Outlook on the fundamental review of market risk capital regulation and its implications

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The views and opinions expressed herein are those of the author and do not necessarily reflect the official position of the Bank of Russia nor the Trading Book Group of the Basel Committee on Banking Supervision

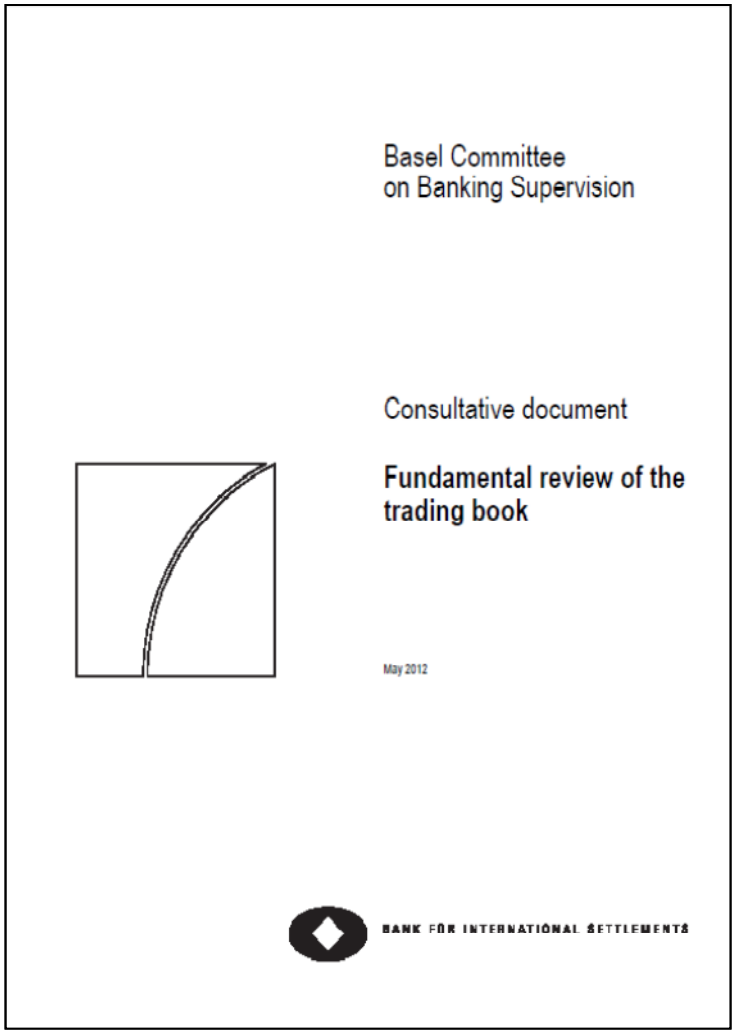
Outline

1. Quick recap: Basel regulations of capital adequacy for market risk
2. Revised boundary between trading book and banking book
3. Revised standardized approach
4. Revised internal models approach
5. Open issues and challenges

Market risk in Basel Capital Accords

- 1993: Two alternative approaches proposed by the Basel Committee (BCBS):
  - Standardized approach (SA)
  - Internal-models approach (IMA)
- 1996: Both SA and IMA adopted by BCBS in the Amendment to the Basel Capital Accord to incorporate market risk
- 1998: Implementation of SA and IMA in G-13 countries
- 1999: SA adopted by the Bank of Russia in a simplified way (Reg. 89-P)
- 2000: SA implemented by eligible Russian banks
- 2001: IMA-based capital requirements for brokers/dealers proposed by the Federal Securities Market Commission in Russia
- 2004: SA and IMA incorporated into New Basel Capital Accord (Basel II)
- 2007: Revised version of SA adopted by the Central Bank of Russia (Reg. 313-P)
- 2009: Crisis-driven revisions to SA and IMA (Basel 2.5)
- 2011: BCBS launched the fundamental review of the trading book
- 2012: Basel 2.5 amendments to SA adopted by the Bank of Russia (Reg. 387-P)
- 2012: BCBS published the consultative document "*Fundamental Review of Trading Book*"

Fundamental review of the trading book



Fundamental Review of the Trading Book

(Basel Committee on Banking Supervision, May 2012)

I. Shortcomings of the present market risk framework

II. Reassessment of the boundary

III. Relationship between standardized and internal models approaches

IV. Choice of risk metric and stress calibration

V. Factoring in market liquidity

VI. Treatment of hedging and diversification

VII. Revised internal models approach

VIII. Revised standardized approach

- Full text available at: http://www.bis.org/bcbs/publ/bcbs219.pdf
- Published for comments till September 7, 2012
- Bank of Russia press release of May 24, 2012 http://www.cbr.ru/Press/Archive_get_blob.asp?doc_id=120524_101850bazel.htm

Lessons learned from the crisis of 2008/09

- Trading book boundary loosely defined
  - Large positions in low-liquid financial instruments prone to market risk and credit risk with inadequate capital coverage at the onset of the crisis
  - Enhancements to the market risk framework to remove certain instruments (e.g. most securitization positions) from the trading book under Basel 2.5
- Market liquidity risk overlooked
  - Ignored in the standardized approach
  - Marginally reflected in the internal models approach
- Incomplete picture of market risk from a single bank perspective
  - Interactions between market players not properly captured, particularly in assessing liquidity of trading portfolios
- Large discrepancies between internal risk estimates across portfolios and those calculated using the standardized approach (e.g. Basel Committee on Banking Supervision, 2013)
- Supervisory instruments to control internal models weak and inadequate
- Unclear relationship between market risk capital and credit valuation adjustment (CVA)

Trading book boundary

CBR Regulation No. 89-P of Sep 24, 1999

1.2.2. Trading book consists of fair-valued financial instruments bought by the credit institution with an intent to resale in the future, including repo-style transactions.

CBR Regulation No. 313-P of Nov 14, 2007

1.1. … fair-valued securities (both equity and debt) … bought by the credit institution with an intent to resale in the short-term (held for trading) or available for sale.

Which criterion is best to define the trading book?

- Availability of market prices?
- Availability of fair value?
- Intent of the bank (intent to trade / not to hold to maturity)?
- Feasibility to trade (sale in the short-term)?
- Active portfolio management?

Trading book boundary

Required properties of the trading book boundary

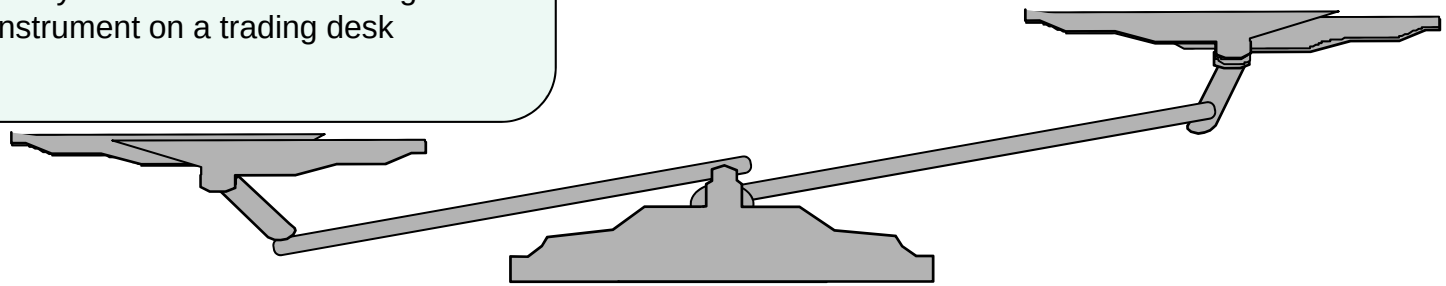
- ü Conceptual simplicity and practical usability
- ü Objectivity
- ü Minimum opportunities for regulatory arbitrage by shifting instruments across the boundary
- ü Flexibility to capture new financial instruments and products

I. Trading-evidence based approach

- þ Enhanced definition from Basel II
- þ Bank has to prove the intent and ability to trade and risk manage the instrument on a trading desk

II. Valuation-based boundary

- þ Accounting classification of financial instruments
- þ Fair-valued instruments with changes in value reflected in regulatory capital



Trading book boundary

“Trading evidence”-based approach

- Instruments must be held for trading purposes at the entry
- Instruments need to be marked to market daily with changes in fair value recognized in P&L
- Formal policies and documented practices for determining what instruments should be included in the trading book
- Objective evidence that trading instruments are actively managed
- Proven feasibility of trading an instrument, e.g. by having an access to relevant markets

If the above criteria are not met, the instrument goes to the banking book

Disadvantages

- Some degree of subjectivity
- Consistency of the approach relies on jurisdiction
- Some fair-valued instruments in the banking book will not receive market risk capital charge

Trading book boundary

Valuation-based boundary

- þ Capital charge applied to a financial instrument if a change in its value leads to a reduction in regulatory capital
- þ Better aligned with accounting treatment of financial instruments recorded at fair value and at amortized cost
- ´ Some fair-valued instruments will be left in the banking book if used for hedging other banking-book positions

Disadvantages

- L Direct link to accounting standards
- L Discrepancies between jurisdictions due to variations in accounting
- L Any fair-valued assets and liabilities can require market risk capital (e.g., patents, property)?

Revised approaches to market risk capital

Underlying principles

- More coherence in risk measures
  - Standardized risk weights will be calibrated to measures produced by internal models
- Transition to IMA approved on a desk-by-desk basis
  - If a trading desk does not meet the conditions for using IMA for regulatory capital, it is transferred to SA
- SA as a “credible fallback” for internal models
  - Lower bound for capital requirements?
  - Add-on to capital charge produced by the internal model?
- Reduction of model risk and overall reliance on internal models
- Recognition of reduced diversification and hedging benefits in the time of crisis
- Correlations between asset classes in IMA will not be fully modeled by the bank
- Hedging and diversification benefits will be better recognized in SA
- Options to recognize diversification effects:
  A. Supervisory correlations between asset classes (interest rate, FX, equity, commodity, and credit)
  B. Lower bounds on correlations for both SA and IMA

Standardized approach reset

Objectives

- q Higher risk sensitivity
- q Soundness of calibration
- q Simplicity, transparency and coherence
- q Reduced dependence on internal models
- q Recognition of diversification effects
- q Credible fallback in case of non-compliance with IMA requirements

Application

- ü Banks with relatively unsophisticated risk profile
- ü Internal models cease to correctly reflect bank risk profile

Options

A. Partial risk factor approach

B. Fuller risk factor approach

Standardized approach reset

Partial risk factor approach

1. Instruments are grouped in buckets based on common risk factors
2. About 20 buckets for each of the 5 asset classes (interest rates, equity, FX, commodities, and credit including securitizations)
3. Capital requirement calculated for each asset class based on supervisory risk weights and correlations
4. Capital requirements aggregated across asset classes using supervisory formula

Framework for defining buckets

1) Estimating returns of instruments within one asset class over a period of market stress
2) Using statistical techniques to assign instruments to buckets
3) Estimating risk weight as expected shortfall (*ES*) of the returns distribution

Standardized approach reset

Partial risk factor approach

Step 1. **Aggregating capital charges within the bucket**

$$K_b = \sqrt{\sum_{i=1}^{I} RW_i^2 MV_i^2 + \sum_{i=1}^{I} \sum_{j \neq i} r_{ij} RW_i MV_i RW_j MV_j}$$

where MV – current market values of the instruments

RW – regulatory-prescribed risk weights of the instruments

ρ – supervisory correlations between instrument returns

Step 2. **Aggregating capital charges across buckets**

$$MRC = \sqrt{\sum_{b=1}^{B} K_b^2 + \sum_{b=1}^{B} \sum_{c \neq b} g_{bc} S_b S_c}$$

where $S_b = \sum_{i \hat{\imath}\, b} RW_i MV_i$

g – regulatory-prescribed correlations between buckets

Standardized approach reset

Fuller risk factor approach

1. A set of risk factors and their classes to be defined by BCBS
2. Mapping positions to risk factors and calculating positions in each risk factor using internal valuation models
3. Aggregating positions across risk factors using regulatory correlations:

$$MRC = \max\left(\sqrt{\sum_{i=1}^{N} IMCC^2(C_i) + \sum_{i \neq j} r_{ij} L_i L_j IMCC(C_i) IMCC(C_j)}, IMCC(C) \right)$$

where *IMCC* – capital requirements for risk factor C_i

L = 1 for long positions, L = -1 for short positions

ρ – regulatory-prescribed correlations between risk factor classes

IMCC(C) – internally modeled capital charge calculated at the bank-wide level without regulatory-prescribed correlations (equivalent to treating all desks as a single risk class)

Standardized approach reset

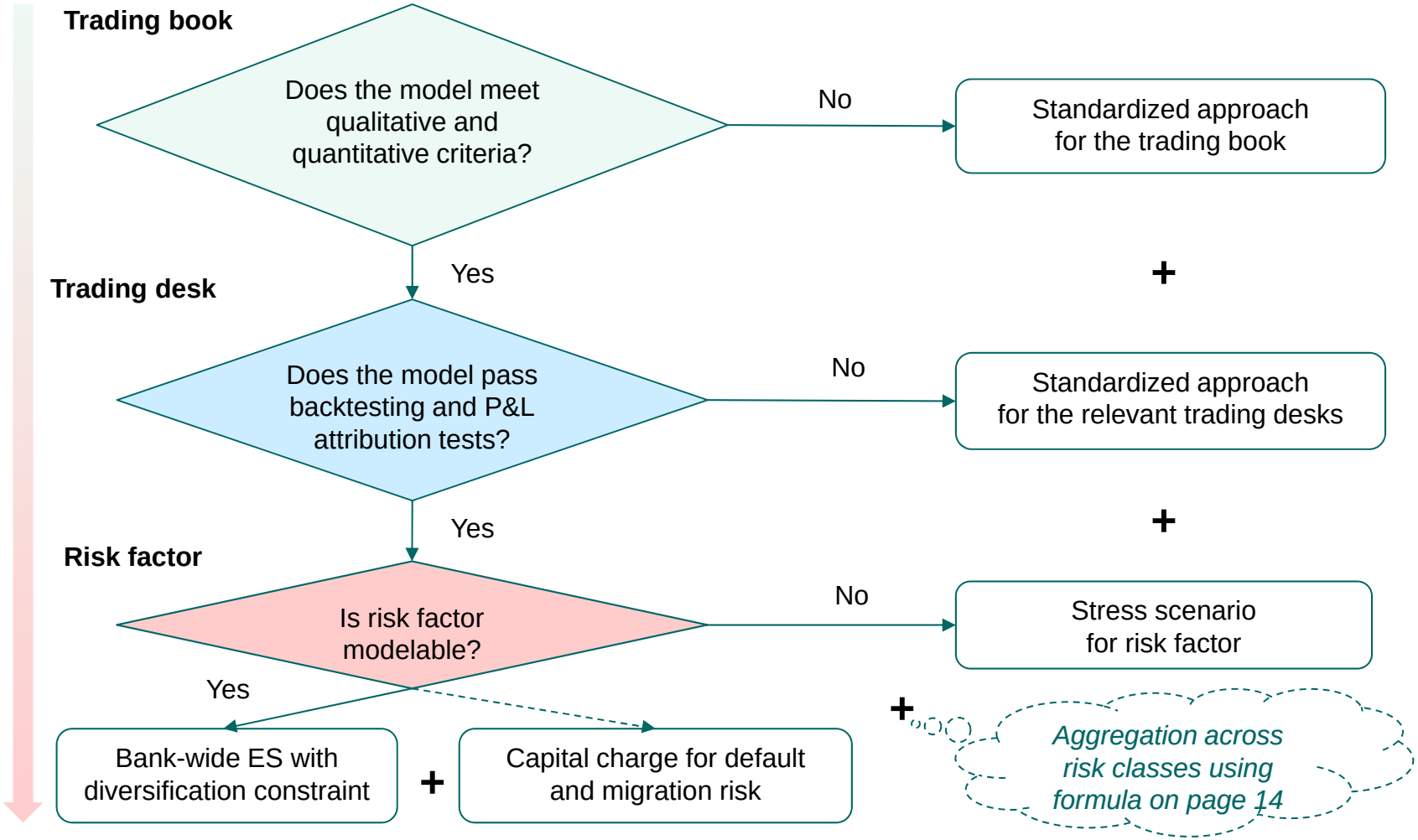
Main issues

- Trade-off between higher risk sensitivity and simplicity
- Degree of conservatism in the recognition of diversification benefits
- Treatment of non-linear risks (e.g. option Greeks)
- Number of variables for calibration
- Frequency of recalibration
- …

The industry has been generally supportive of the revised standardized approach but expressed concerns about the complexity of the fuller risk factor approach

Internal models approach 3.0

Determining eligibility of trading activities for using internal models-based approach



Internal models approach 3.0

Identifying eligible trading desks

- Criteria for identifying IMA-eligible trading desks:
  - Ü Daily P&L attribution
  - Ü Daily backtesting *VaR* or *ES*
- Trading desk is eligible for modeling if the following average values are below regulatory-prescribed thresholds (*to be specified by BCBS*):
  - $\frac{\text{Mean of the difference between the theoretical and actual P\&L (unexplained P\&L)}}{\text{Standard deviation of the actual P\&L}}$
  - $\frac{\text{Variance of the unexplained P\&L}}{\text{Variance of the actual P\&L}}$
- Model performance to be assessed through daily backtesting (*methodology to be developed by BCBS*)

Internal models approach 3.0

Identifying eligible trading desks (Basel Committee 2012)

- Trading desks defined by the bank in line with internal policies and organizational structure
- Possible criteria for assigning trading activities to trading desks:
  - Coordinated structure and control of the activities
  - Joint management of risk levels and limits
  - Coordinated control of inventory levels
  - Links between the compensation of traders and the performance of the different activities
  - Unified booking of trades from different activities
- Banks establish and document a trading desk structure and develop a business strategy for each trading desk
- Regulators compare trading desk structures across banks with similar activities to ensure that the structures are reasonably consistent across similarly situated banks

Internal models approach 3.0

Example of a trading desk structure at a large financial firm (Basel Committee 2012, p. 33)

Equity

- Domestic cash equity
- Domestic equity derivatives
- Quantitative equity strategies
- Foreign equities
- Emerging market equities

Fixed income/currency

- Domestic interest rate & derivatives
- International interest rate & derivatives
- Spot FX
- FX derivatives
- Domestic structured products
- Global structured products
- Distressed debt
- High grade credit
- High yield credit
- Syndicated loans

Commodity

- Commodities – agricultural
- Commodities – energy
- Commodities – metals

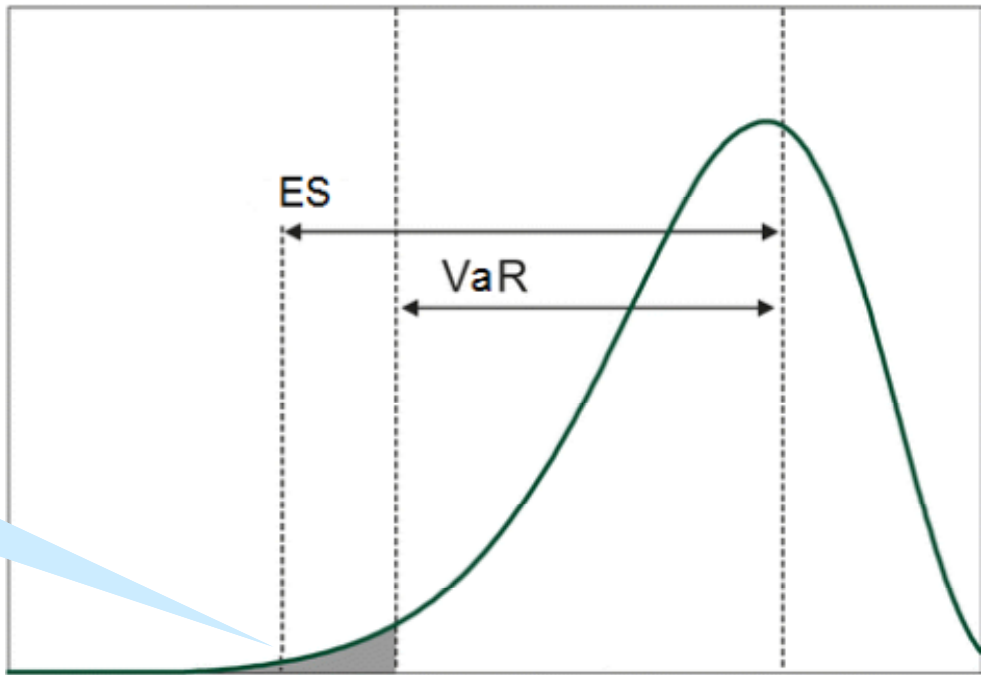
Multi-asset trading units

- Special opportunities
- Strategic capital
- Quantitative strategies

Internal models approach 3.0

Choice of risk metric

$$ES = E(L \mid L > VaR_\alpha) = \int_0^\alpha \frac{1}{1-\alpha} VaR_p dp$$



Industry largely supported substituting *ES for VaR*

α = 95-99%

Conditional expected loss in excess of *VaR* (*expected shortfall – ES, Conditional VaR – CVaR*) is a *coherent* risk measure that, unlike *VaR*, more accurately captures losses in heavy-tailed distributions

Internal models approach 3.0

Model calibration

- Model parameters calibrated over a period of market stress ("stressed" *ES*)
- Implementation of "stressed *VaR*" (*SVaR*) under Basel 2.5 revealed problems in stressed calibration of *VaR* models (e.g. Lobanov 2012):
  - Relatively short periods of market stress suitable for calibration of all necessary parameters
  - Approximations required when using longer time frames (e.g. when some significant market factors did not exist)
  - Capital requirements may exceed the current market value of positions

Internal models approach 3.0

Market liquidity risk

- Under Basel 2.5, market liquidity risk is partly captured in the comprehensive risk measure (*CRM*) and incremental risk capital charge (*IRC*) (Basel Committee 2009)
- 10-day *VaR* presumes that trading positions are equally liquid
- Options to factor in market liquidity:
  - A. Various holding periods for calculating *ES* for different asset buckets or risk factors?
  - B. Capital add-on to cover jumps in liquidity premium?
  - C. Prudent valuation adjustments to market values of positions (i.e. regulatory valuation of positions to reflect the impact of endogenous liquidity risk)?

Credit risk

- Possible options:
  - A. Integrated model: default risk and rating migration risk as modelable risk factors
  - B. Separate capital charge: default risk and migration risk modeled separately and added *as IRC* to market risk capital requirement

The industry broadly supported incorporating liquidity risk to the market risk framework

Open issues and challenges

Standardized approach

- Mapping portfolios to risk factors may be complex and non-unique
- Correlations between risk factors and asset buckets ≠ Correlations between trading desks!
  - Example: correlations between markets (risk factors) might be significant, while correlation between trading desk revenues may be *on average* very low (*see next page*)

Internal models approach

- *ES* estimates is less stable than *VaR*
- Absence of a simple and operational framework for backtesting *ES*-models
  - Backtesting the underlying *VaR*-model using the Basel traffic-light approach?
  - Backtesting P&L attribution?
- Soundness of correlation-based aggregation
  - Implicit assumption of a normal multivariate distribution of returns?
  - High correlation does not ensure a comparable dependence between tails of the returns distributions (e.g. Brigo and Nordio 2010)
- Reduction of capital requirements compared with 3 x *VaR* in the Basel 2 framework?

Open issues and challenges

Example: Trading desk returns are only marginally correlated in normal times (Perold 2001)

Table 1: Correlations Between Trading Revenues of Businesses Within Major Product Segments

	Interest-Rate Products	Equity Products	Foreign-Exchange Products	Commodity Products
Interest-Rate Products	1.000			
Equity Products	0.135	1.000		
Foreign-Exchange Products	0.053	-0.111	1.000	
Commodity Products	0.057	-0.007	-0.002	1.000

Table 2: Distribution of Correlations Between Unit Trading Revenues

	All Trading Businesses	Interest-Rate Products	Equity Products	Foreign-Exchange Products	Commodity Products
Range of correlations:					
Low	-0.430	-0.078	-0.430	-0.014	-0.124
High	0.401	0.191	0.284	0.401	0.075
Average correlation	0.065	0.126	0.125	0.202	0.009

Next steps

Basel 2.5

BCBS Consultative document *Fundamental Review of the Trading Book*

Second Consultative Document *Fundamental Review of the Trading Book**

New rules on market risk capital adequacy*

2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2017 | ...

BCBS charged Trading Book Group with the fundamental review of the trading book and approaches to market risk capital

Discussion with the industry

Quantitative impact studies*

Implementation of new rules*

**Time estimated to be announced by BCBS*

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QUESTIONS???