)

Overview

Mitigation of systemic risk by central counterparty clearing		Root causes of systemic risk
CCPs as independent risk managers ▪ Neutral valuation of risk exposure at current market prices ▪ Enforcement of independently determined collateralisation levels	… prevents …	Excessive risk taking
Addressing interconnectedness with central clearing ▪ Novation of contracts to reduce interconnectedness ▪ Reducing risk exposure by multilateral netting	… lowers …	Interconnectedness of market participants
Protecting market participants from clearing member defaults ▪ Insuring against tail risks by robust lines of defence ▪ Reducing the impact of default by a transparent default management process	… mitigates …	Insufficient collateralisation of market and credit risk

How CCP reduce systemic risk in the financial system (2/9)

CCP as independent Risk Managers

- CCPs are independent risk managers because they only step into a trade after a trade is concluded between two members
- As a legal counterpart to both original buyer and seller, CCP assumes the performance of the transaction if one of the trading parties fail
- CCP is neutral to the profits and losses of the contract but bears risk of losses while ensure the surviving member's trade in the event of a counterparty default
- CCP collects collateral from trading parties regardless of their counterparty risk. This collateral reflects worst-case losses required to guarantee fulfilment of the side of the trade towards the non-defaulter
- The CCP acts as a guarantor or contracts towards its non-defaulting members and must ensure it can manage any default(s)

How CCP reduce systemic risk in the financial system (3/9)

CCP as independent Risk Managers

- **Neutral valuation at current market prices**

  - ✓ Independent position of CCPs is reflected in the transparency of their valuation of all positions including OTC derivatives
  - ✓ CCP's pricing methodology is used across all participants with the same trade and are transparent to all parties
  - ✓ Accurate pricing is essential to ensure that CCPs accurately collateralise the trades so that correct variation margins is exchanged between affected members
  - ✓ The profit and losses (variation margin) is exchanged at least daily to ensure losses do not accumulate

- **Enforcement of independently determined collateralisation**

  - ✓ In addition to variation margin exchange, CCPs also charge collateral called Initial Margin
  - ✓ The exchange of Initial Margin reflects possible future changes in the value of the contracts
  - ✓ Its level reflects possible close-out costs of a position and ensures that the CCP is able to fulfil its guarantee towards its non-defaulting clearing members and is monitored continuously
  - ✓ Clearing members must have sufficient collateral placed at the CCP at all times for all open positions
  - ✓ Prudent level of collateralisation is important as insurance against impact of default of a member
  - ✓ Counterparty credit risk is reduced which CCP transforms into margin requirement for members
  - ✓ This ensures members cannot undertake which they cannot afford to collateralise

How CCP reduce systemic risk in the financial system (4/9)

CCP as independent Risk Managers – AIG case study

- **Facts :**

  - ✓ AIG nearly collapsed due to inadequate risk management of a Credit Default Swap (CDS) in 2007
  - ✓ AIG had a derivatives portfolio with notional of $2.7 tn ($ 440 bn of CDS)
  - ✓ Risk management was not done internally and sufficient collateral was not put up
  - ✓ Bilateral counterparties of AIG did not require appropriate collateralisation of CDS transaction due to their AAA credit rating
  - ✓ The government had to bail out AIG with $ 182 bn to avoid a collapse of this systemic institution

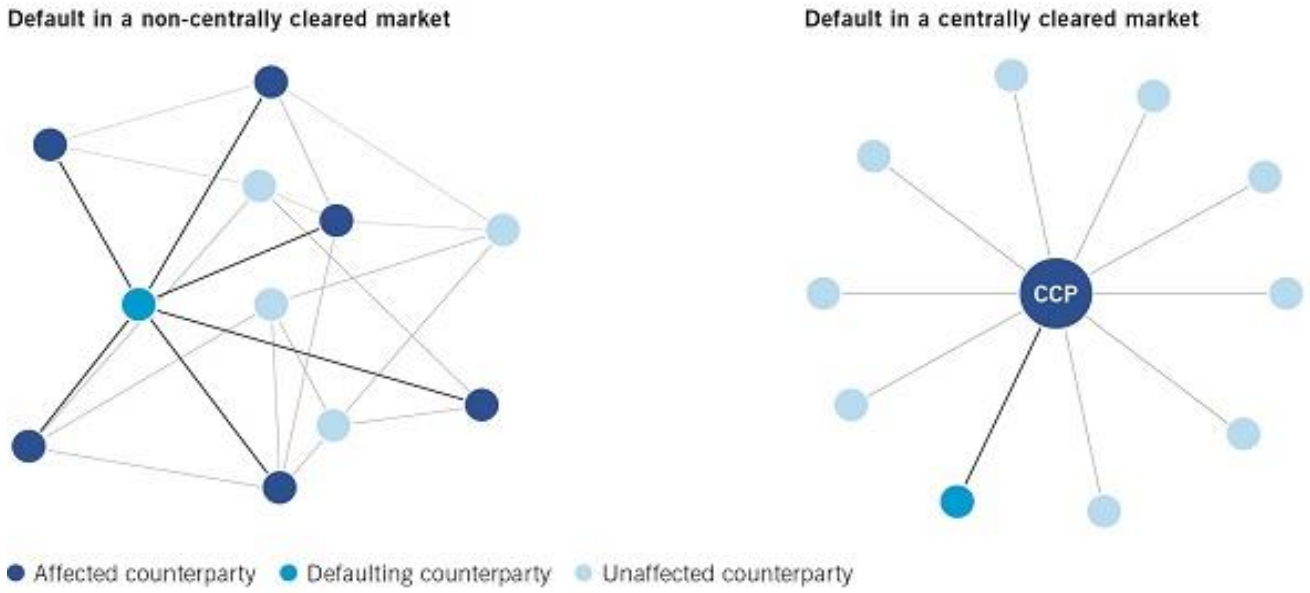
- **What would happen if the trades were cleared on CCPs?**

  - ✓ Appropriate collateralisation will be required by CCP
  - ✓ Uncollateralised exposure would not have grown systemically critical
  - ✓ CCP will act as independent risk manager and will be able to use collateral collected to contain impact to other clearing members and reduce systemic risk of the default

How CCP reduce systemic risk in the financial system (5/9)

Addressing interconnectedness

- In the event of default, CCP protects other market participants by reducing interconnectedness in two ways :
  - ✓ CCP will keep the collateral posted by the defaulting counterparty to secure the trades and replace the defaulting counterparty
  - ✓ CCP reduce risk exposure of market participants via multilateral netting



How CCP reduce systemic risk in the financial system (6/9)

Addressing interconnectedness

- **Novation of contracts**

  - ✓ Novation is the process where CCP legally step into the trades of market participants and replace the original counterparties' exposure to each other with that of the CCP
  - ✓ For cleared derivatives , market participants face a smaller number of counterparties due to limited number of CCPs which reduce interconnectedness
  - ✓ In a default, only CCP is directly affected and market participants are only affected if CCP's default management process and margin from defaulting member did not suffice
  - ✓ Transparency of CCP especially in terms of risk management, mitigates panic from counterparty uncertainty
  - ✓ Interconnectedness is further mitigated when CCP protect end clients from their clearing members losses in default with client asset segregation

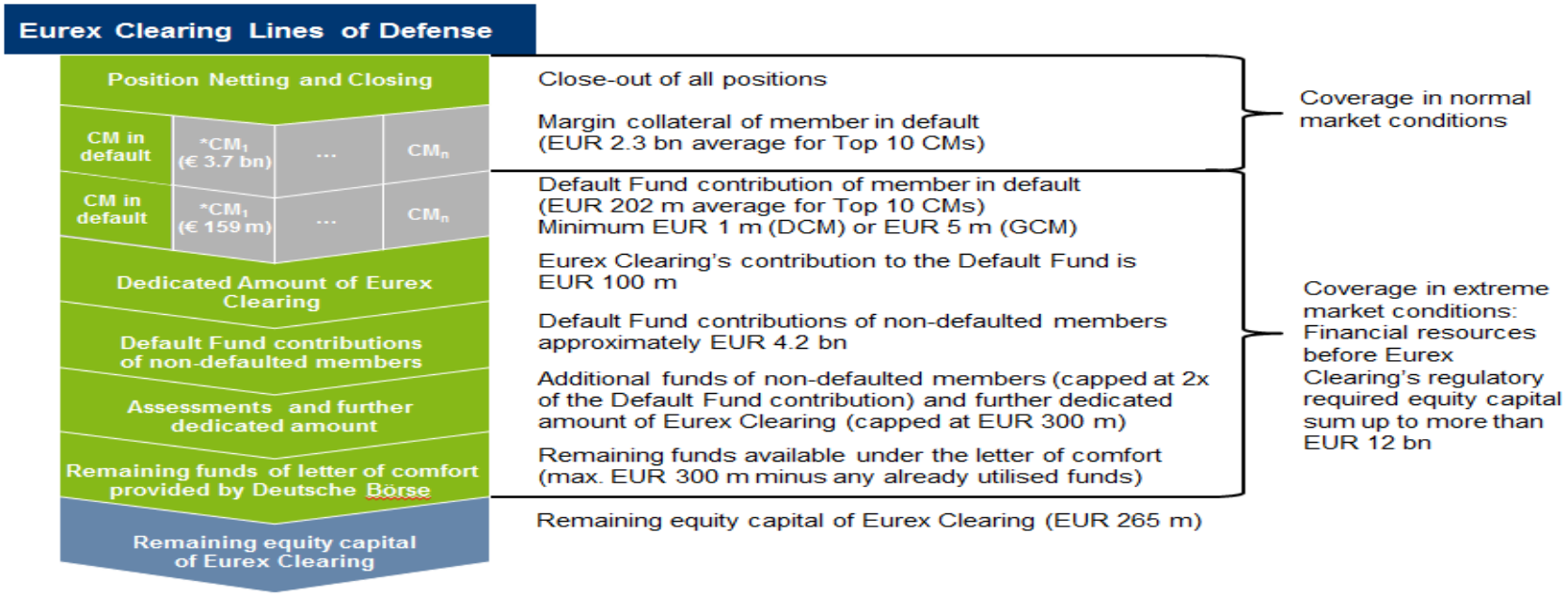
- **Reducing risk exposure by multilateral netting**

  - ✓ Multilateral netting means that a clearing member's contracts can be netted with all its counterparties via the CCP which further reduce overall risk exposure for market participants
  - ✓ Without CCP , two counterparties will only be able to net their bilateral outstanding claims
  - ✓ Netting efficiency is enhanced with increasing use of CCPs in the derivatives market and if CCP clears multiple asset classes

How CCP reduce systemic risk in the financial system (7/9)

Protecting market participants from clearing member defaults

- In the event of default, CCPs protect non-defaulting clearing members and serve as shock absorbers
- CCP employs the margins of the defaulter and its lines of defence – additional funds from CCP and its members to protect against extreme tail events



* Largest Clearing Member by TMR.

as of 30/06/2016

How CCP reduce systemic risk in the financial system (8/9)

Protecting market participants from clearing member defaults

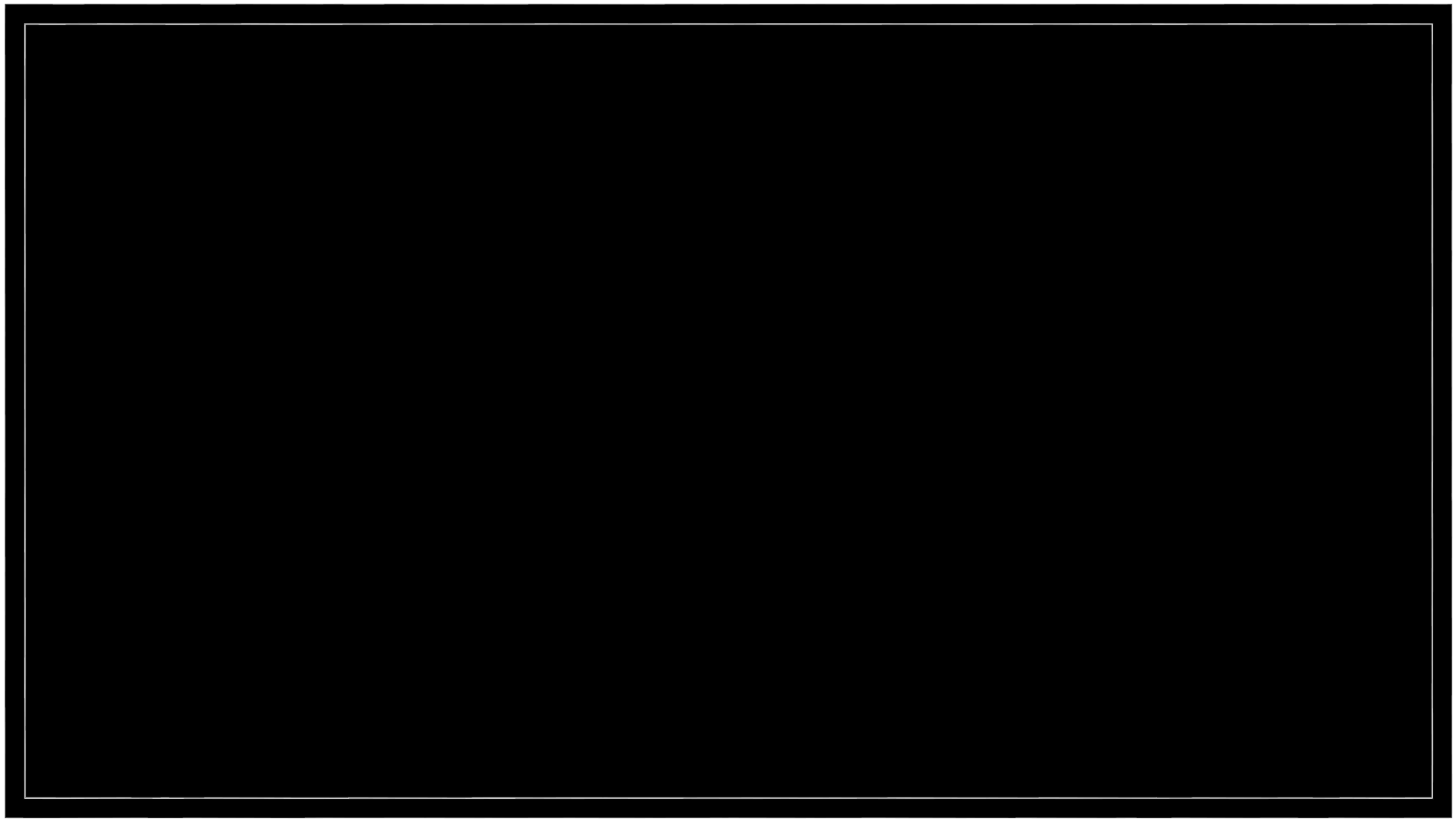
- **Absorbing shocks by the defaulting member's margins**
  - ✓ Any losses by closing of a position are first covered by margins of the defaulter
  - ✓ During the Lehman Brother and MF Global default, losses were covered by initial margin and did not affect other members of the CCP
  - ✓ Clearing members are also obliged to contribute to CCP's default fund which consists of standard minimum plus an amount proportional to the risk exposure
  - ✓ If clearing member defaults, its contribution mitigates losses not covered by its margin before CCP's dedicated resources are touched

- **Absorbing shocks by loss mutualisation**
  - ✓ Suppose defaulting member's margins and default fund are insufficient to cover losses, the CCP's contribution to the default fund prevent losses from spreading
  - ✓ CCP has 'skin in the game' with own contribution as a line of defence
  - ✓ Next line of defence is remaining default fund of all clearing members
  - ✓ Such line of defence for all except extreme scenarios, non defaulters are unaffected. In severe tail event, mutualisation provides a deep pot by spreading impact to all members in small chunks

- **Reducing impact of default by transparent default management process**
  - ✓ A CCP's default management process is transparent and have a strong legal basis
  - ✓ This transparency limits uncertainty and fosters confidence in reliable default handling as opposed to disorderly wind-down in non-centrally cleared markets

How CCP reduce systemic risk in the financial system (9/9)

Protecting market participants from clearing member defaults : Case study



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Trends observed after Regulatory Reforms

Highlights

- Futurization of swaps by global exchanges
- Clearing houses increase diversity of product offering for OTC cleared trades
- Increased cleared volume of OTC trades due to mandatory clearing and margin for non cleared trades mandate
- Innovative clearing models by clearing houses to address asset segregation for end clients and leverage ratio requirement for banks
- Less depth in market liquidity for certain sovereign and corporate debt markets due to Basel III capital requirements for banks
- Banks are still adjusting their business models due to high capital requirements

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Case study on Futurization – Eurex MSCI derivatives (1/5)

Background

- Futurization is the process of standardizing the terms of settlement and delivery of a contract such that the contract may be listed on an exchange, rather than over-the-counter (OTC)
- Eurex MSCI futures is an example of futurization of Total Return Swaps (TRS) on MSCI
- Our objective is to provide clients with CCP protection without compromising flexibility that comes with an OTC trade – we have included some characteristics of OTC trades for Eurex MSCI derivatives
- MSCI derivatives are traditionally used by buy-side (fund managers, insurances, pension plans, endowments) seeking broad and reliable performance benchmarks and looking for tools to analyse risk and returns (estimated USD 9.5 tn are benchmarked against MSCI)
- With the increase of MSCI related ETFs , swaps and additional structure, we see an increased need for cheap and efficient hedging tools – futures and options (estimated USD 440 bn are invested in equity ETFs based on MSCI indexes)

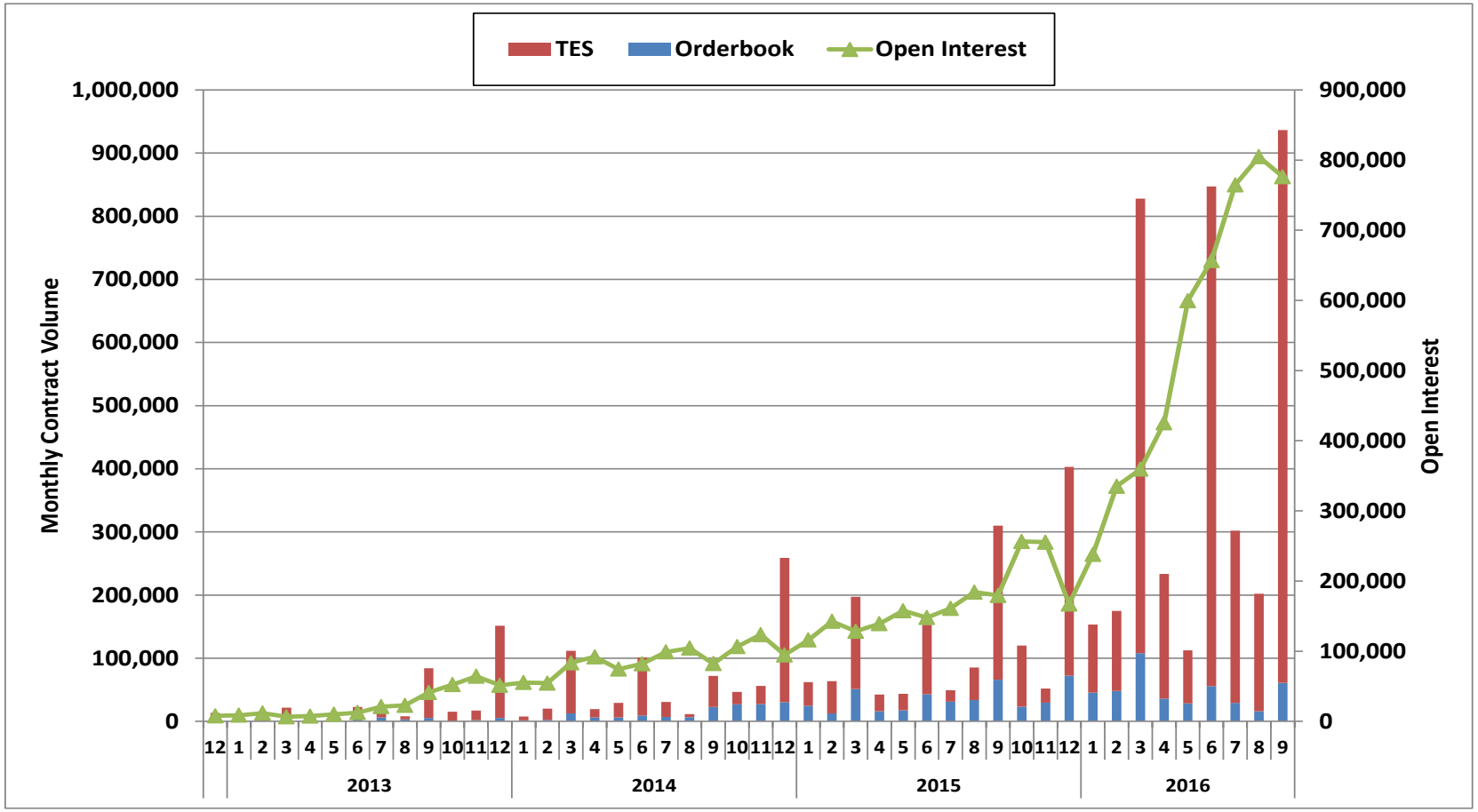
Case study on Futurization – Eurex MSCI derivatives (2/5)

Comparison of features

Features	MSCI TRS OTC	Traditional Exchange-Traded Derivatives	Eurex MSCI Derivatives
Customisation	Yes	No	Yes for maturity day, exercise price, expiration day, exercise style and minimum block trade size
Offbook trades (selecting chosen counterparty)	Yes	No	Yes via Trade Entry Services
Multilateral Trades	Yes	No	Yes via Multilateral Trade Registration Services
Initial Margin	Margin (collateral) is exchanged but subject to negotiation between counterparties	Yes	Yes
Daily settlement (mark to market) and margin calls			
Mandatory margin requirements	No	Yes	Yes
Orderbook	No	Yes	Yes
Transparency of market prices	No	Yes	Yes
Paperwork agreement between counterparty	Yes	No	No

Case study on Futurization – Eurex MSCI derivatives (3/5)

Volume Development



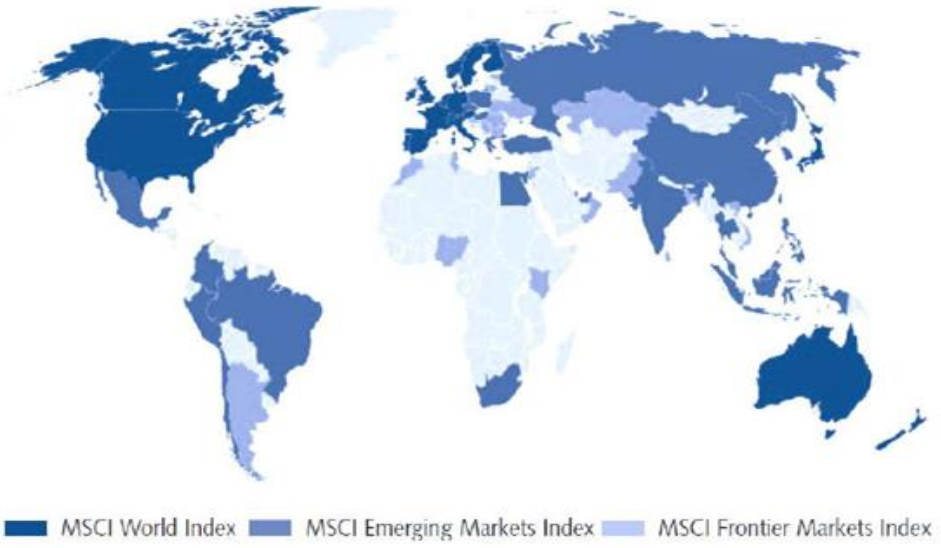
Case study on Futurization – Eurex MSCI derivatives (4/5)

Regional and country indexes listed at Eurex Exchange

The world divided by development status:
- MSCI World = all Developed Markets
- MSCI EM = all Emerging Markets
- MSCI FM = all Frontier Markets

Emerging Markets divided by region:
- MSCI EM Latin America
- MSCI EM EMEA
- MSCI EM Asia
- MSCI EM single countries*

Developed Markets by region:
- MSCI Europe
- MSCI Asia Pacific ex Japan
- MSCI DM single countries
- MSCI DM factor indexes



Case study on Futurization – Eurex MSCI derivatives (5/5)

Contract specs

	MSCI Index Futures	MSCI Index Options
Contract value	1, 10, 50, 100 or 1000 EUR, USD or GBP per index point	
Contract terms	Up to 36 months (4 quarterly maturities + 4 semi-annual)	Up to 5 years (for Europe, EM & World) Up to 2 years (for others)
Minimum price change	between 0.01 and 10 index points	0.01 or 0.1 index points
Tick value	5, 10 or 25	1, 5 or 10
Settlement	Cash settlement	
Final settlement price	Based on the closing index level on the last trading day of the maturity/expiration month	
Final settlement day	Next Eurex trading day following the last trading day (to cover all index close levels)	
Last trading day	Third Friday of the maturity/expiration month**	
Continuous trading	08:00 – 22:00 CET	09:00 – 17:30 CET
Eurex Trade Entry Service (TES)	08:00 – 22:00 CET	09:00 – 19:00 CET
Eurex TES Flexible Contracts	Available	
Eurex TES Minimum Block Trade size	Differs per contract	
Trading calendar	MSCI products will be tradable on each Eurex exchange day	