Credit Risk Management Challenges in the Light of Basel II

Challenges from New Risk Management Developments
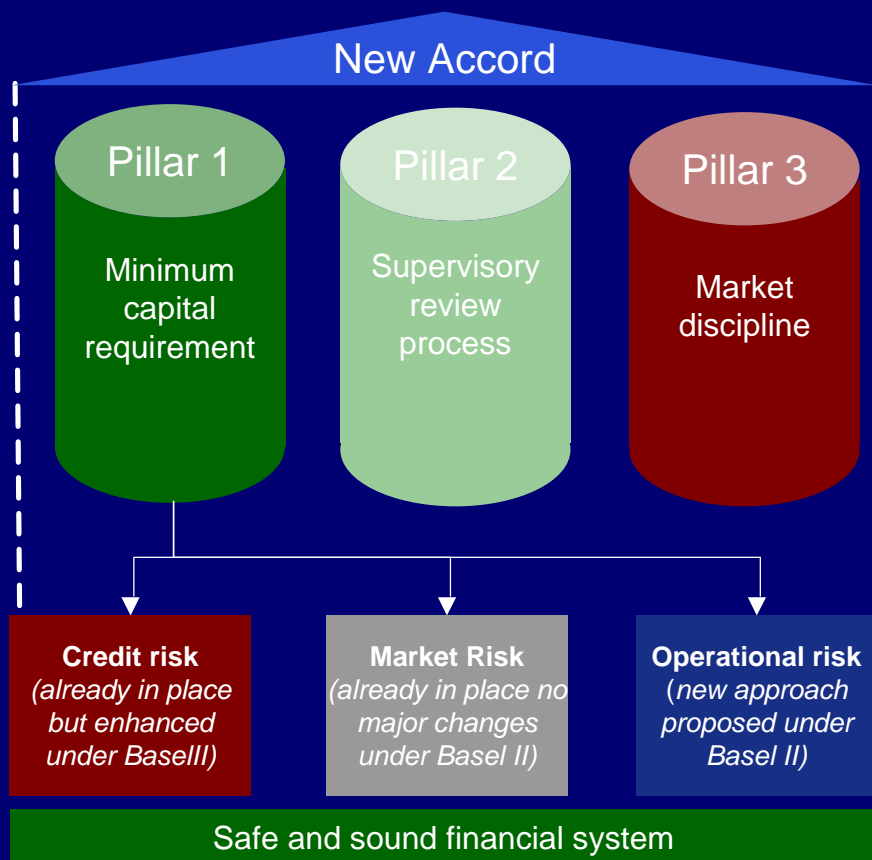
Istanbul, 27th of April, 2004
Jörg Hörster

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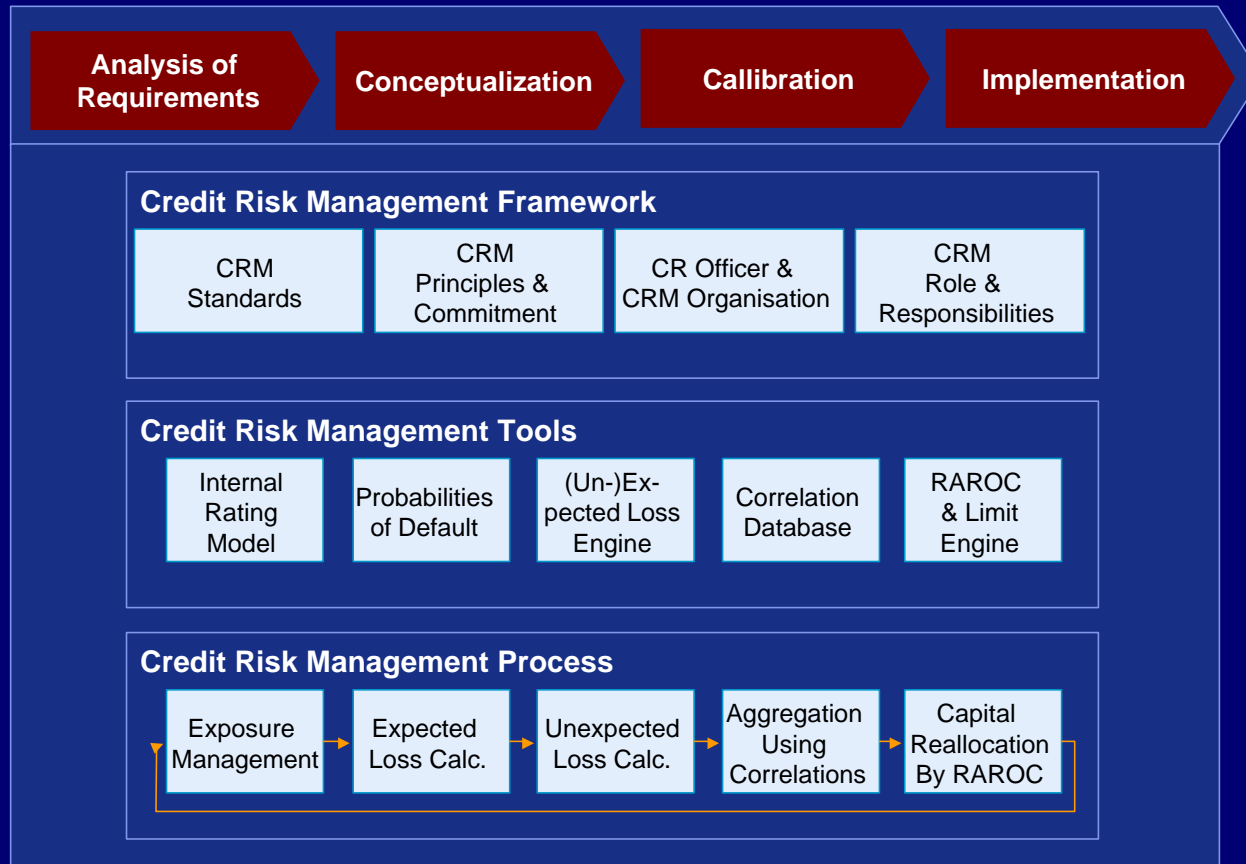*Risk Management Services*
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Future regulatory context - Basel II overview

New Accord

Pillar 1

Minimum capital requirement

Pillar 2

Supervisory review process

Pillar 3

Market discipline

Credit risk
(already in place but enhanced under BaselII)

Market Risk
(already in place no major changes under Basel II)

Operational risk
(new approach proposed under Basel II)
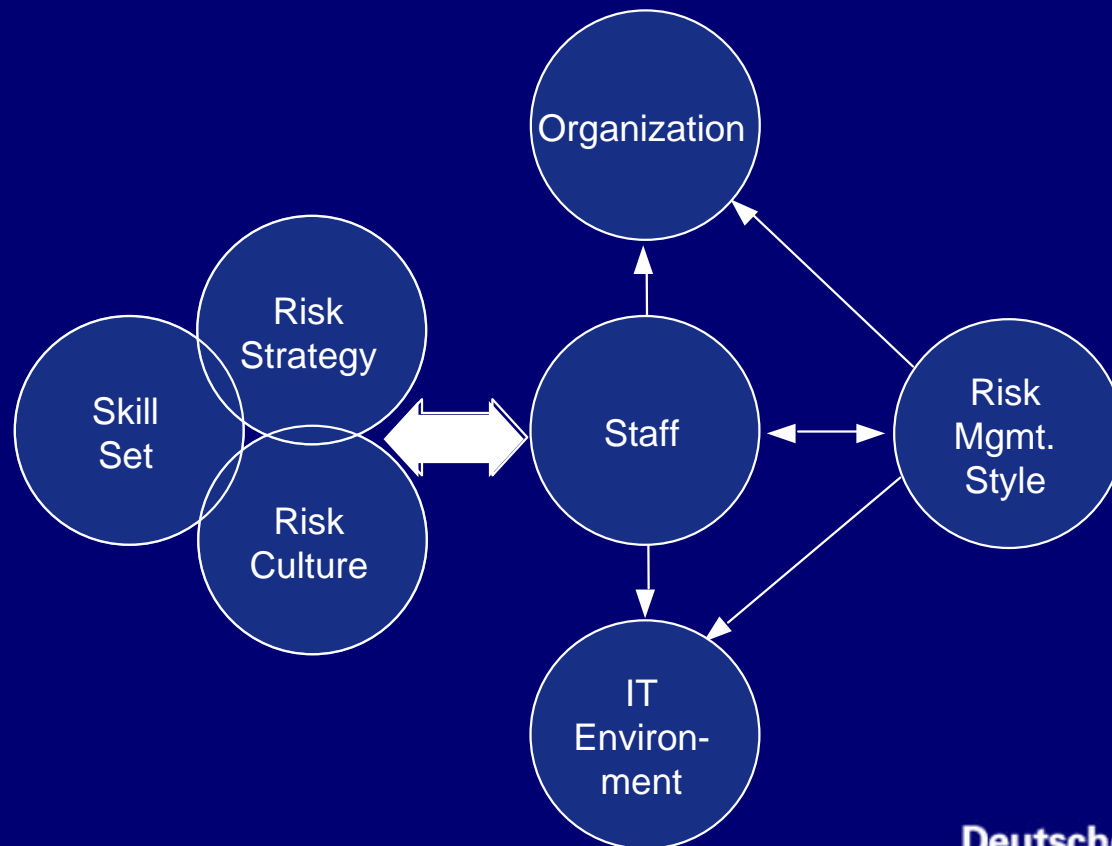
Safe and sound financial system

- More emphasis on bank's own internal methodologies, supervisory review and market discipline

- Banks have several options:

  - Flexibility

  - Menu of approaches

  - Incentives

- More credit risk sensitivity for better risk management

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The implementation of an internal credit risk management brings a competitive advantage, but is also a challenge

Analysis of Requirements	Conceptualization	Callibration	Implementation

Credit Risk Management Framework

CRM Standards	CRM Principles & Commitment	CR Officer & CRM Organisation	CRM Role & Responsibilities

Credit Risk Management Tools

Internal Rating Model	Probabilities of Default	(Un-)Ex-pected Loss Engine	Correlation Database	RAROC & Limit Engine

Credit Risk Management Process

Exposure Management	Expected Loss Calc.	Unexpected Loss Calc.	Aggregation Using Correlations	Capital Reallocation By RAROC

The implementation of credit risk management has a severe impact on the bank

Organization

Risk Strategy

Skill Set

Risk Culture

Staff

Risk Mgmt. Style

IT Environ-ment

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Deutsche Bank's Five Principles

- Deutsche Bank manages risk on a fully integrated basis on all levels

- Execution of Risk Management by dedicated units in the Business Divisions and a complementary group function

- Risk Management is independent from the Business Divisions

- The Group Risk Board steers, strengthens and integrates Risk Management across Divisions. It has ultimate judgement on the risk position

- Group Board and Supervisory Board maintain their ultimate responsibility for Risk Management

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Definition of credit risk

■ **Credit risk reflects the potential that customers might not fulfil their contractual payment obligations to the bank**

■ **For most institutions credit risk is the largest single risk and is comprised of the following types:**

| Default Risk | the failure of customers to meet contractual payment obligations |

| Country Risk | the inability of customers to fulfil their payment obligations owing to government measures (e.g. transfer restrictions) or country-specific economic factors (e.g. currency devaluation) |

| Settlement Risk | the risk that arises if financial obligations are not settled on time or at all, either for the bank or when the bank acts as an intermediary for its clients or other third parties |

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Credit risk management units have the primary day-to-day responsibility for

- assessing the creditworthiness of credit counterparties

- approving credit limits

- managing credit exposure

- managing credit portfolios through periodic reviews

- developing and implementing tailored credit risk management infrastructure and systems

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Risk assessment is the prerequisite for credit risk evaluation

- Risk assessment consists of analysis of
  - Obligor's financial condition and market position
  - Business environment and obligor's management
  - (for cross border transactions) in addition analysis of country risk

- The result is a Credit Rating, which
  - affects the outcome of the credit decision
  - Influences the level of decision-making authority required to extend the credit and terms and conditions of the transaction

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The risk assessment and approval process depend on
Example: Corporate

- **Financial Condition**
(in status + prospects / outlook)
  - Earnings and profitability
  - Cash flow generation and liquidity financing structure
  - Capital adequacy
  - Quality of assets

- **Market position and business environment**
  - Industry environment (e.g. competition, demand dynamics, product substitution)
  - Location (e.g. political, legal and economic risks, regulatory environment)
  - Product offering (e.g. quality and breadth) and marketing strengths
  - Dependencies
  - Special risk (e.g. environmental, product liability, technical)

- **Quality of management**
  - Short to long term strategies and business policies
  - Experience and quality of management (of different levels)
  - Structure, continuity and succession for key management positions

- **Relationship**
  - Risk/return profile (RaRoC) and business prospects
  - Manner of account operation and conduct of account
  - Provision of Information
  - Level of Contact

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Exposure and credit risk limits

Credit Limit Type

Structure of Credit Limits

- Size
- Tenor
- Product / Terms and Conditions for Utilisation

Cash Limits

Contingencies

Margin Limits
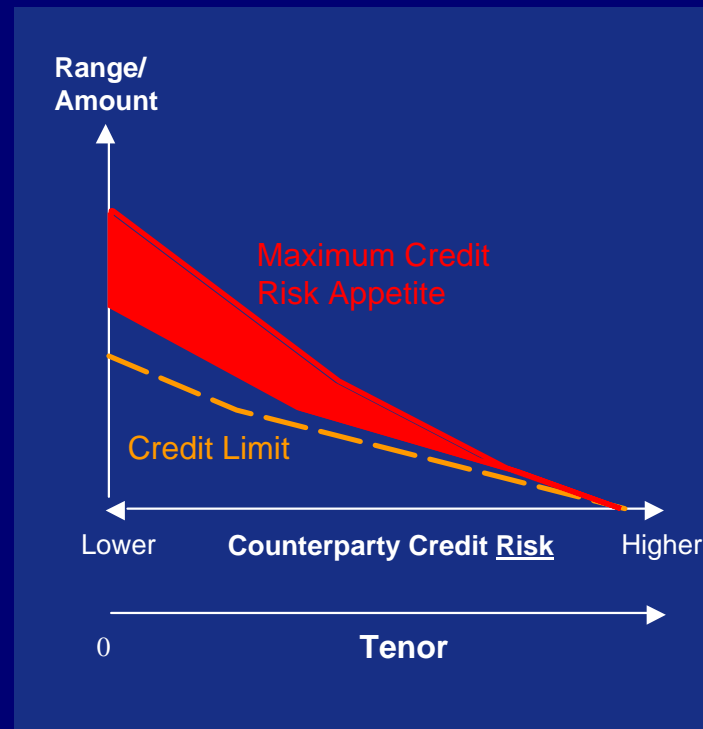
Security Limits

Settlement Limits

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Exposure and credit risk limits

- The maximum **Credit Risk Appetite**
  - generally declines with credit quality and increasing tenor
  - is a range, not a specific number

- The Amount of **Credit Limit**
  - generally declines with credit quality
  - reduces over time, reflecting future uncertainty of counterparty's credit worthiness
  - is below the maximum credit appetite
  - is a specific number

Range/ Amount

Maximum Credit Risk Appetite

Credit Limit

Lower **Counterparty Credit Risk** Higher

0 **Tenor**

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Risk is the exposure to uncertainty
Possible measurements of risk

- Cash Exposures with Notional
- Derivative Exposures
    - Current Credit Exposure (cost of closing out the position at MTM)
    - Value at Risk (covers potential movement of underlyings over the close-out period)
    - Potential Future Exposure (PFE)
        - covers potential (i.e. estimated) exposure over the lifetime of the transaction
        - based upon the historic and/or implied volatility of the underlyings
        - based upon probability calculations
        - result depends on required and predefined confidence level
- Collateralised Exposures
    - Liquid, marketable securities (unrelated to borrower risk) with official, daily price quotations as Collateral: PFE, CCE, VaR
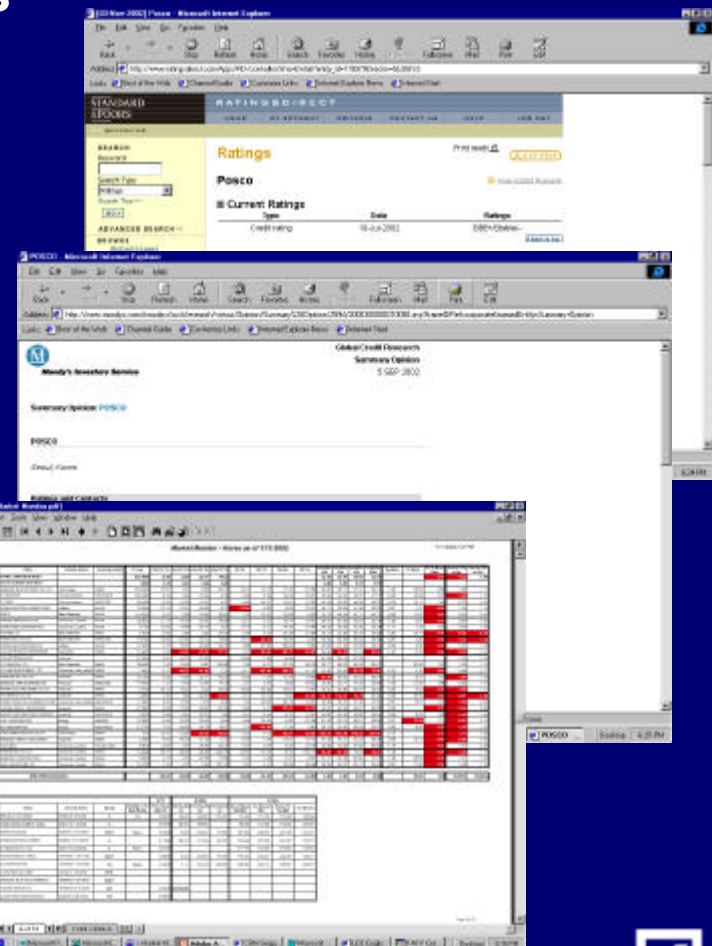- Notional in all other cases

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Responsibility of exposure management

- Sensitivity of a particular portfolio against
  - interest rate movements
  - currency movements
  - deterioration of credit quality

- Portfolio approach as to
  - industry caps
  - country caps (i.e. country limits)
  - counterparty/group caps
  - sensitivity analysis

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Available supporting systems

- Access to research / rating reports of rating agencies via internet
  - Standard & Poors
  - Moody's
  - Fitch IBCA
  - Reliable locale Rating Agencies
- Bloomberg

- KMV
- CreditMetrics
- CreditPortfolioView
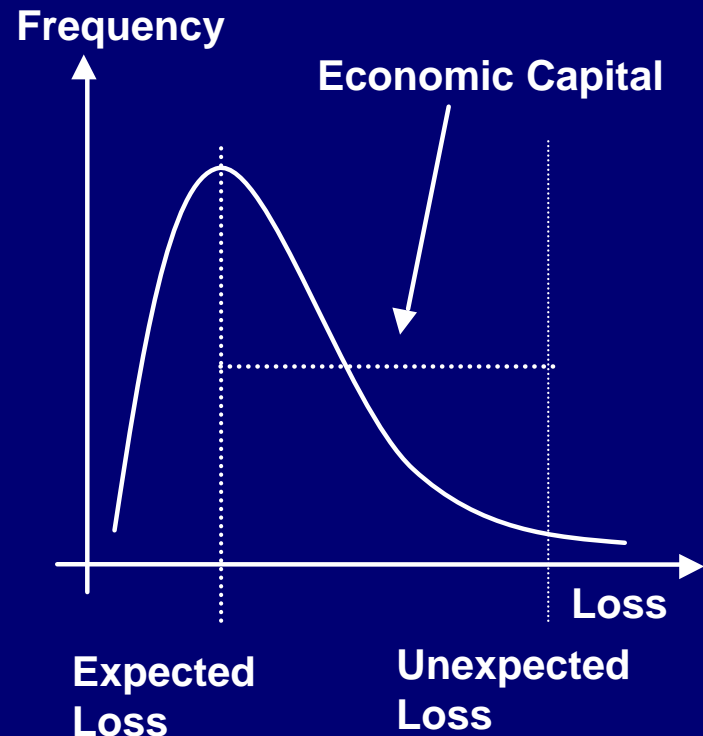- CreditRisk+
- Bond Spread Monitor

Samples only

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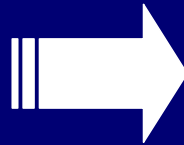# Managing value creation with Economic Capital concept

Economic Capital

- Expected Loss: Average expected loss over 1 year

- Expected Loss in the future is uncertain, i.e. it oscillates around an expected value

- Economic Capital: required capital to cover (unexpected)

  losses over one year with a certain probability (e.g. 99%)

- (Unexpected) losses meaning actual loss ./. expected loss

Frequency

Economic Capital

Loss

Expected Loss

Unexpected Loss

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The "Expected Loss" plays a key-role

Required Input Data:

- Counterparty:
  type, country, industry and rating

- Exposure:
  product, outstanding, limit, tenor, collateral

- Provisions:
  Country provisions, specific LLP, recovery rates, write-offs

Expected Loss:

$$EL = PD \times LEE \times LGD$$

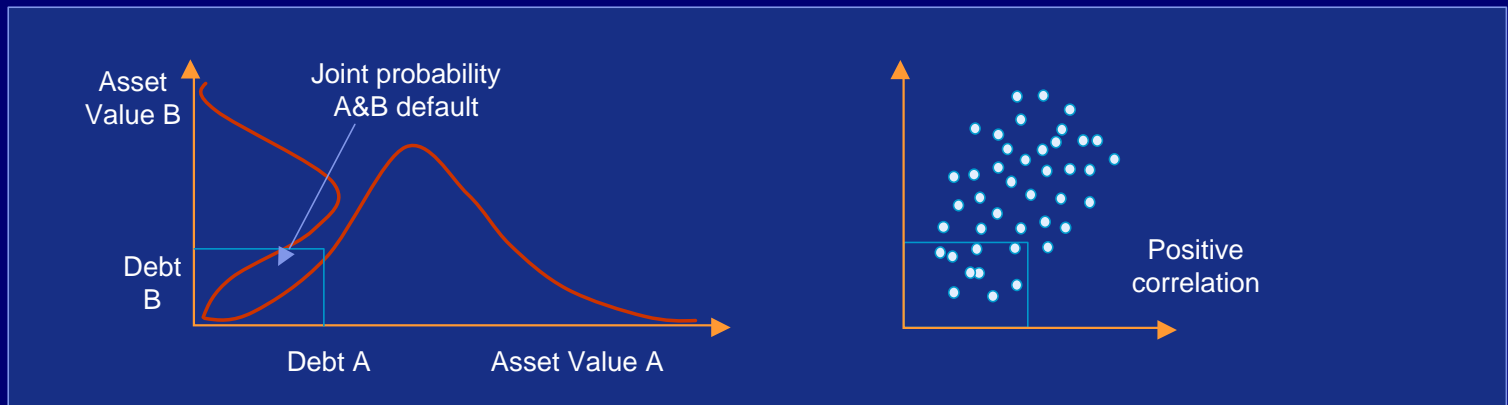*Probability of Default*
=> Rating

Loan Equivalent Exposure
=> Product Type / Outstanding / Limits

Loss Given Default
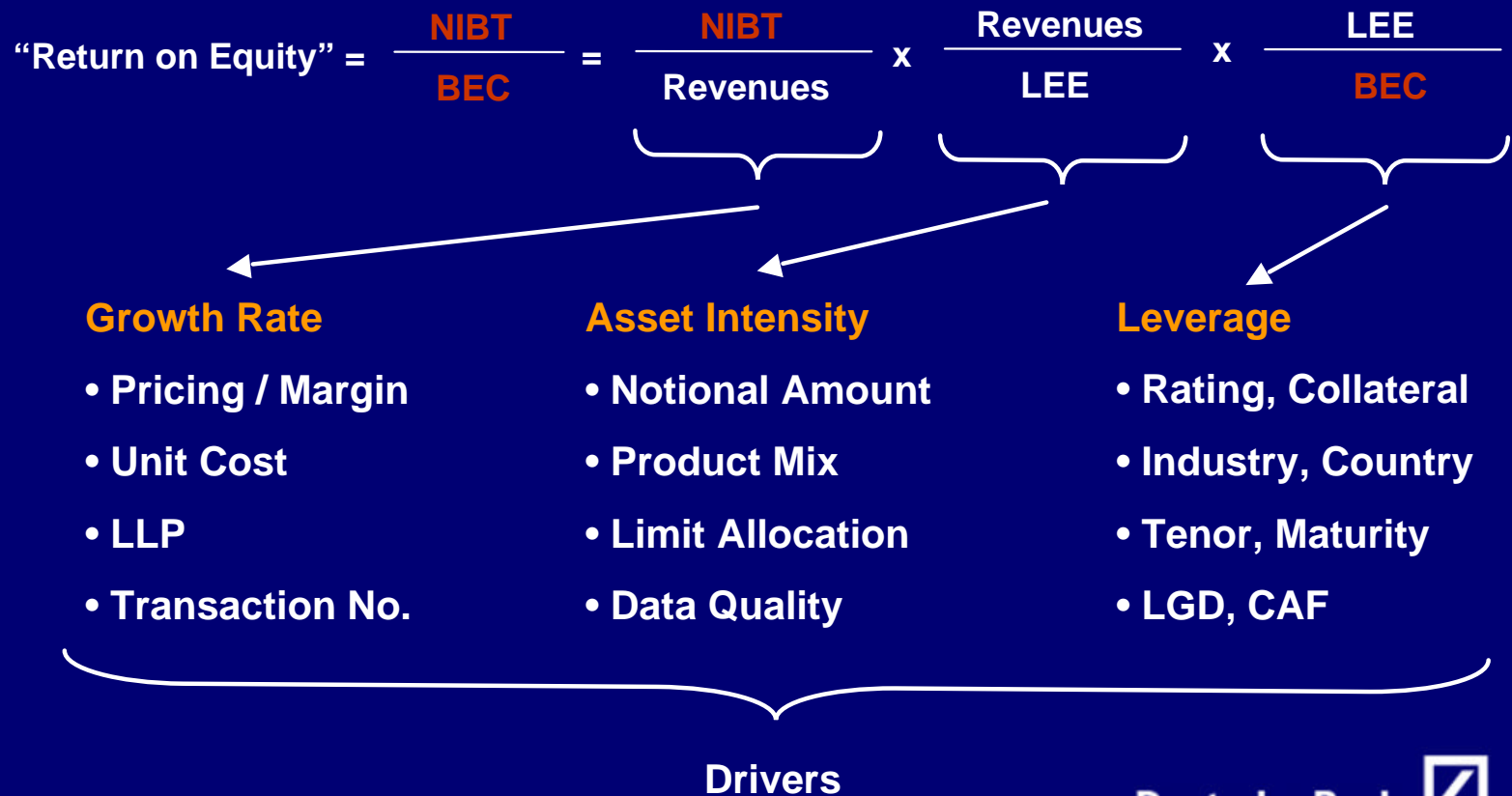**Collateral / Guarantees Seniority / Recovery**

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Transactional vs Portfolio Perspective

Calculation of loss distribution on portfolio level to capture:

> Concentration risk

> Industry trends

> Diversification effects

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Active credit risk management optimizes the balance sheet and increases (equity) value

"Return on Equity" $= \dfrac{\text{NIBT}}{\text{BEC}} = \dfrac{\text{NIBT}}{\text{Revenues}}$ x $\dfrac{\text{Revenues}}{\text{LEE}}$ x $\dfrac{\text{LEE}}{\text{BEC}}$

Growth Rate

- **Pricing / Margin**
- **Unit Cost**
- **LLP**
- **Transaction No.**

Asset Intensity

- **Notional Amount**
- **Product Mix**
- **Limit Allocation**
- **Data Quality**

Leverage

- **Rating, Collateral**
- **Industry, Country**
- **Tenor, Maturity**
- **LGD, CAF**

Drivers

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Implementing an Operational Risk Management Organisation

Challenges from New Risk Management Developments

Istanbul, 27th of April, 2004
Jörg Hörster, Risk Management Services

http://www.deutsche-bank.com/rms

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Operational risk is an own risk type inherent in the bank's business and activities

Credit Risk

Business Risk

Operational Risk

Market Risk

Liquidity Risk

Reputational Risk

"Operational Risk is the potential for incurring losses in relation to employees, project management, contractual specifications and documentation, technology, infrastructure failure and disasters, external influences and customer relationships."

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Operational risk and its complexity

Fraud

Unauthorised Trading

Discrimination Risk

Operations Risk: Control/Settlement Breaks, Data Quality Risk, Nostro reconciliation exceptions, Fails

Product Liability, Suitability, Misselling

Advisory Risk

Project Management Risk

Regulatory Risk

Restructuring/ Merger Risk

Model Risk

Natural Disaster

Sexual Harassment

Legal Risk

Business Interruption

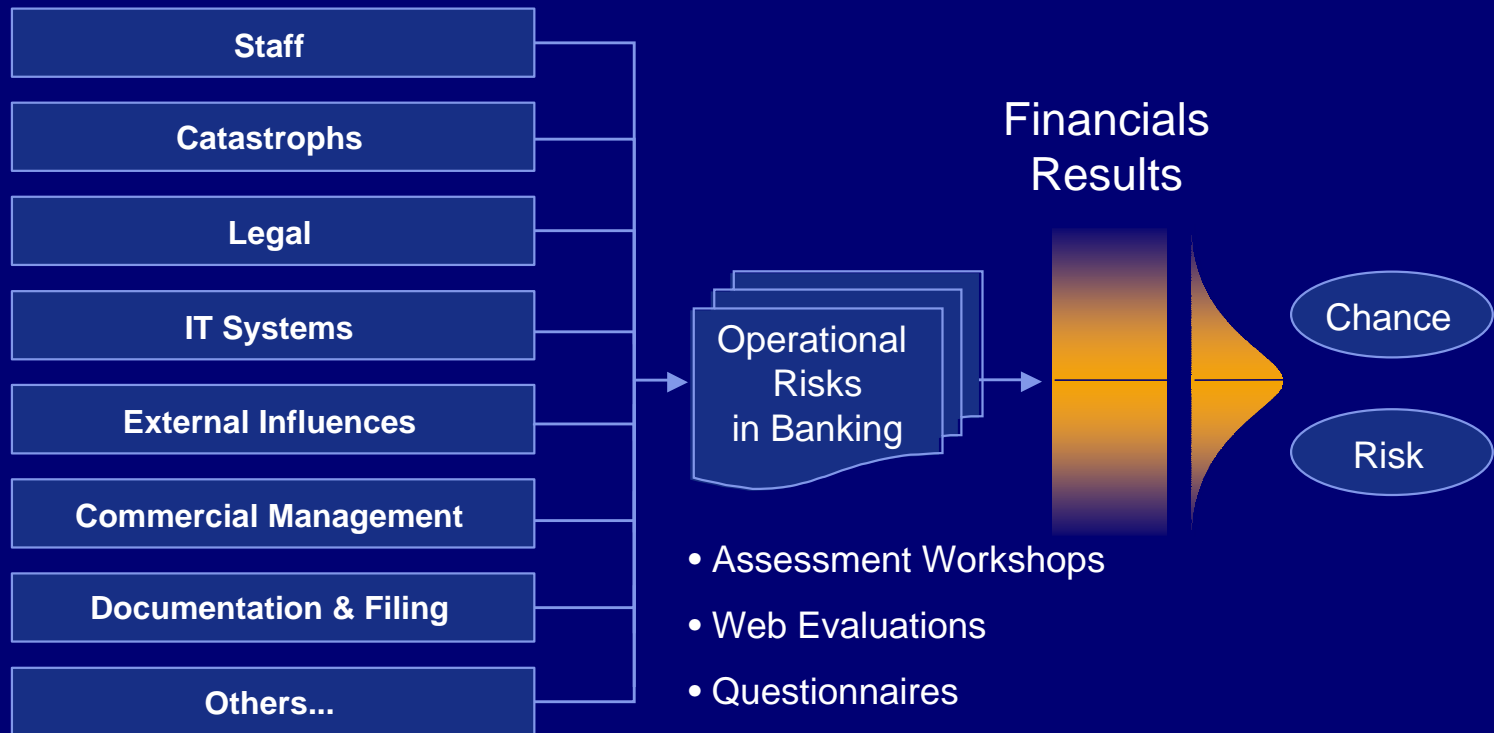Data Security Risk

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Improve the Group's overall risk profile by establishing a proactive operational risk management with the aim to

- create transparency on the OR situation based on a comprehensive OR reporting
- perform a consistent qualitative assessment of OR in the divisions on all levels and regions
- foster OR mitigation awareness in order to take better informed OR transfer and financing decisions
- create accountability for OR management in operating units
- leverage the information delivered by OR instruments
- reduce frequency and severity of OR incidents
- in future define acceptable levels of OR exposure in business divisions (processes and products, etc.)
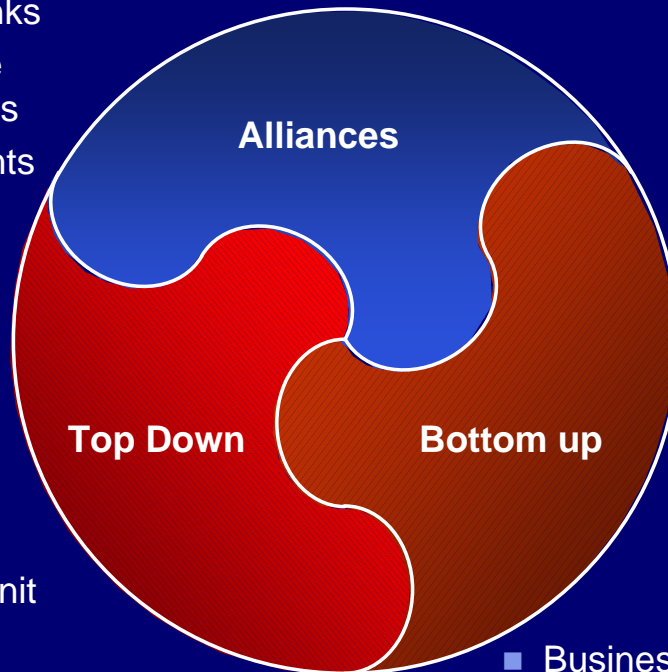
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OR process and tools at Deutsche Bank

Identification

Assessment

Reporting

dbCube

Treatment

EC-Incentive Scheme

Monitoring

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Operational risk factors must have a direct impact on the financial results

Staff

Catastrophs

Legal

IT Systems

External Influences

Commercial Management

Documentation & Filing

Others...

Operational Risks in Banking

Financials Results

Chance

Risk

- Assessment Workshops
- Web Evaluations
- Questionnaires

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Anchoring operational risk management in the bank's organization is key for loss data collection

- Other banks
- Insurance companies
- Consultants

Alliances
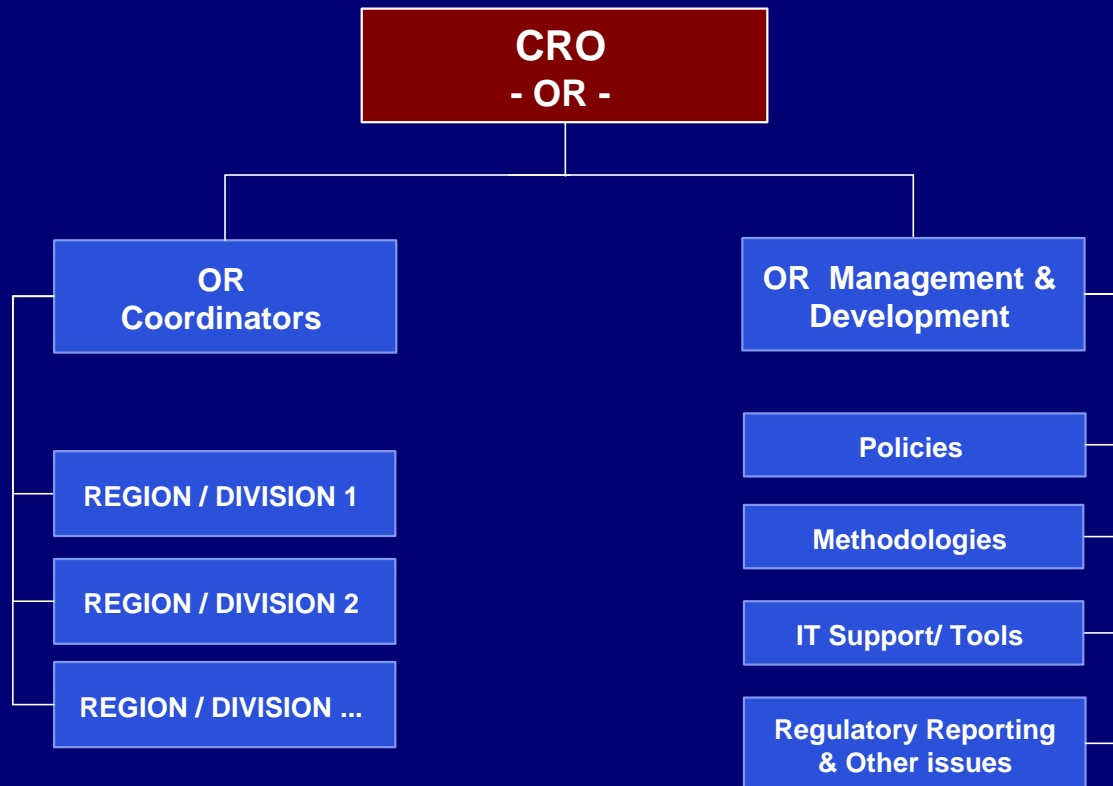
Top Down

Bottom up

- Business unit managers
- Business area controllers
- Business process failure tree analysis

- Business unit employees
- Support staff
- Clients

- People contribution and engagement
- Clear risk event definitions
- Mutually exclusive risk categorization
- Sufficient historical loss data, esp. high-impact/low-frequency-events
- Considering secondary and tertiary effects

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OR coordinators should be experienced managers

Regulatory Capital calculation methods

Methods for calcualting the Regulatory Capital:

Basic Indicator Approach (BIA)
Capital = (gross income) * 30%

Standardized Approach (SA)
Capital = Σ (gross income$_{BL}$ * Beta$_{BL}$)
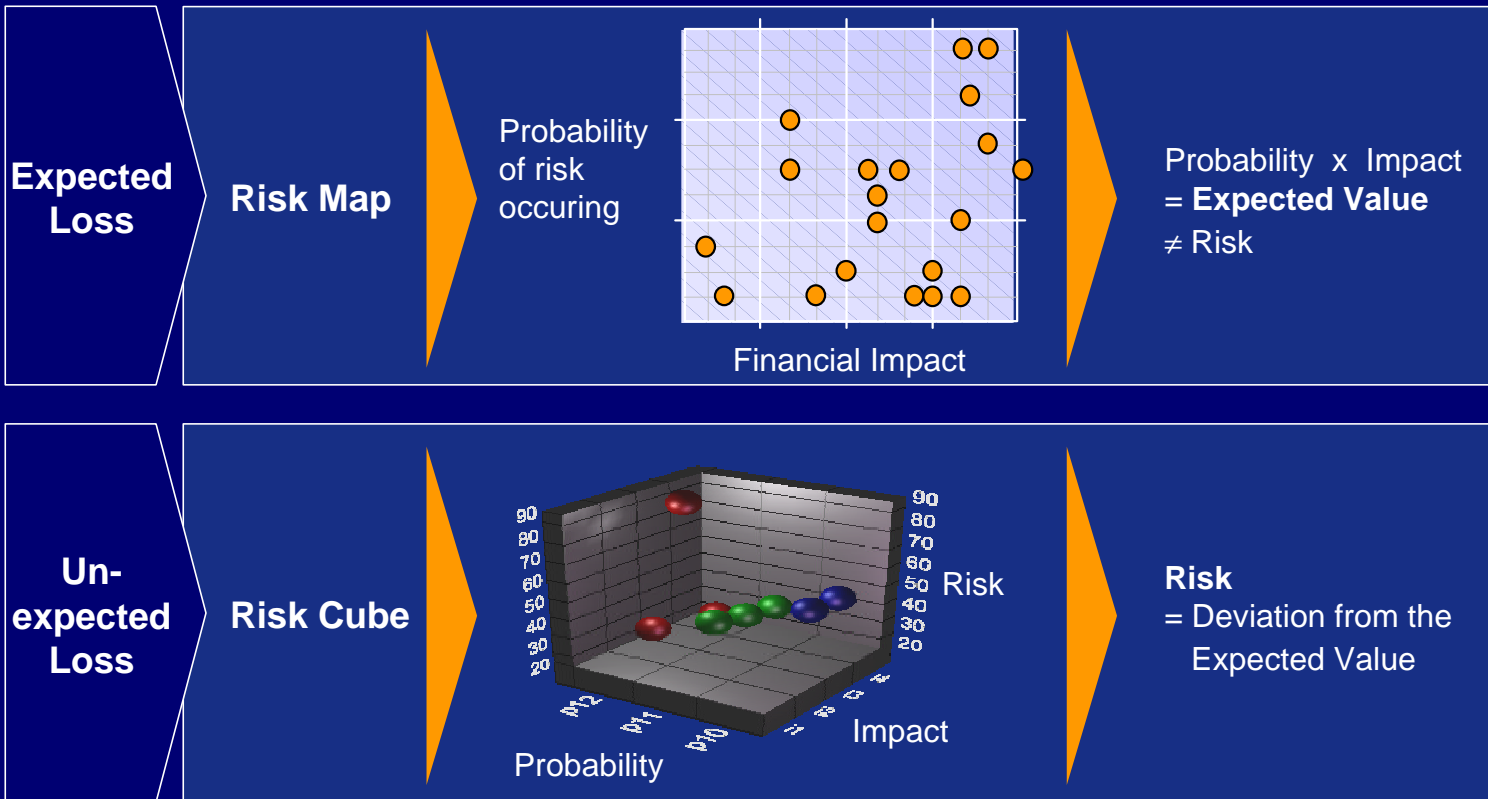
Advanced Measurement Approach

Complex requirements for IT Solutions

New Basel Capital Accord

Pillar 1	Pillar 2	Pillar 3
Quantitative & Qualitative approaches for minimum capital requirement	Oversight and Supervisory judgement	Market discipline via enhanced public disclosure

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Risk is the dispersion from the expected loss

Expected Loss → **Risk Map** →

Probability of risk occuring

Financial Impact

→ Probability x Impact
= **Expected Value**
≠ Risk

Un-expected Loss → **Risk Cube** →

Probability Impact Risk

→ **Risk**
= Deviation from the Expected Value

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The Internal Measurement Approach

For a line of business and loss type

- **Op Risk Capital (OpVaR) = EI_{LOB} x PE_{LOB} x LGE_{LOB} x $g_{industry}$ x RPI_{LOB}**

- EI   =   Exposure Index **- e.g. no of transactions * average value of transaction**

- PE   =   Expected Probability of an operational risk event
  (number of loss events / number of transactions)

- LGE   =   Average Loss Rate per event **- average loss/ average value of transaction**

- LR   =   Loss Rate (PE x LGE)

- γ =   Factor to convert the expected loss to unexpected loss

- RPI   =   Adjusts for the non-linear relationship between EI and OpVar
  (RPI = Risk Profile Index)

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Implementation design

| Analysis of Requirements | Conceptualization | Implementation | Testing |

Operational Risk Principles

| OR Definitions | OR Categories | Operating Principles | Governance, Role & Responsibilities |

Operational Risk Tools

| Calculation Methodology | OR Risk Engine | OR Process Chains & Risk Tags | O-RiskMap & O-RiskCube | OR Reporting |

Operational Risk Process

Identification → Assessment → Reporting → Treatment → Monitoring