

**DRAFT**



# **Traded Risk & Regulation**

University of Essex Expert Lecture

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**Traded Risk Associates**

# Contents

- Introduction and UK Regulatory Environment
- Counterparty Credit Risk
- Fundamental Review of the Trading Book
- Summary and Q&A

# Contents

- **Introduction**
  - **Impact of Crisis**
  - **Changes to Regulatory Capital**
  - **UK Regulatory Structure**
- Counterparty Risk
- Fundamental Review of the Trading Book
- Summary and Q&A



**TRADED**RISK  
ASSOCIATES

## Regulatory Risk Advisory Services

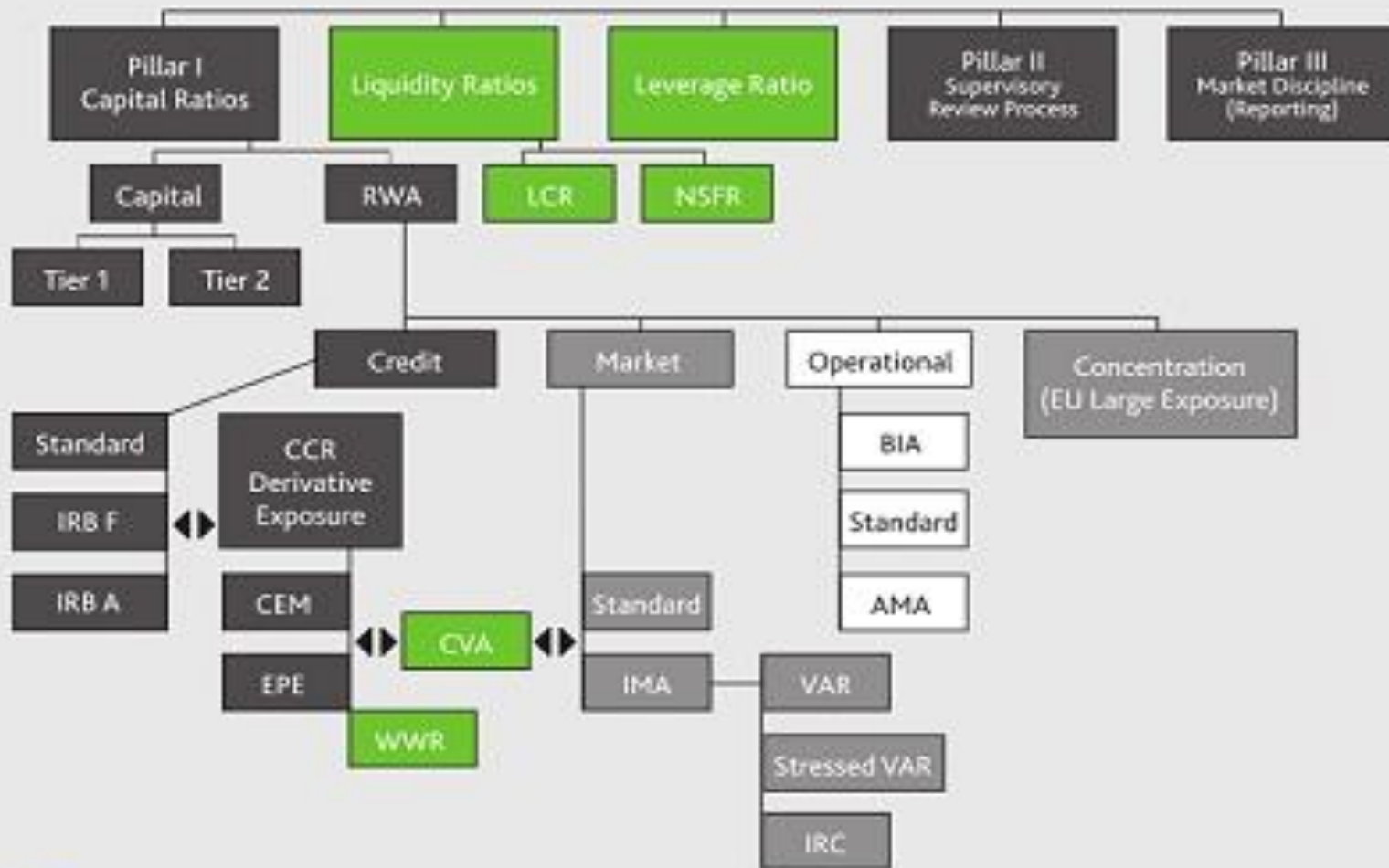
- Traded Risk Associates provide niche technical Regulatory Risk Advisory Services.
- Specialist areas covered include:
  - Market and Counterparty Credit Risk
  - Prime Brokerage and Clearing Risk
  - Regulatory Capital - Advanced Models Approaches, Stress Testing, ICAAP
  - Regulatory Consultancy on the impact and implementation of new Regulation :  
Basel 3/ CRD4, Compliance with PRA and FCA Handbooks, Dodd Frank, EMIR, Fundamental Review of the Trading Book
  - Management of Regulatory Permissions , Approvals and Regulatory communications
  - Management of Regulatory Change Projects
- Paula Haynes is the Managing Partner of Traded Risk Associates and has more than 15 years experience in Trading , Risk Management and Regulatory Affairs. Paula was previously Head of Regulatory Governance in Market Risk at Deutsche Bank and has also been a Technical Regulator at the FSA. She has also held various roles in Trading and Front Office Risk at Goldman Sachs and HSBC.
- **Paula holds the position Executive Fellow, Essex Business School, University of Essex**

# Financial Crisis – Recalibrated our view of Risk



# Basel Regulatory Response....

## Basel III - Framework



Brand new with Basel 3
  Updated with Basel 3
  Updated with Basel 2.5
  No Change from Basel 2

# Basel “3 Pillars” approach to Regulatory Capital

## • Pillar 1 “\*Mandatory Minimum Reg Capital to hold”

### – Minimum Capital Requirement

- For Market, Credit, Counterparty, Operational & Liquidity Risks
- Based on Models or Standard Rules (formulae)

## • Pillar 2

### – Capital for Risks not covered in Pillar 1

- Supervisory Review - ICAAP / SREP process
- Review of Risk profile, compliance with Regulations, systems
- Stress Testing

## • Pillar 3

### – Disclosure (Reporting – “Public”)

- Transparency for Market Participants
- Pillar 3 Report (US equivalent: 20F)
- Reporting for model and stress tests

# Basel 3 (CRD4/ CRR) - Summary

## Strengthen Capital

- Increase quality & quantity of Regulatory Capital
- Greater focus on common equity - Minimum to be raised to 4.5% of RWA, after deductions

## Limit Procyclicality

- Capital Conservation Buffer - Common equity of 2.5% of RWA, bringing the total common equity to 7%
- Countercyclical Buffer - Imposed within a range of 0-2.5% common equity

## Address Leverage

- Introduction of Min Leverage Ratio of 3% - Backstop to Risk based capital measures
- Leverage Ratio = Tier 1 Capital/ Total Assets



# Basel 3 (CRD4/ CRR) Summary) - Continued

## Improve Liquidity Management

- Liquidity Coverage Ratio (LCR) - requires banks have sufficient high-quality liquid assets to withstand a 30-day stressed funding scenario
- Net Stable Funding Ratio (NSFR) - longer-term structural ratio designed to address liquidity mismatches. It covers the entire balance sheet and provides incentives for banks to use stable sources of funding.
- New Regulatory liquidity framework & Supervisory monitoring

## Enhance Risk Coverage

- **Focus is Counterparty Risk**
- **Introduction of Stressed Risk Calibration & Capital Charge for Volatility of CVA**
- **Incentives for use of CCPs**
- **Enhanced standards for Model Validation, Stress Testing. Governance, Reporting.**

# Lessons learned from the crisis

The inter-connectedness of firms arising from complex transactions led to significant systemic risk

Banks were significantly undercapitalised for the risks they were taking

There were shortcomings in the credit origination & lending process

Regulatory Arbitrage occurred between Trading Book & Banking Book



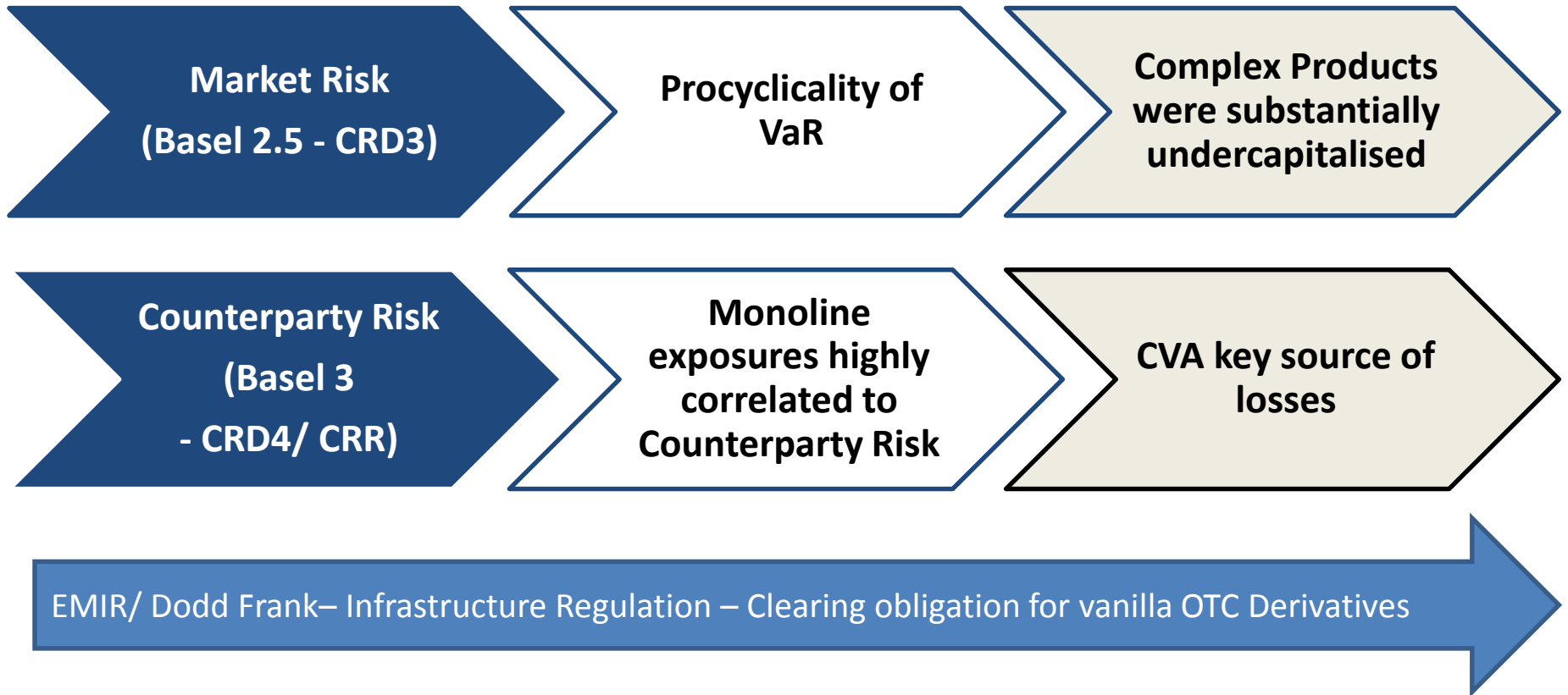
Mark-to-Market Volatility of CVA (Counterparty Risk) was a large driver of loss

An over-reliance on Models such as VaR. Models did not capture specific risk, basis risks, liquidity risks, gap risks...

Concentrated exposures to Monolines & Wrong Way Risks were not captured

A range of Risk Management weaknesses including poor controls, inadequate reporting and insufficient senior management oversight

# The Trading Book – An Area of Regulatory Focus

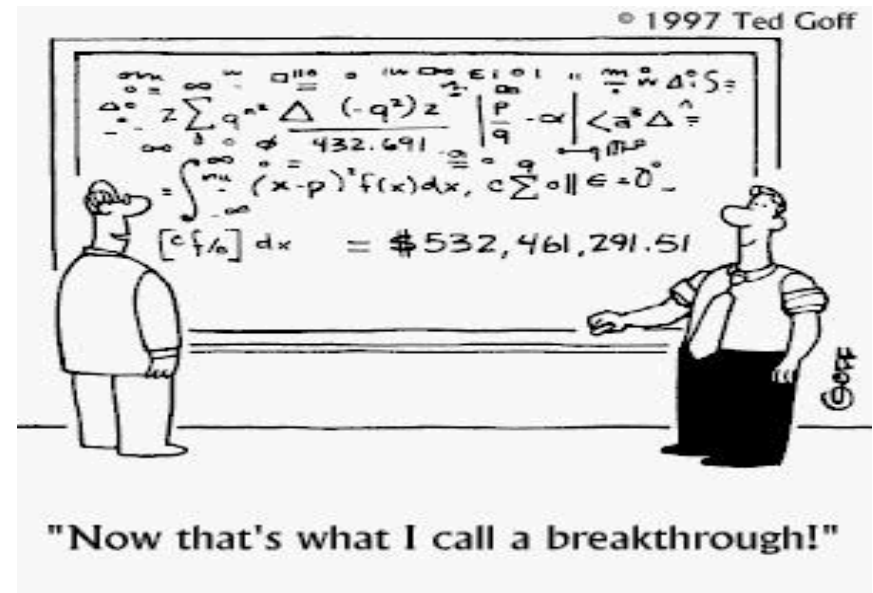


Lack of transparency → Interconnections → Risks not captured → Arbitrage opportunities → Risk Management & Control framework → Board & Senior Management Governance → Reporting & MI → Model standards → Data limitations → infrastructure & systems limitations.

# Risk Models underestimated Risk during the Crisis

Risk Models: VaR, EPE, Equity factor models, Gaussian Copula

“Parameters”: LGD, R, PD, implied volatility surfaces, correlation, stress test shifts, Market Scenarios



- Risk models and derived parameters are used for Regulatory Capital
- Certain risks were not captured – Liquidity, Gap Risk, Basis Risks, correlation
- Procyclical effects – E.g. Historical Simulation VaR, Stress Test Shifts
- Data quality and reporting issues
- Weaknesses in Risk management frameworks and governance
- Lack of Board / Senior Management oversight
- Lack of independent Model testing and Validation
- Supplement Models with Stress Testing

# Regulatory Capital – Models vs Standard Rules

## •Standard Rules Approach

- Formula approach rather than model
  - E.g  $\text{Reg Cap} = 8\% \times 20\% \times \$\text{market value}$
  - Limited offset of hedges and netting
  - More conservative
  - Used by small to mid- sized firms
  - Less disclosure and Regulatory oversight

## •Models Approach

- Models such as VaR or EPE
  - Full offset of hedges - Risk-based approach
  - Risk Management “Best Practice”
  - Used by larger firms
  - Significant disclosure requirements and Regulatory oversight

# Changes to Trading Book Regulatory Capital

## •Market Risk – CRD3 (Basel 2.5)

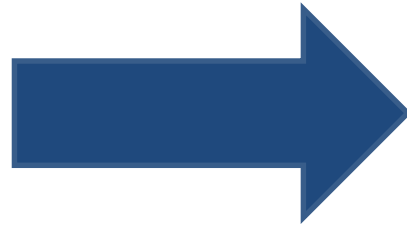
- Capital charges additional to VaR:
  - Stressed VaR
  - IRC charge for unsecuritised credit products
  - CRM charge for correlation credit products
  - Standard Rules Charge for securitised products

## •Counterparty Risk – CR4/ CRR (Basel 3)

- New Capital charges for **uncleared** derivatives:
  - Stressed EPE
  - CVA VaR
- Framework for Wrong Way Risk (WWR)
- [WWR Definition - where PD & credit exposure are correlated e.g. monolines]
- Small Charge for Centrally Cleared (vanilla) derivatives

**Enhanced standards for Model Validation, Stress Testing, Reporting, Data, Senior Management oversight etc.**

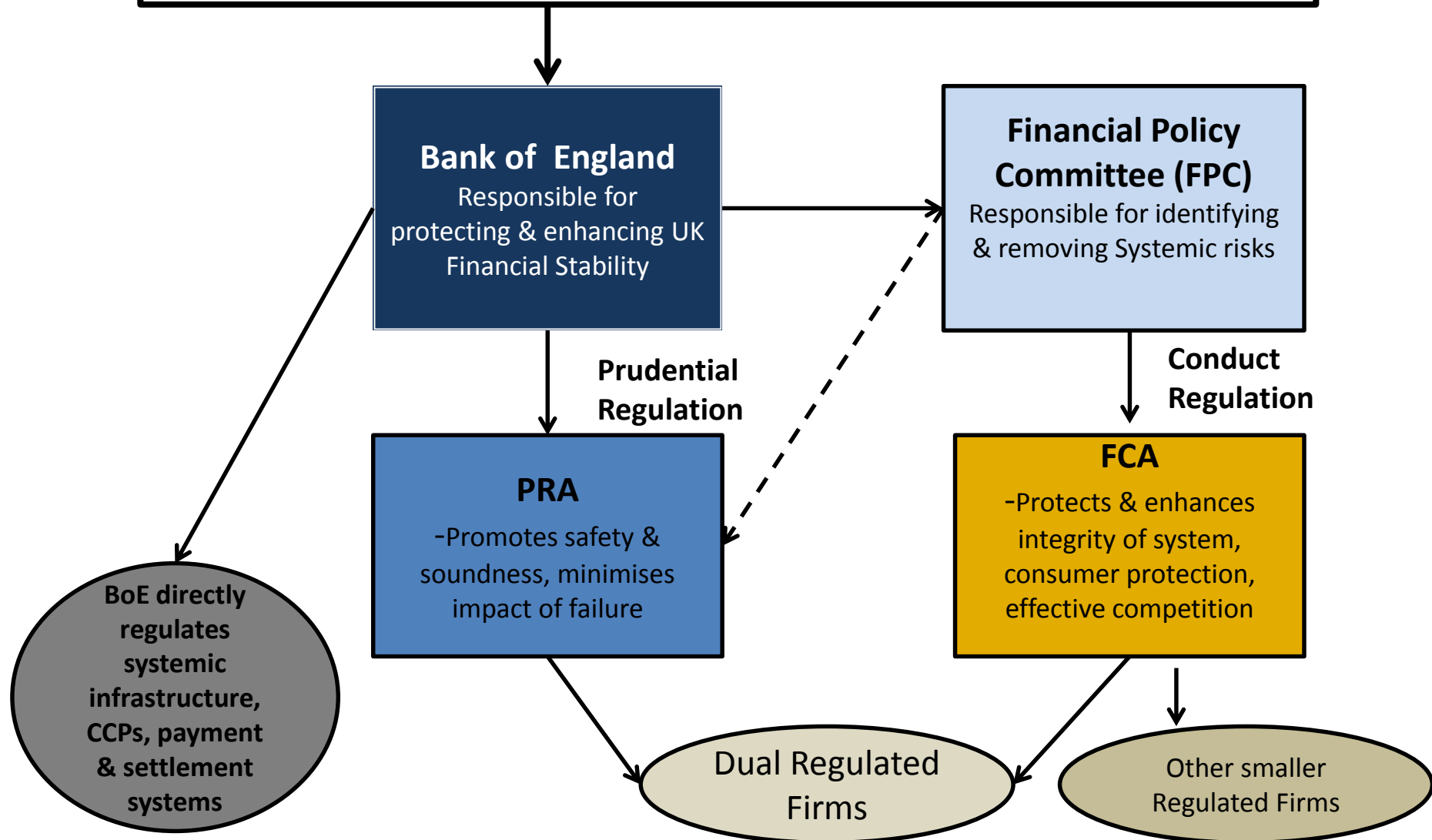
# UK Regulatory Structure



BANK OF ENGLAND  
PRUDENTIAL REGULATION  
AUTHORITY

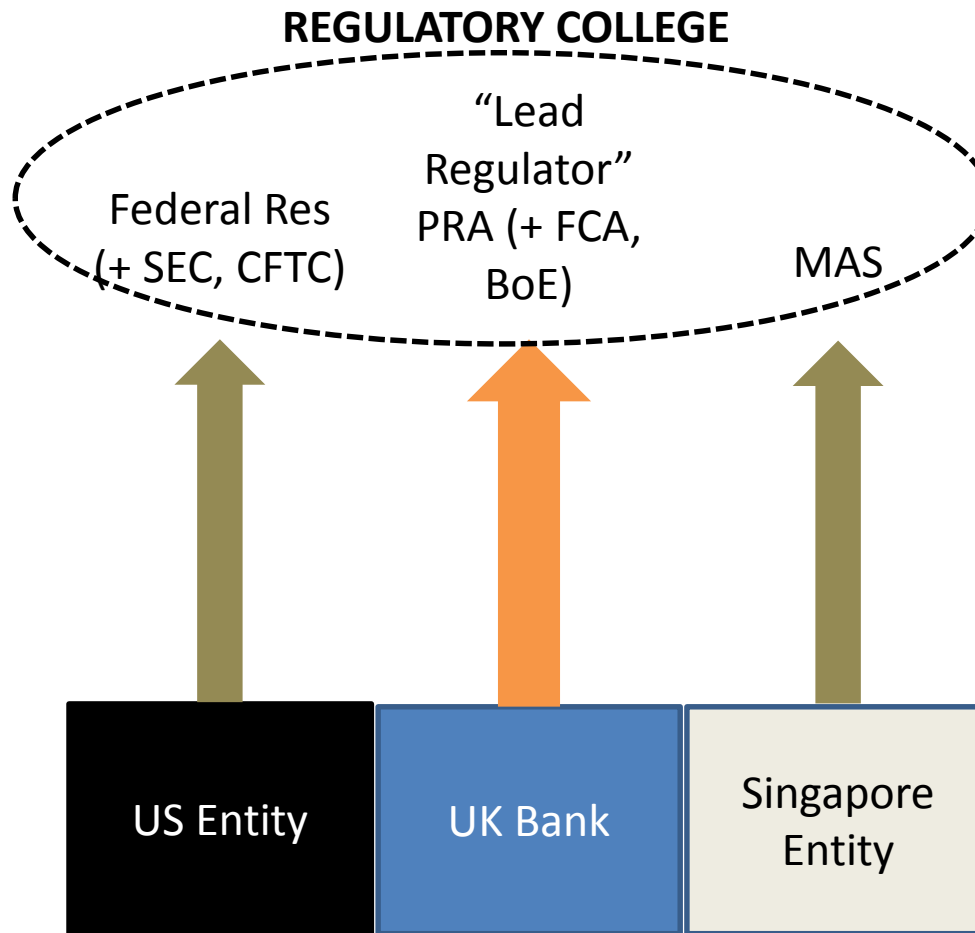
# UK “Twin Peaks” Regulatory Model

Treasury & Parliament – Overall Responsibility for UK Financial System





# International Banks have Multiple Regulators (& complex Regulatory Relationships)



# Contents

- Introduction
- **Counterparty Risk**
  - Lehman Example & Introduction
  - CRD4/ CRR changes to Counterparty Risk Capital
  - EMIR
- Fundamental Review of the Trading Book
- Summary and Q&A

# Lehman default fundamentally changed the market perception of Counterparty Credit Risk

| BEFORE   | AFTER   |
|--|---|
| “Too Big to Fail” myth obscured Counterparty Risk    | “Too Big to Fail” myth is shattered by Lehman plus other pseudo Bankruptcies                                |
| Monolines were seen as risk-free                     | Every Counterparty Risk situation is 2-Way  |
| AAA/ Aaa was risk-free                               | Scepticism surrounding Ratings – Use Credit spread  |
| Wrong Way Risk was a concept rather than reality     | Stress Testing and Reporting to identify General and Specific Wrong Way Risk                                |
| No one had heard of DVA                              | CVA and DVA   |
| Light-touch Regulation                               | Increased Regulation & Regulatory Review  |
| Over reliance on VaR, EPE and other Financial Models | Introduction of Stressed VaR, Stressed EPE, CVA Charges. Additional specific Risk Models for VaR - IRC, CRM |



## “Too Big to Fail” Myth

The failure of Lehman Brothers has significantly changed the perception of counterparty risk

Lehman filed for Ch 11 on 15 Sept 2008 listing assets ~ \$700 Bn

# What is Counterparty Risk?

## •Counterparty Risk Definition

- *The risk that a Market Counterparty will not fulfil its contractual obligations i.e. failure to pay, failure to meet collateral call*
  - Applies to **OTC derivative** transactions and Securities Finance Transactions (SFT)
  - **Does not apply to Exchange traded and centrally cleared transactions**
  - Mitigated by netting, collateral, hedging with CDS

## •Derivatives can have Positive or Negative values

## •Only Positive Exposures result in Counterparty Risk

- E.g. Long bond position vs Long swap
- Monte Carlo Simulation used to project risk factors forward in time to allow for future Valuations of derivatives portfolio

# Only positive values result in Counterparty Risk

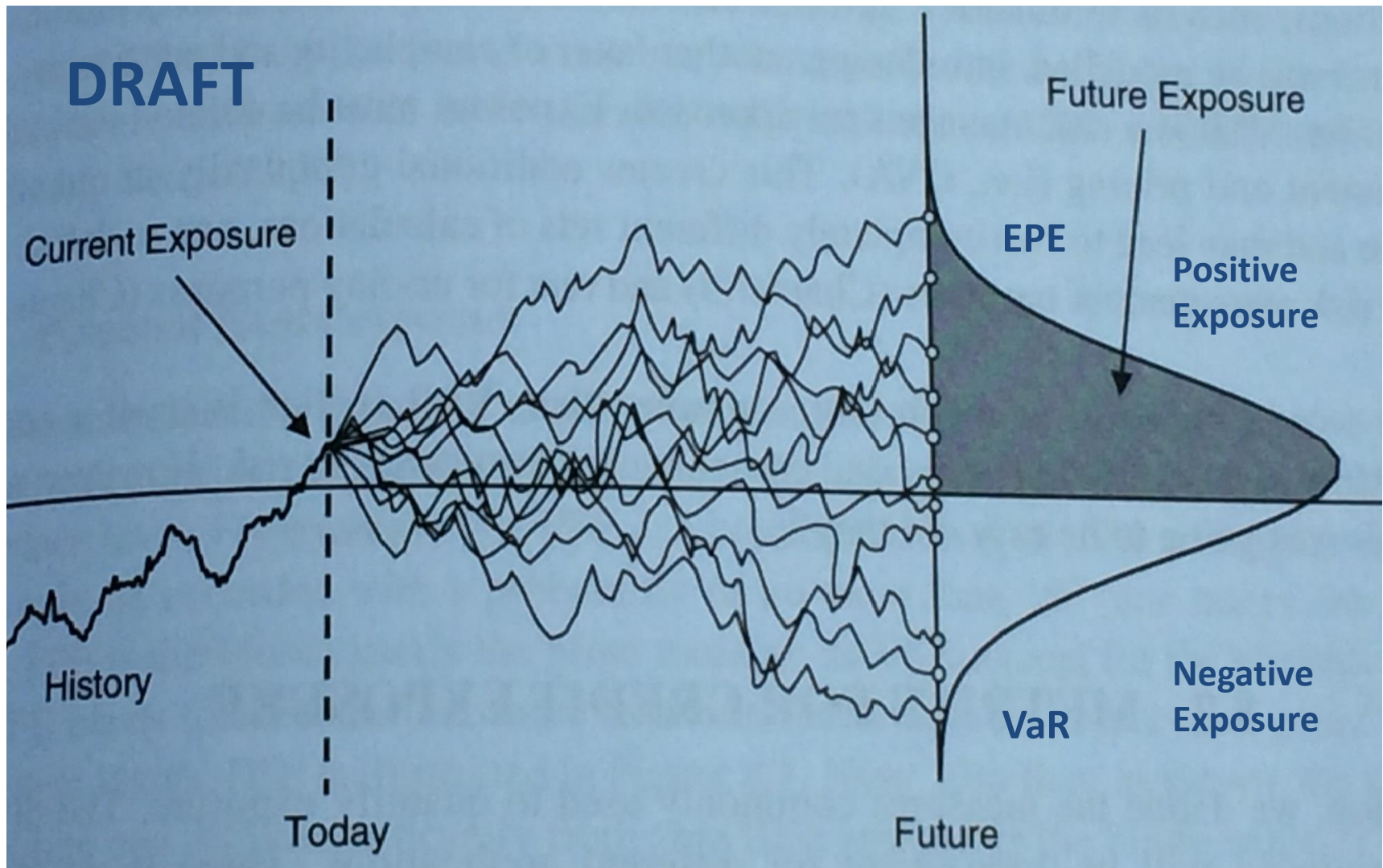


Figure taken from "Counterparty Credit Risk & CVA" – Jon Gregory

# Definitions/Counterparty Risk Measures

- **PFE** is Potential exposure at a Future Time
- PFE at 99th percentile gives a potential future credit loss
- Market Risk **VaR** is 1st percentile
- **EE** is the Expected Exposure i.e. the average Exposure at some point in time
- **EPE** is Expected Positive Exposure = average of the Expected Exposure (EE) over some pre-defined period (usually from the current time to the maximum maturity of the portfolio)
- Exposure at Default – **EAD** - is the positive value of transactions with a Counterparty. This will be the net value where netting is legally possible.

# IMM – Regulatory Counterparty Risk

- IMM refers to Internal Models Method for Counterparty Risk
- $EAD = \alpha \times EPE$   
where  $\alpha = 1.4$
- EAD is the positive value of transactions with a Counterparty.  
(netted where legally possible)
- In Regulatory calculation, EE and EPE are calculated using minimum maturity of 1 year
- Use of IMM represents “Best Practice” in Risk Management.
- Maximum netting benefits when compared to CEM or standardised methods.
- Significant validation and Reporting requirements

# Mitigating Counterparty Risk

- Netting, Collateral, hedging, or use CCP

## Netting

- Positive and negative exposures can be *netted* leaving a residual “net” exposure to a counterparty. E.g. 2 CDS Trades
- Trade 1: MV= +\$100m; Trade 2: MV=-\$95m
- Netted +\$5m vs Gross \$195m

## Hedging

- Buy CDS protection, hedge FX, interest rate risk

## Collateral

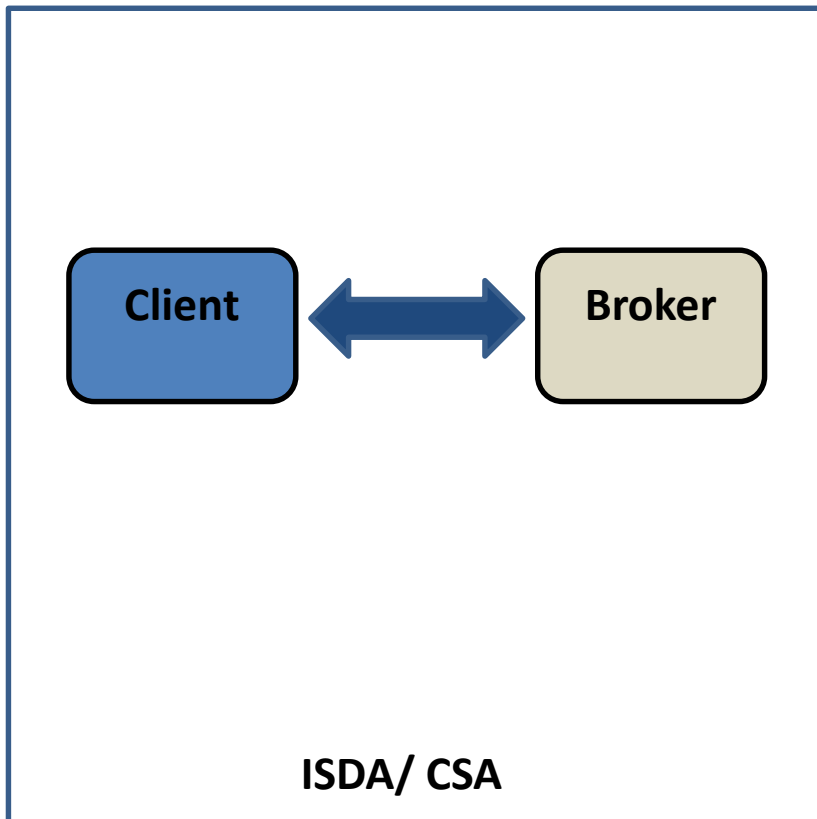
- Take collateral e.g. cash, bonds from counterparty
- If counterparty defaults, close position and sell collateral

-> Central Clearing

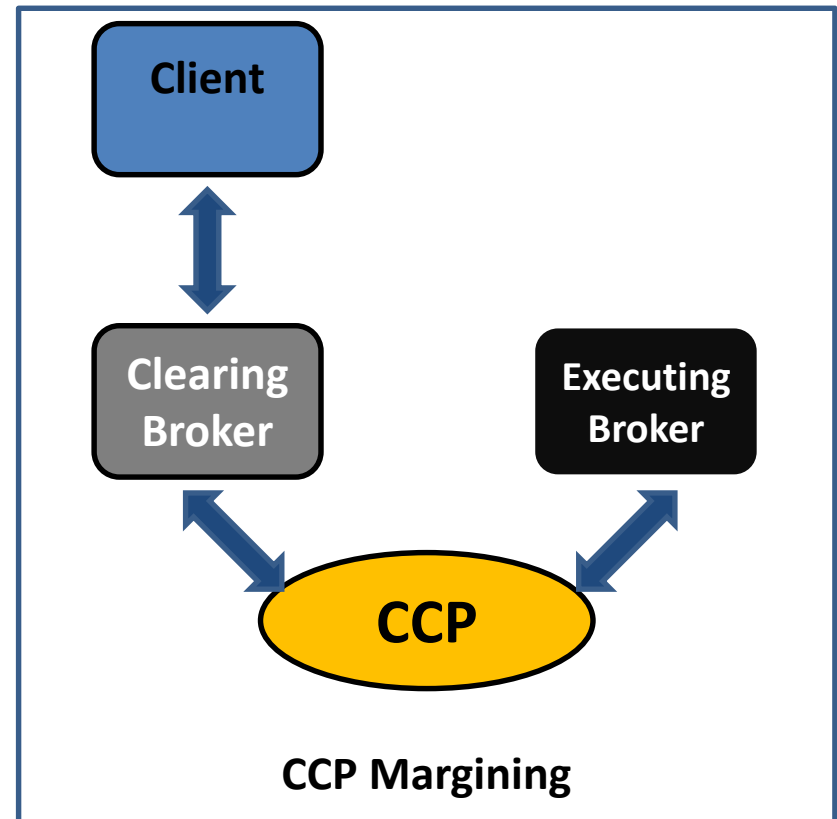


# Bilateral vs Central Clearing

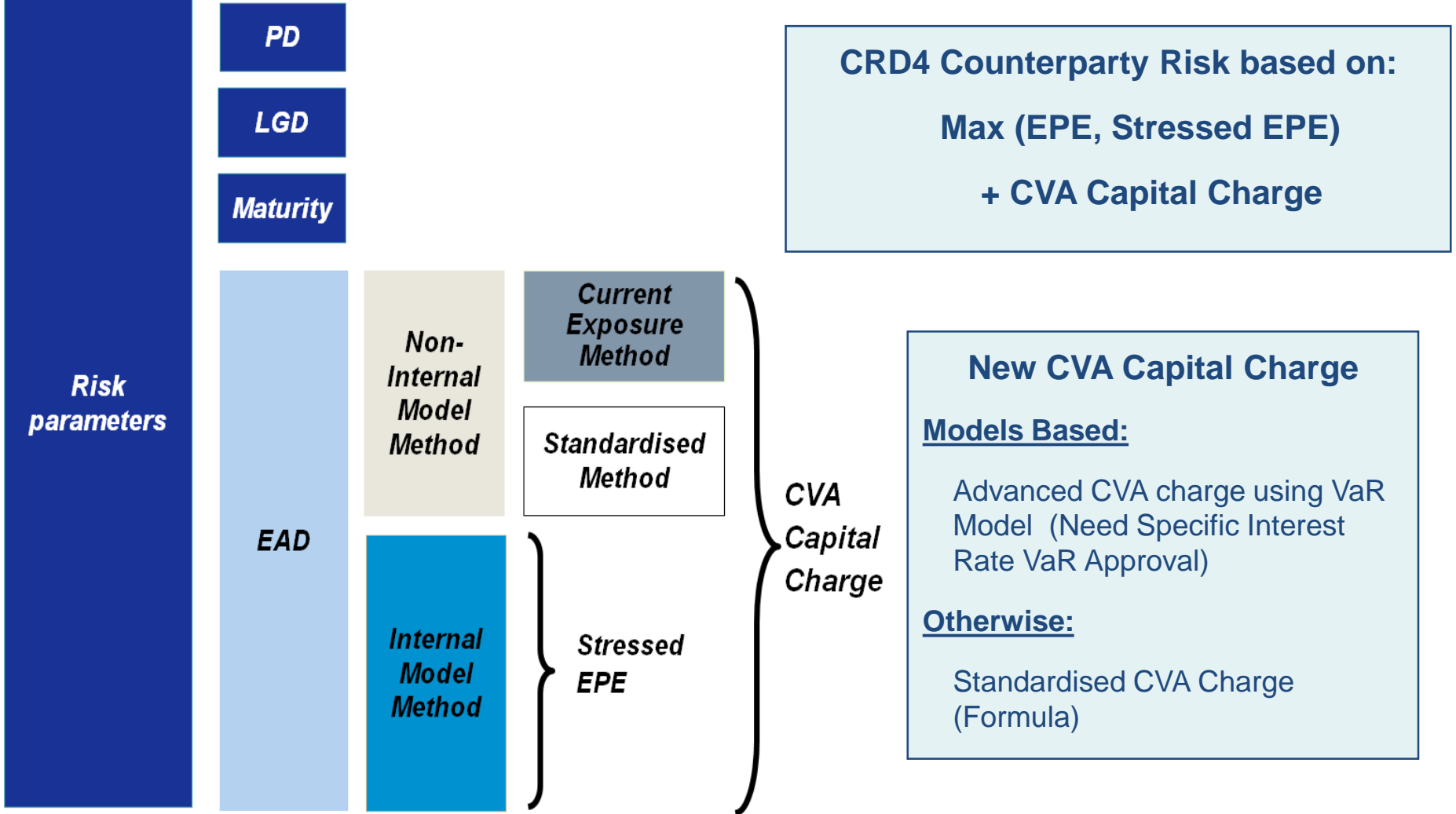
## Bilateral OTC Trading Model



## Central Clearing Model



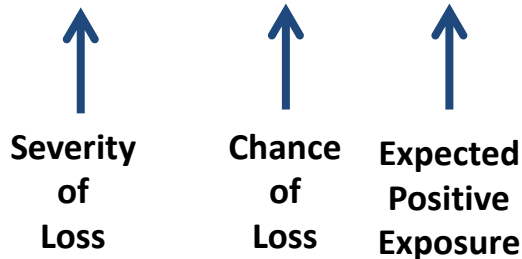
# New CRD4/ CRR Counterparty Risk Framework - Uncleared Derivatives



# CVA is Credit Valuation Adjustment

- OTC derivatives have CVA to reflect **Counterparty Risk**
- CVA is the “Expected Loss” or Market price of counterparty risk
- $CVA = \text{Derivative MtM (Risk-free)} - \text{Derivative MtM (Risky)}$

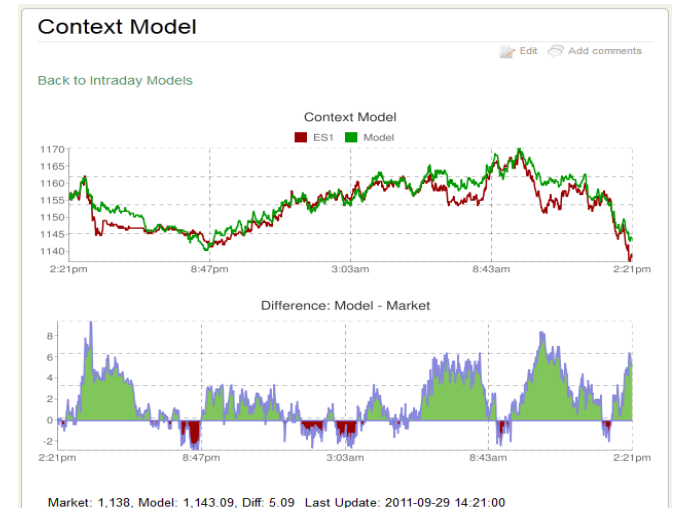
$$CVA \approx (1-R) \times PD \times EPE = \text{Spread} \times EPE$$



- Calculation of CVA is complex (more complex than pricing the derivative itself)
- **CVA Regulatory Capital Charge (“CVA VaR”)- Introduced to mitigate losses from volatility of CVA charge**
- Note that above formula does not take into account WWR (Wrong Way Risk) – When PD and exposure positively correlated

# CRR/ CRD4 has enhanced Model Validation standards for Counterparty Risk Models

- Banks with internal model approval (VaR or IMM)
  - need to carry out on going validation of models
- Backtesting is a form of Model Validation
- Backtesting is quantitative comparison of
  - model forecast, and
  - realised values



- Basel 3 requires Independent Model Validation of IMM Model
- Backtesting of EPE vs MtM over entire distribution
- Risk factor evolution for a number of different time horizons
- Selection of data for Backtesting – Portfolio & Market Data
  - Real vs hypothetical trades & development of statistical tests
- Exploration of poor Backtesting Results and decisions to take remedial actions
- Policies and Procedures - Define acceptable / unacceptable model performance
- Board and Senior Management to be involved & receive appropriate reporting

# Summary of Counterparty Risk Changes

- Counterparty Risk – CR4/ CRR (Basel 3)

- New Capital charges for **uncleared** derivatives:
  - Stressed EPE & CVA VaR
  - Reg Capital based on  
Max (EPE, Stressed EPE) + CVA VaR
- Framework for Wrong Way Risk (WWR)
- Enhanced Standards for Model Validation
- Enhanced Standards for Stress testing
- Increased weighting for financial sector counterparts (125% correlation coefficient applied to large financial sector counterparts for IRB firms)
- Enhanced standards for governance, reporting, data, senior management oversight etc.
- For Centrally Cleared derivatives: Small Charge – Links to EMIR

# EMIR – European Markets Infrastructure Regulation

- Market Infrastructure
- Covers derivatives, CCPs and Trade Repositories (TRs).
- Aims to reduce (counterparty) risks of derivatives market and to improve transparency.
- Establishes common organisational, Conduct of Business & Prudential Standards for CCPs & TRs
- Both OTC and Exchange Traded
- US equivalent – Dodd Frank Title VII

## EMIR – Requirements

- Report every derivative contract to TR (OTC & ETD)
- Clear via CCP OTC derivatives subject to mandatory clearing obligation i.e. vanilla
- New Risk Management Standards – including margining and operational processes for bilateral OTC Derivatives i.e complex/ exotic derivatives which cannot be cleared
- EMIR came into force August 2012, but effective from 15 March 2013 (RTS finalised)
- OTC & ETD Derivatives reported to TR from 12 Feb 2014
- First clearing obligations applied – expected late 2014
- Margin requirements for non-cleared trades – Variation margin from 1 Dec 2015, initial margin phased in from 1 Dec 2015.

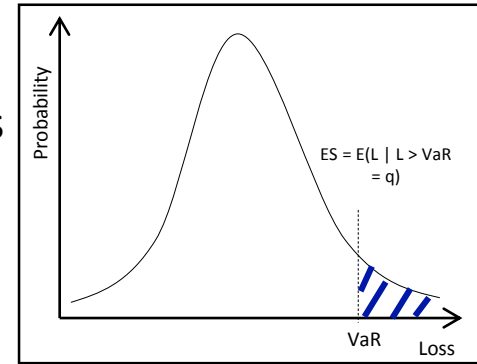
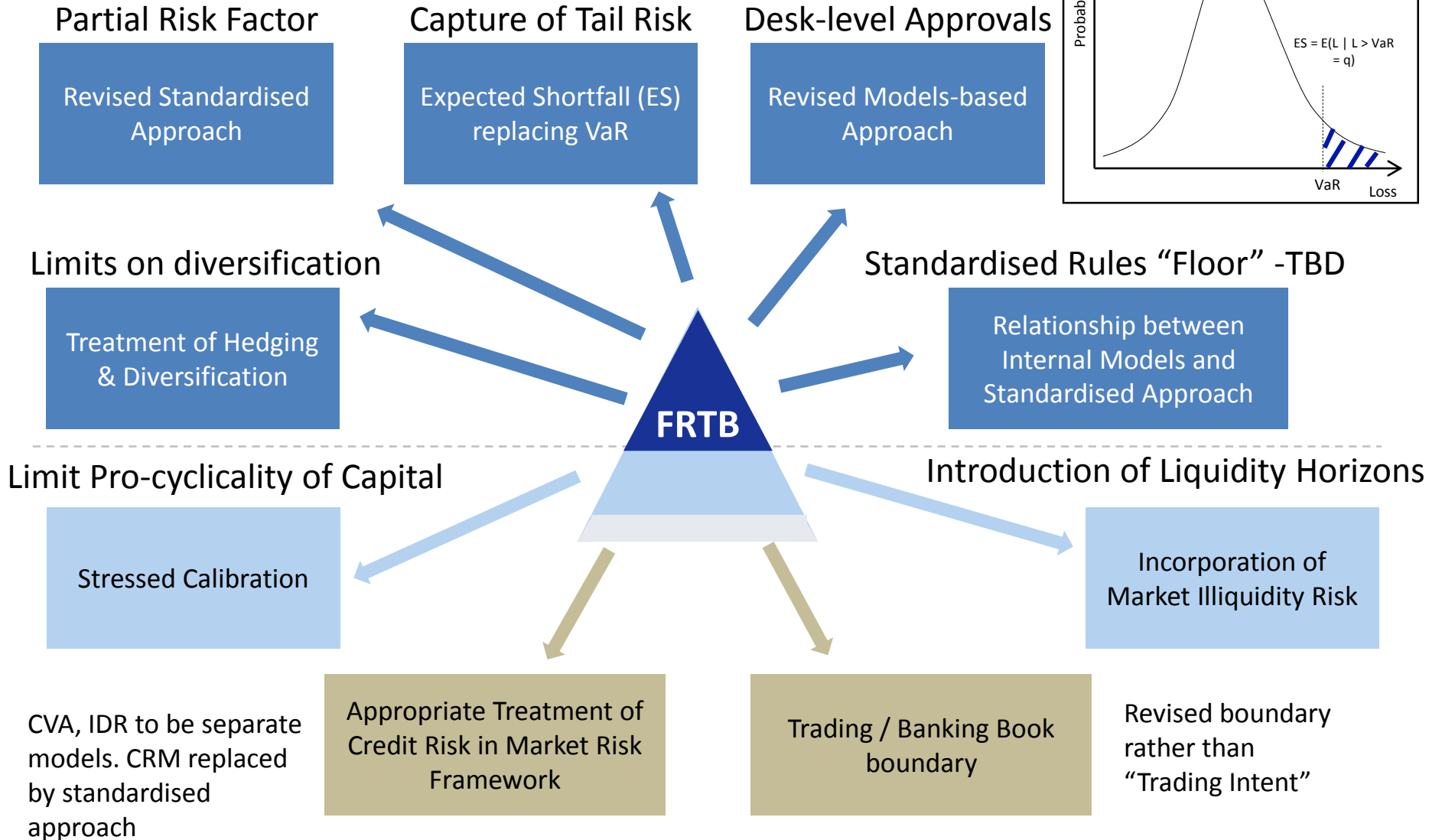
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# Fundamental Review of the Trading Book

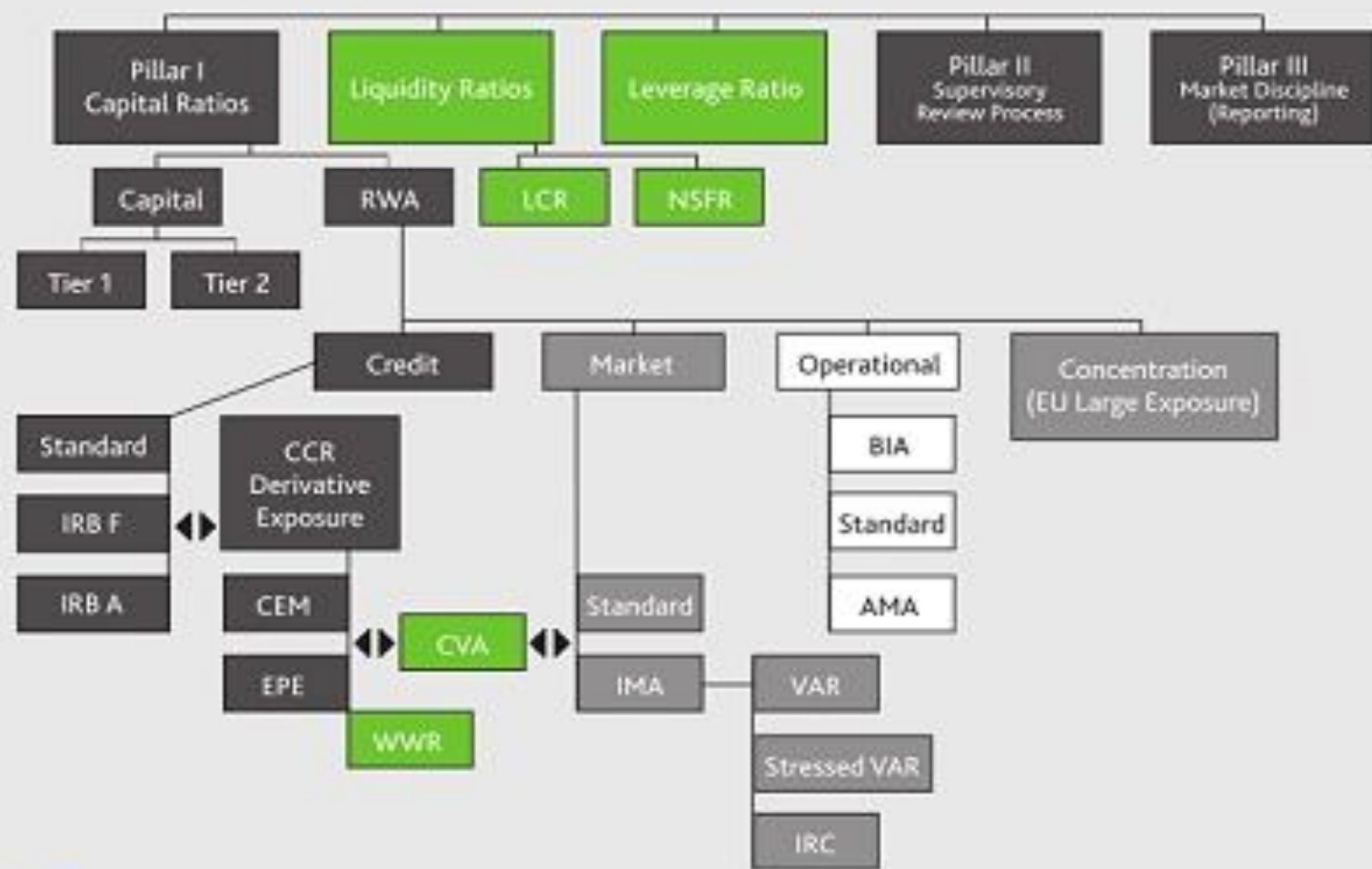
Review focuses on 9 key components



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# Basel III - Framework



Brand new with Basel 3
  Updated with Basel 3
  Updated with Basel 2.5
  No Change from Basel 2

# Summary – Impacts of Recent Regulation

- Basel 2.5 (CRD3), Basel 3 (CRR/ CRD4), EMIR
- Uncertainty – Delays in finalisation of regulation
- Polarization of Banking Sector - Need Infrastructure to deal with Regulatory Change
- Divergence between Risk management & Regulations? → “Use Test”
- Increase in Regulatory Capital for Trading Book (3+ times)
- Certain Products become uneconomic
- Exotics & Securitised Products moving to Asset Management or Shadow Banking
- Centralisation/ Concentration of Counterparty Risks to CCPs
- Enhanced Model validation standards, increased reporting requirements
- Models approaches under increased scrutiny
- Now we have Basel Fundamental Review of the Trading Book (FRTB) .....

# Questions?

# Suggested Titles

- “How the Lehman Brothers default changed the perception of Counterparty Credit Risk”
- “Does Central Clearing reduce systemic risk?”
- “Counterparty Credit Risk and the lessons learned from the Financial Crisis”
- “Impact of Fundamental Review of the Trading Book”

# References

- BIS website on Basel III - <http://www.bis.org/list/basel3/index.htm>
- Basel 3 website - <http://www.bis.org/bcbs/basel3.htm>
- PRA and FCA Handbooks - <http://fshandbook.info/FS/>
- FCA CRD4/ CRR website - <http://www.fca.org.uk/firms/markets/international-markets/eu/crd-iv>
- Basel Fundamental Review of the Trading Book (October 2013)  
<https://www.bis.org/press/p131031.htm>
- “Counterparty Credit Risk and Credit Value Adjustment: A Continuing Challenge for Global Financial Markets” – Jon Gregory (The Wiley Finance Series)
- “Counterparty Credit Risk” – Jon Gregory (Wiley Finance)
- “Risk Management and Financial Institutions” – Jon Hull (Wiley Finance)

“seek, and you will find”