

Advanced Market Risk Management Approach for the Turkish Market



Group Market Risk Management
Andreas Bohn, 27. April 2004



Two Main questions to be answered today:

1. How did Deutsche Bank implement the Capital Adequacy Rules?
2. What specific rules apply for Turkish banks?

Risk

**Market CRO
Richard Evans
Risk Manager of
the Year 2003**



The Turkish Capital Adequacy Regulation

Key Articles:

Article 6 : Banks have to maintain a 8% ratio of capital versus Risk Weighted Assets

Article 7 : Market Risk Exposure (Value at Risk) is multiplied by 12.5

Article 10 : RM must be independent, accurate, on time, well documented and equipped

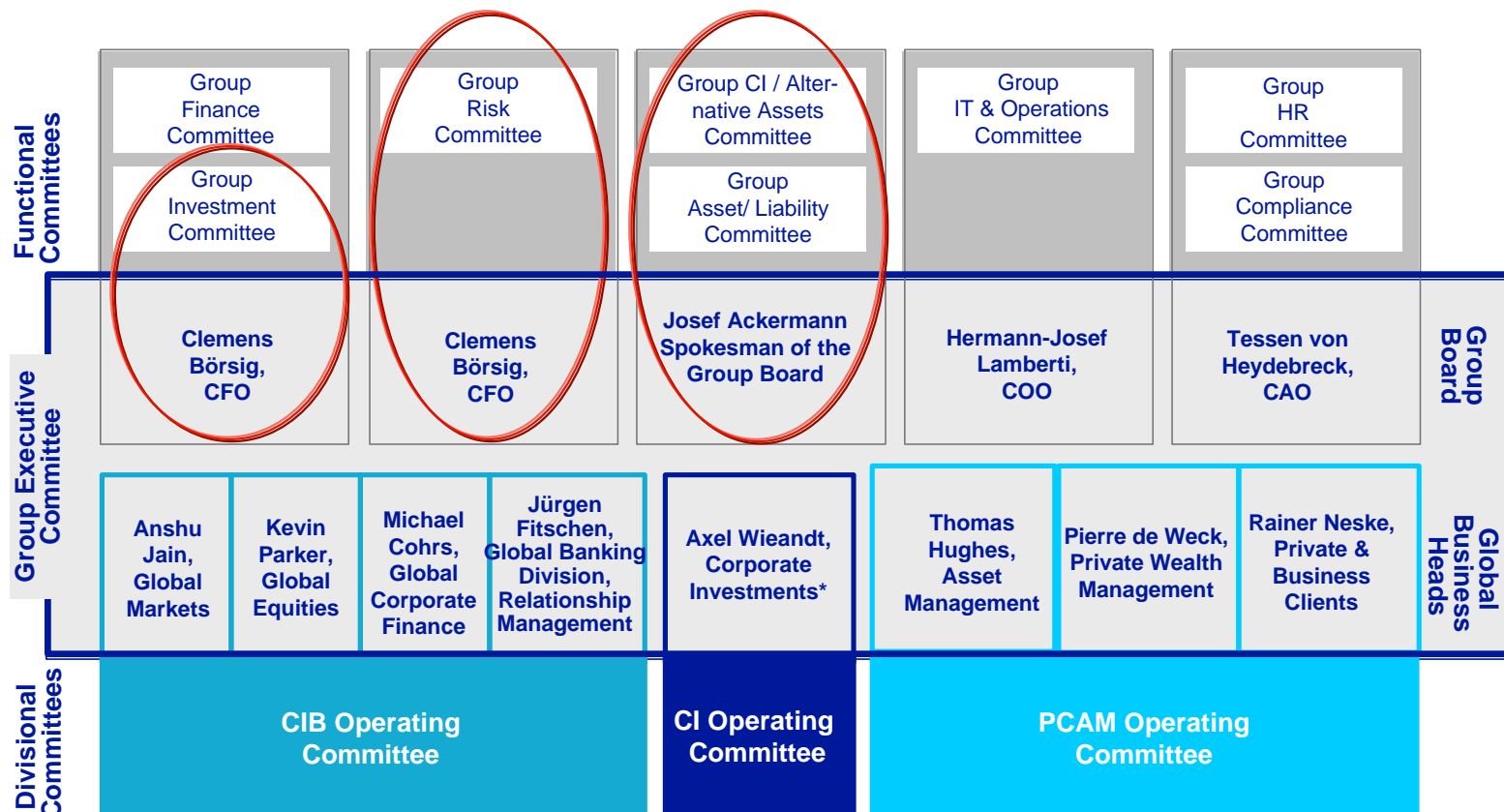
Article 11 : VaR from Internal Model shall be

- calculated on daily basis, 99% confidence interval, minimum holding period 10 days
- reviewed at least every three months
- agency may determine to use specific time series
- 'Variance / Covariance', 'Historical Simulation', 'Monte Carlo Simulation' may be used
- specific risks and option risks must be captured

Article 12 : $VaR = \text{Max}(\text{last 60d average VaR}, \text{yesterdays VaR})$

Article 13 : Stress Test Required

Risk Management Organisation

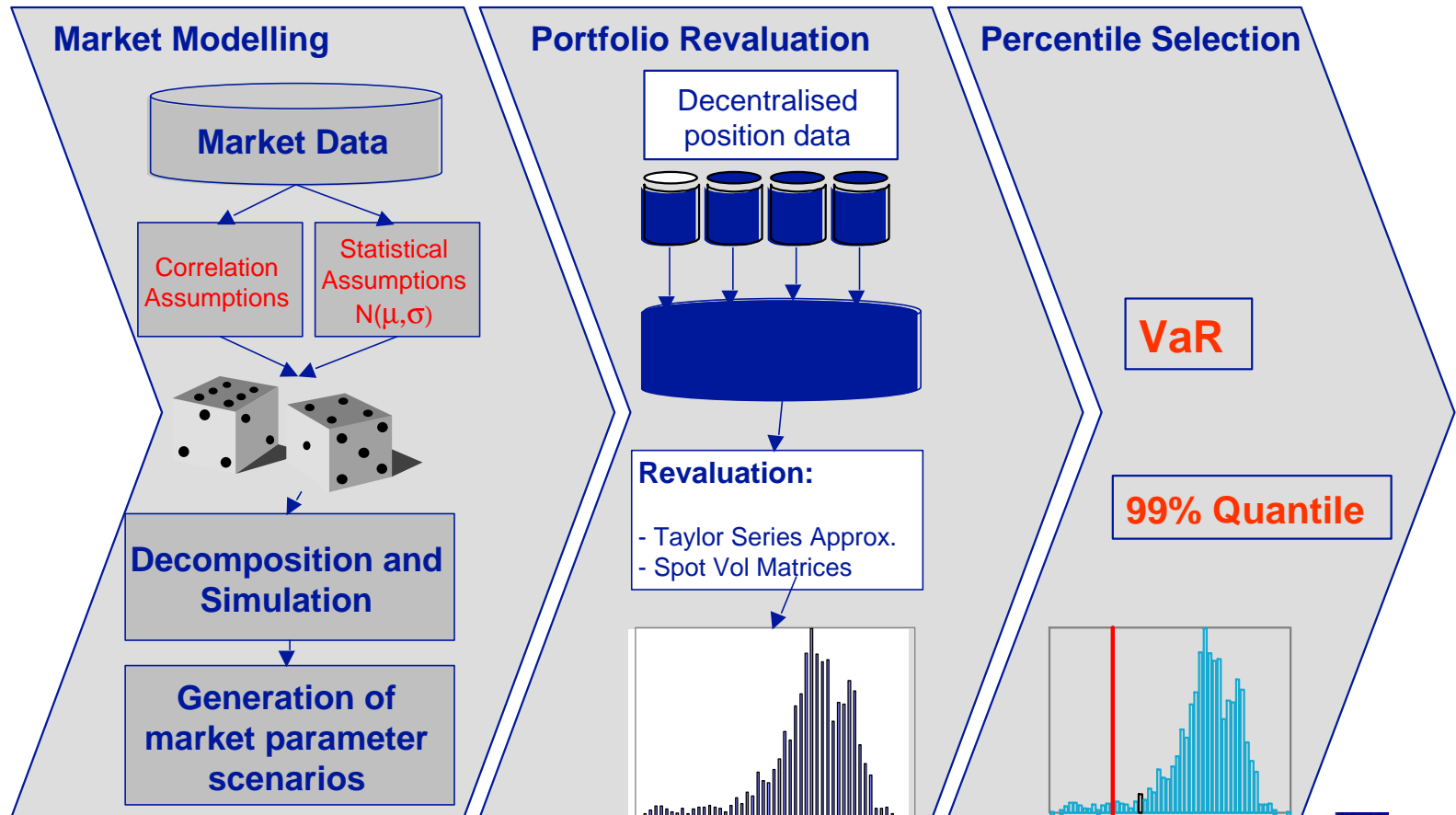


Risk Management units “cut” across all business units

Independent reporting line for “risk” through to Group Board Member responsible for risk as required by German minimum requirements for trading activities



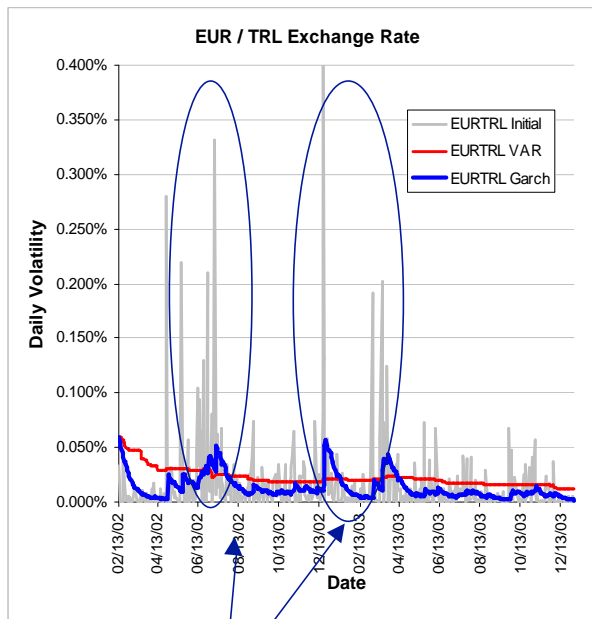
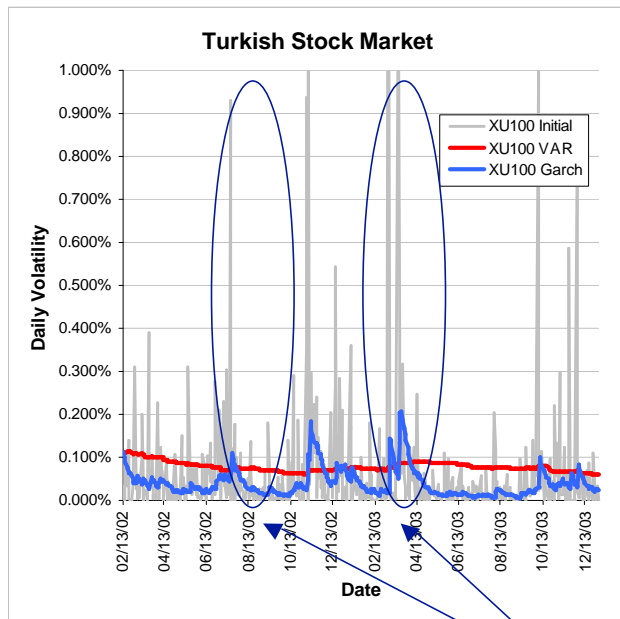
VaR process at Deutsche Bank



Unexpected Market Conditions

Section II, Article 11h (3):

The model should be designed to cope with unexpected market conditions. With historical simulations and worst case scenarios the model should be able to signal unexpected market conditions.



**Time Series
Analysis**

Garch

Egarch

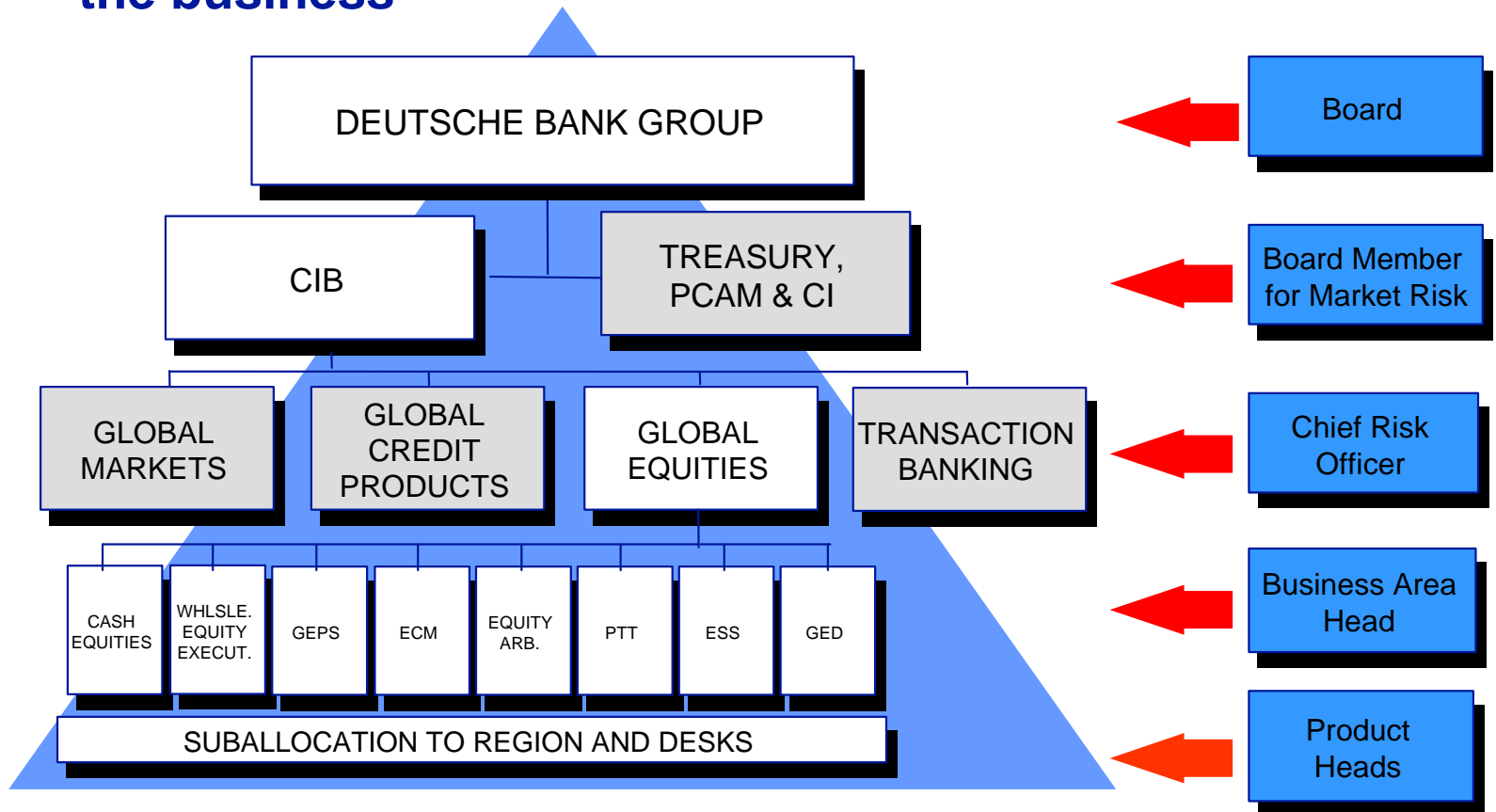
EWMA

Markov Switch

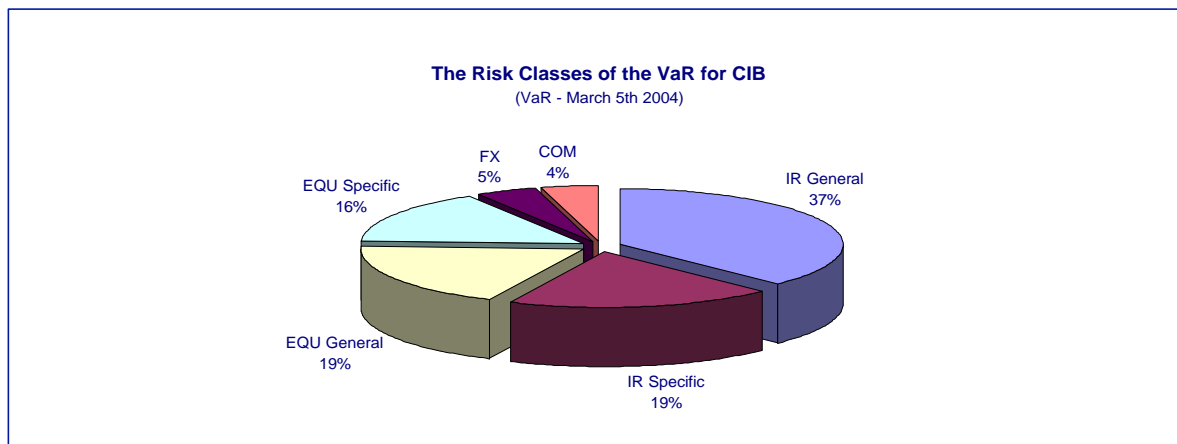
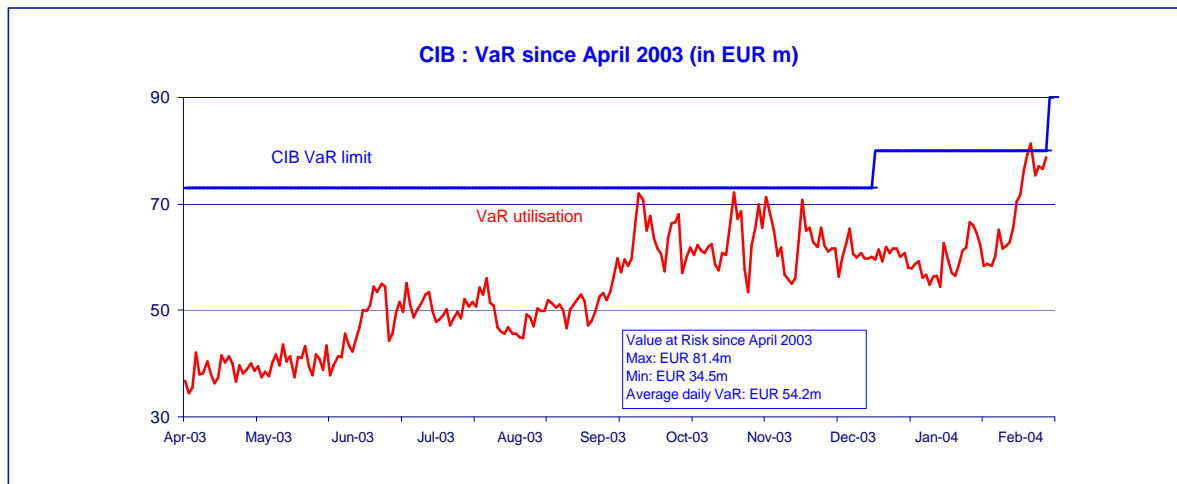
**Hectic
Correlation**

etc.

Limits structure - global limits “cascaded” down through the business

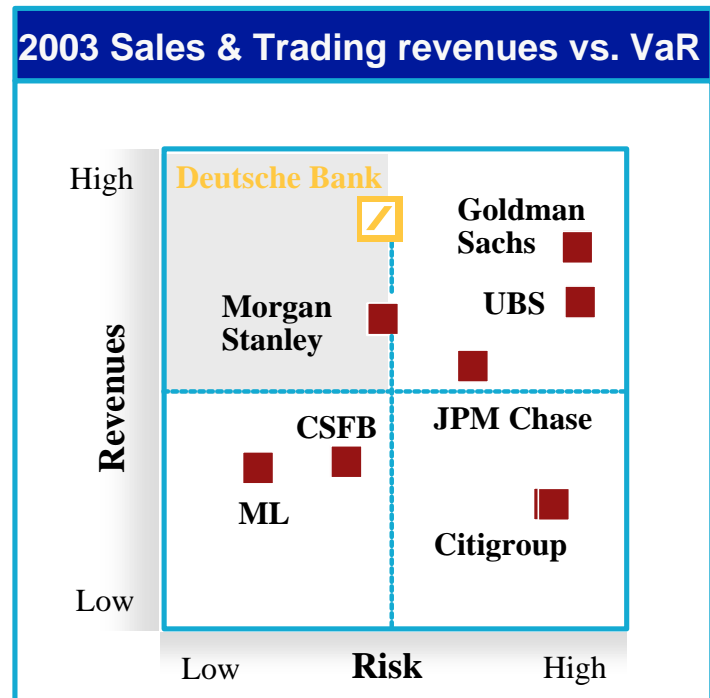
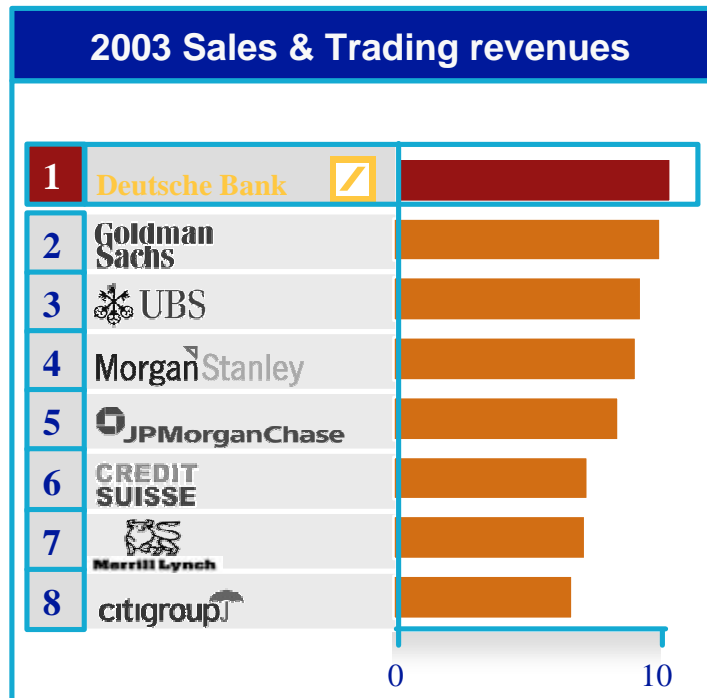


VaR levels



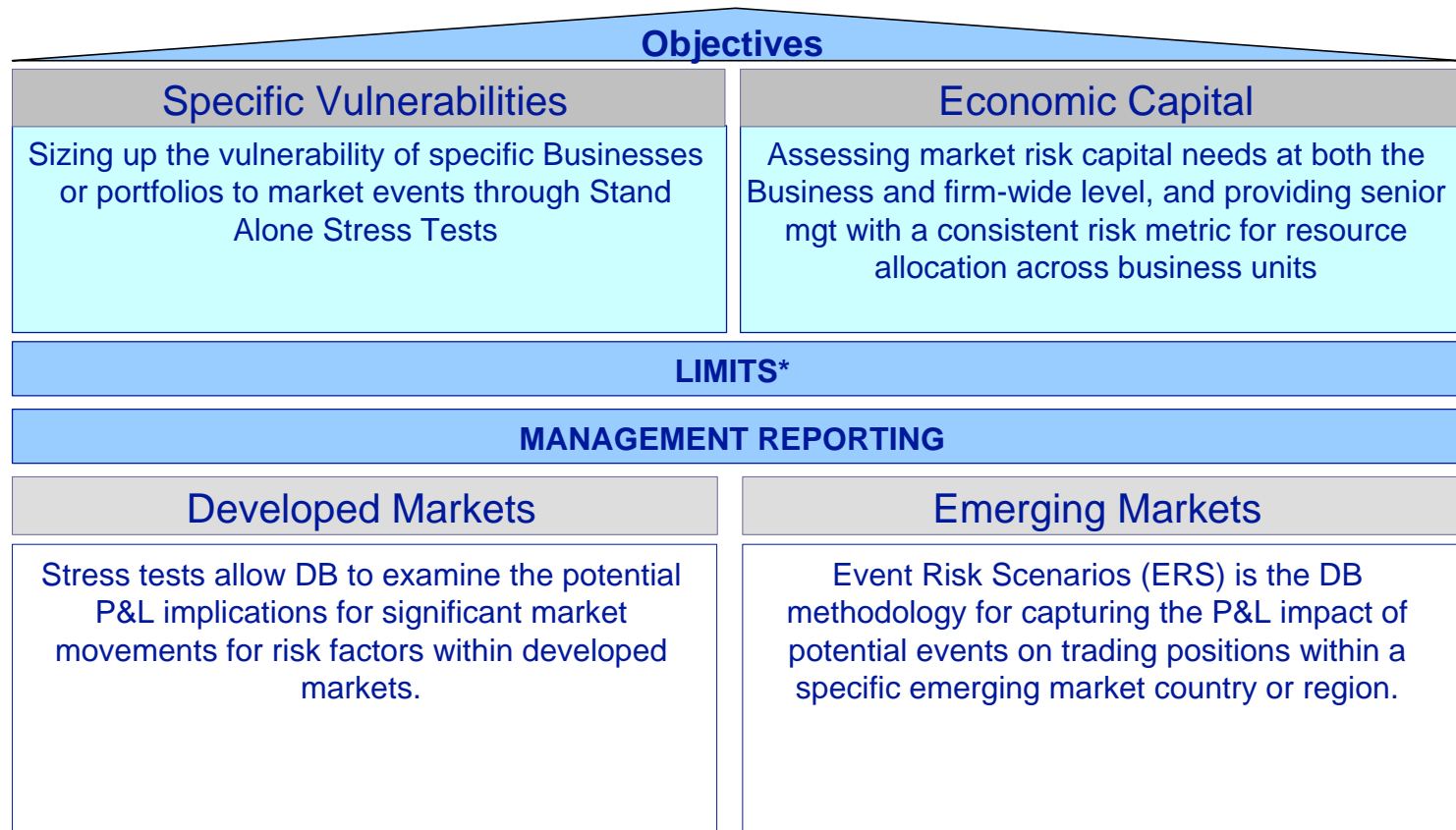
Risk versus Return

In EUR bn



Note: Trading Value at Risk, 1 day 99% confidence; quarterly peer data converted to YTD equivalent based on DB trading days; data converted to EUR at historical FX rates

Stress Testing framework



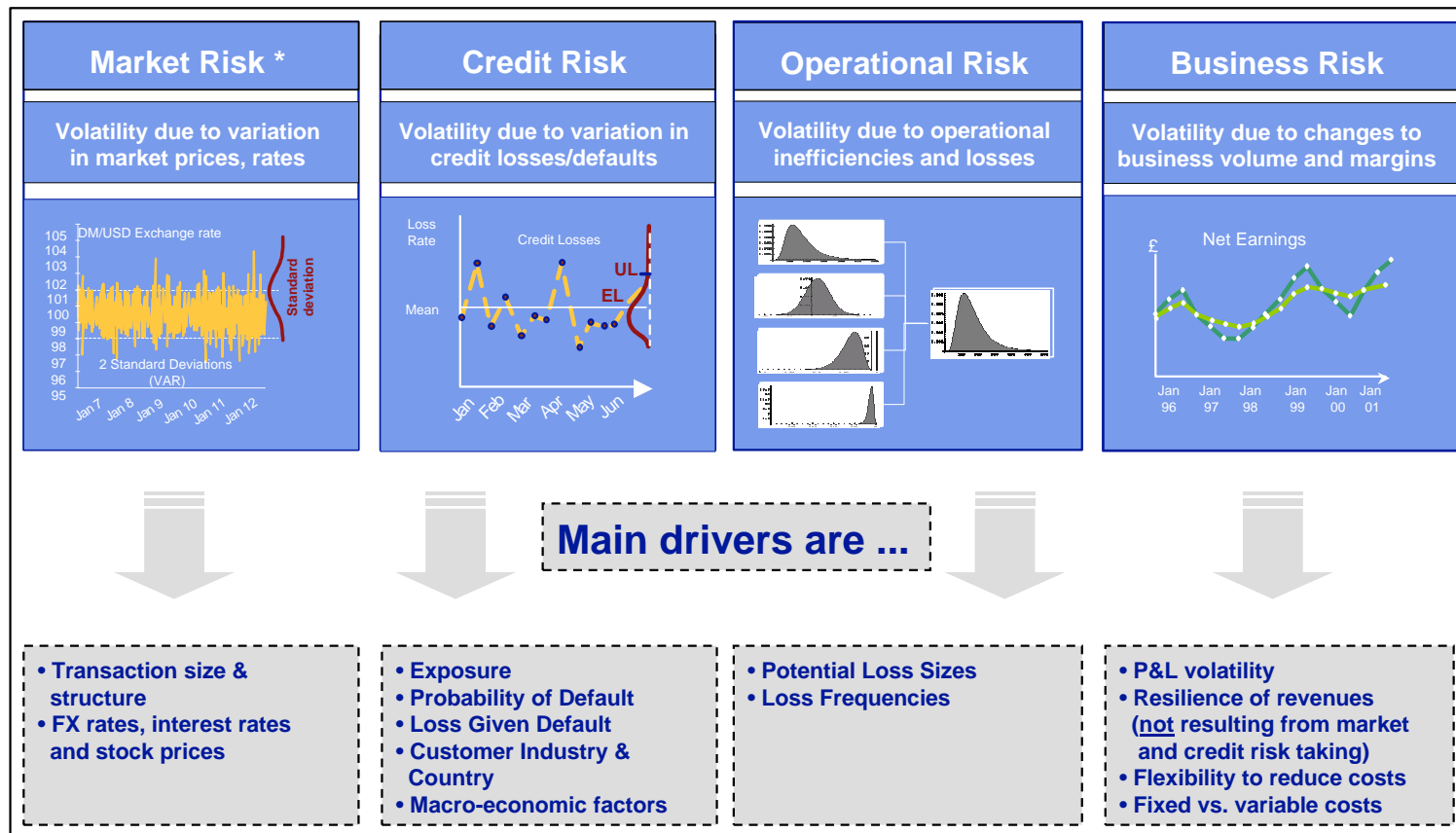
Event Risk Scenario Reporting - Emerging Markets

- ❑ each country has a **Rating** (1 to 10) defined by DB Research,
- ❑ different “**stress**”-**scenarios** for each country,
 - FX: Depreciation of Currency
 - Equities: Price drop of Equity Market
 - Interest Rate Risk: Change in domestic yield curve and in spread over governments
- ❑ netting between the 4 risk classes' risks,
- ❑ expected loss measured versus limits.

Ten largest absolute changes in ERS between				
ERS changes XXXX - XXXX (EUR mn)				
Country	Rating	Increases	Current	Previous
Russia	6	-11	-30	-19
Taiwan	6	-11	-31	-20
China	4	-11	-41	-30
Korea	5	-10	-66	-57
Thailand	6	-7	-32	-25
	Rating	Decreases	Current	Previous
Malaysia	6	14	-35	-49
Philippines	6	18	-59	-77
Argentina	10	21	-3	-25
Singapore	4	22	-14	-36
Brazil	7	37	0	-37

Major Event Risks for c.o.b. XXXX (Non-G10)					
Risk	Interest Rate		Equity	FX	Total
	Domestic	Credit Spread			
Indonesia					
Global Markets	-37	-18	0	-7	-61
Global Corporate Finance	0	0	-8	0	-8
Other	0	0	0	-1	-1
Total DB Group	-37	-18	-8	-8	-70
Korea					
Global Markets	-31	-3	0	-4	-39
Global Equities	1	-13	-12	-2	-26
Global Corporate Finance	0	0	-2	0	-2
Total DB Group	-30	-16	-14	-6	-66
Philippines					
Global Markets	-26	-26	0	-6	-58
Global Equities	-1	0	0	-1	-1
Other	0	0	0	0	0
Total DB Group	-26	-26	0	-7	-59
China					
Global Markets	-12	-8	0	-14	-34
Global Equities	0	0	-6	0	-6
Other	0	0	-1	0	-1
Total DB Group	-12	-8	-7	-14	-41

Economic Capital brings together different risk types



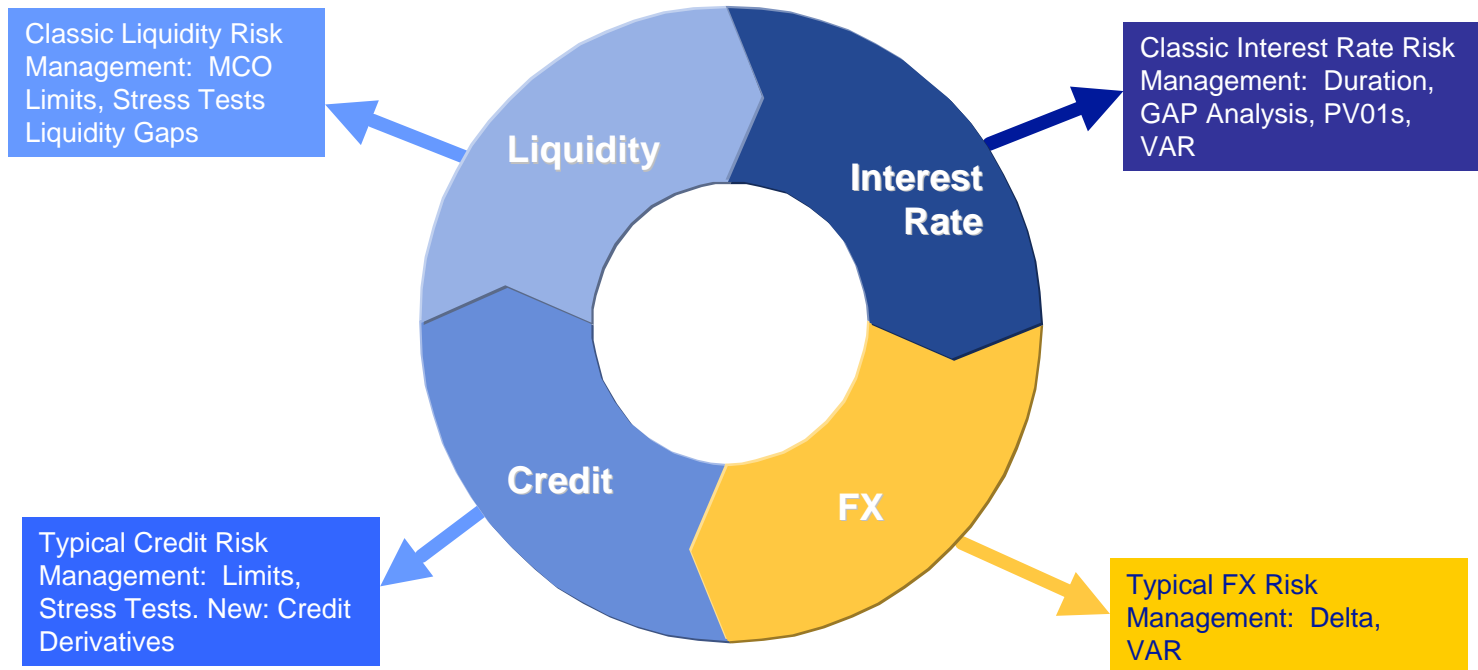
* excl. Alternative Assets Risk

Traditional versus Value Based Approach for Asset-Liability-Management

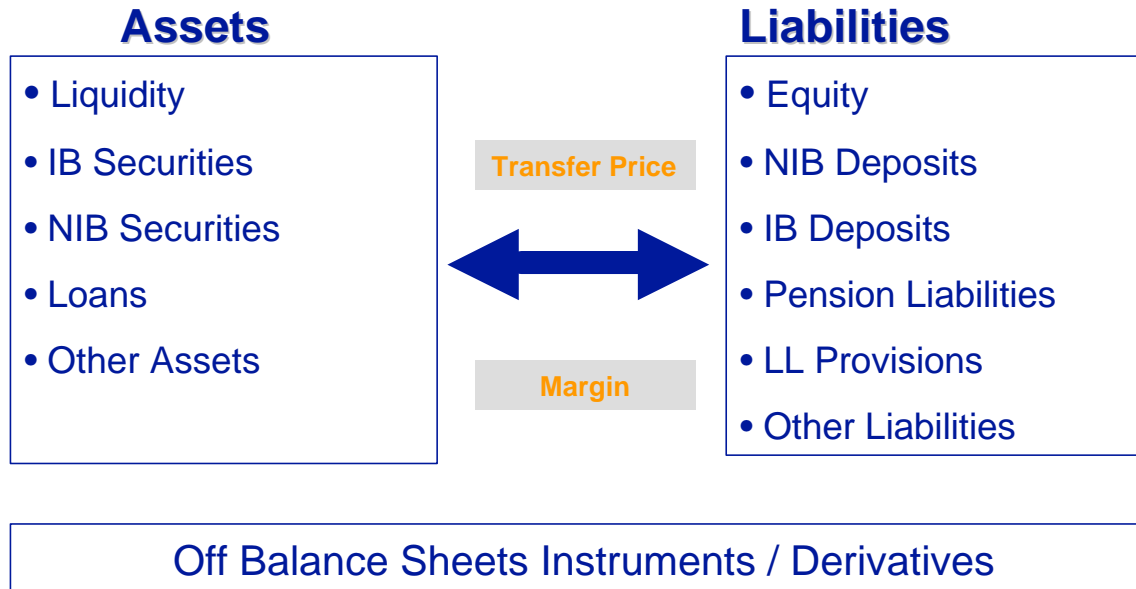


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Key risks in 'classic' banking book perspective

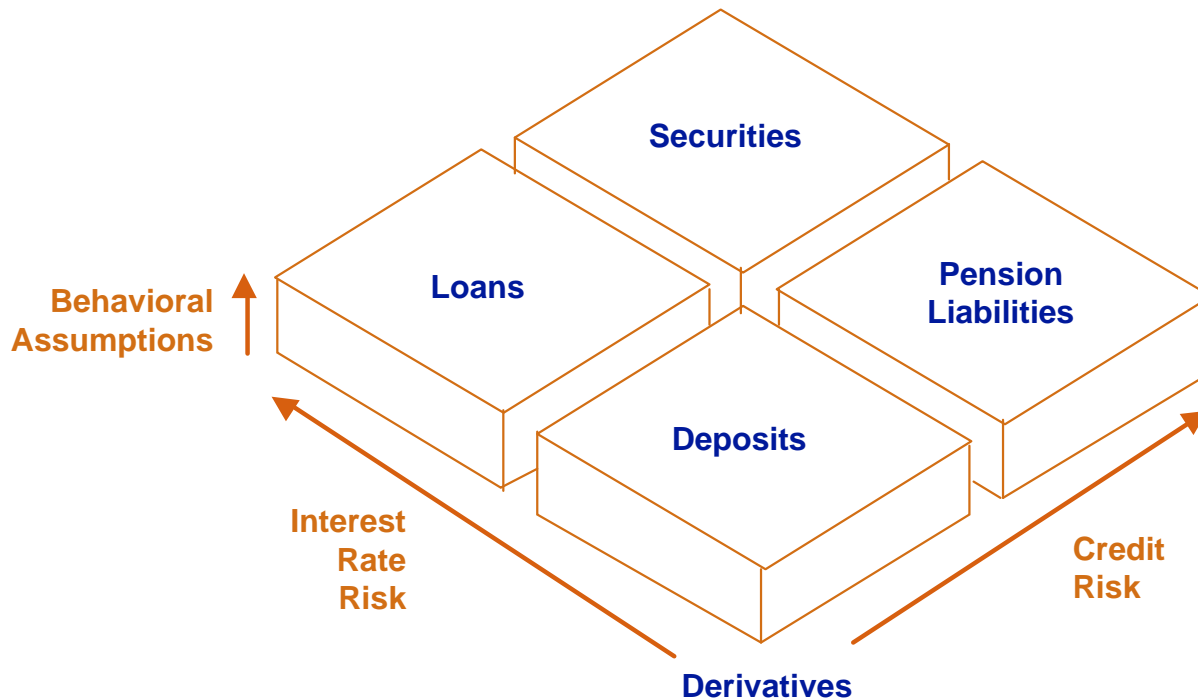


Typical Balance Sheet



Recent developments in financial instruments and their pricing allows the determination of the NPV for (almost) all balance sheet items

Three Dimension for NPV of Balance Sheet Items



Example: Three Factor Model for Deposits Bucketing

1. Factor: Volume of Deposits

Based on deposit time series variability, the mean trend and the current balance a confidence band (e.g. 99%) is determined for future years. This is the basis for the calculation.

Additionally a variability for this estimate is determined.

2. Factor: Interest Rates

The interest rate level is the dominant factor driving the interest paid on DBs external deposits. Also, the overall volume of deposits can be correlated with interest rates.

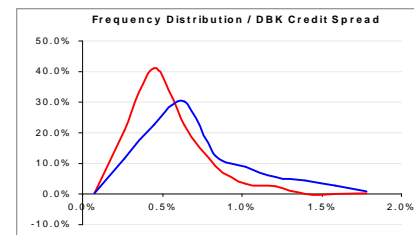
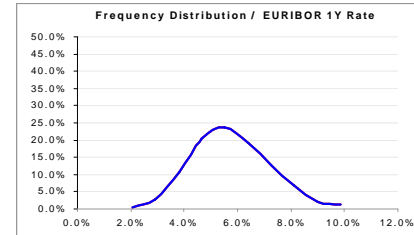
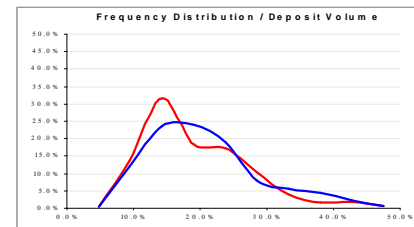
3. Factor: Rating

A downgrade of Deutsche Bank may invoke customers to withdraw deposits sooner than expected

Model: DBX, 3M Time Steps, 5000 simultaneous simulation of volume, interest rates and credit spread

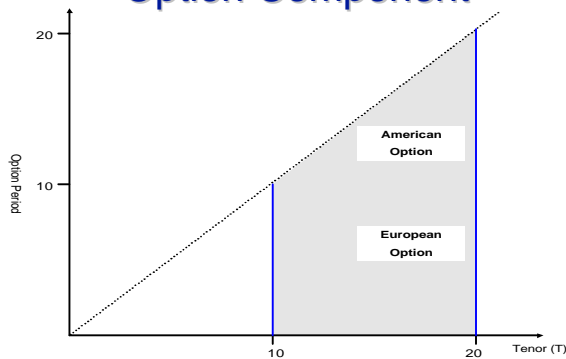
Correlation

The three Factors are correlated. The stronger the dependencies are the higher the impact on the deposit balance can be.



Example: Call Rights in Mortgage Loans

Option Component

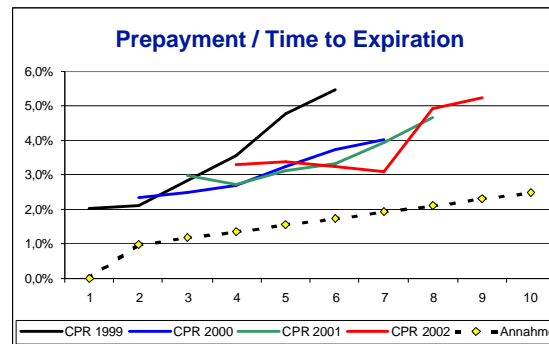
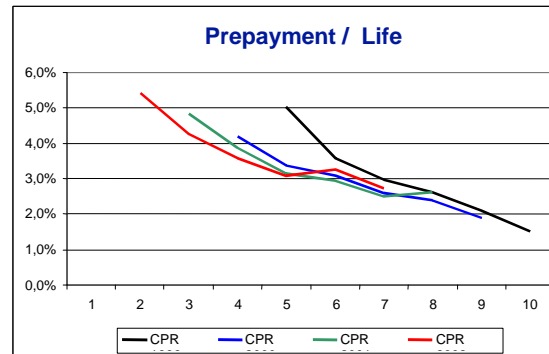


Option Right has American and European Features

Credit Component

- PD
- LGD
- Recovery

Behavioral Component



Example: Pension Liabilities

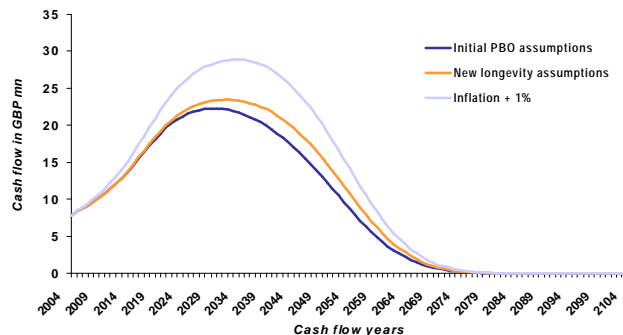
Impact on NPV of Defined Benefit Pension Liabilities

- Inflation
- Interest Rate
- Credit Spreads
- Life Expectations
- Fluctuation

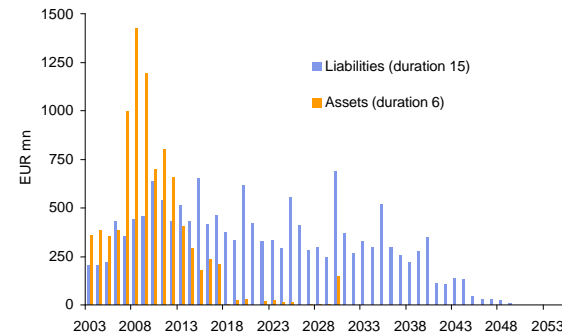
Typical Assets:

- Inflation Linked Bonds
- Bonds
- Equities

Scenarios for Projected Benefit Obligations



Immunizing Asset and Liabilities



Monte Carlo Simulation

Positions

- PV01s
- Inflation PV01s
- CS01s
- Equity / FX Deltas
- Vegas

Market Parameter

- Interest Rates
- Inflation
- Credit Spreads
- Equity / FX Deltas
- Vegas

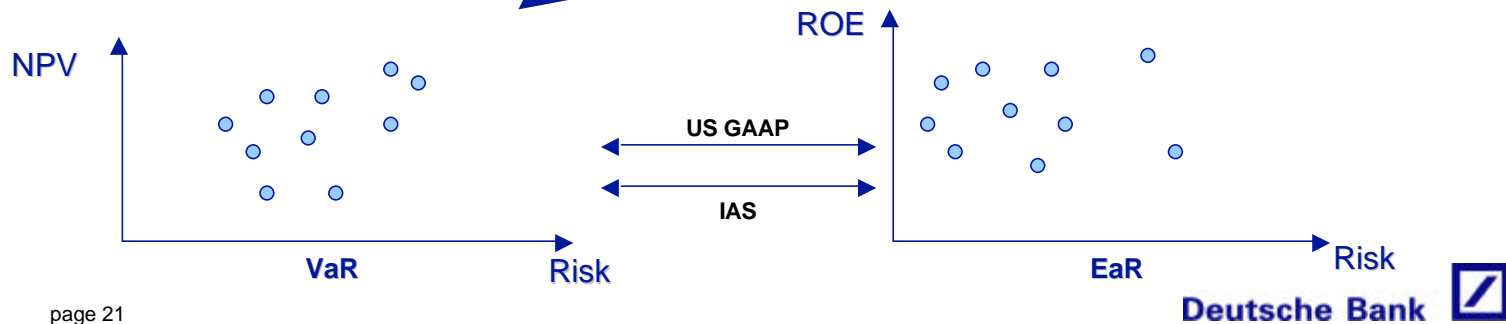
Behavioral Assumptions

- Prepayment
- Deposit Withdraw
- Job Fluctuation

Monte Carlo Simulation

Limits

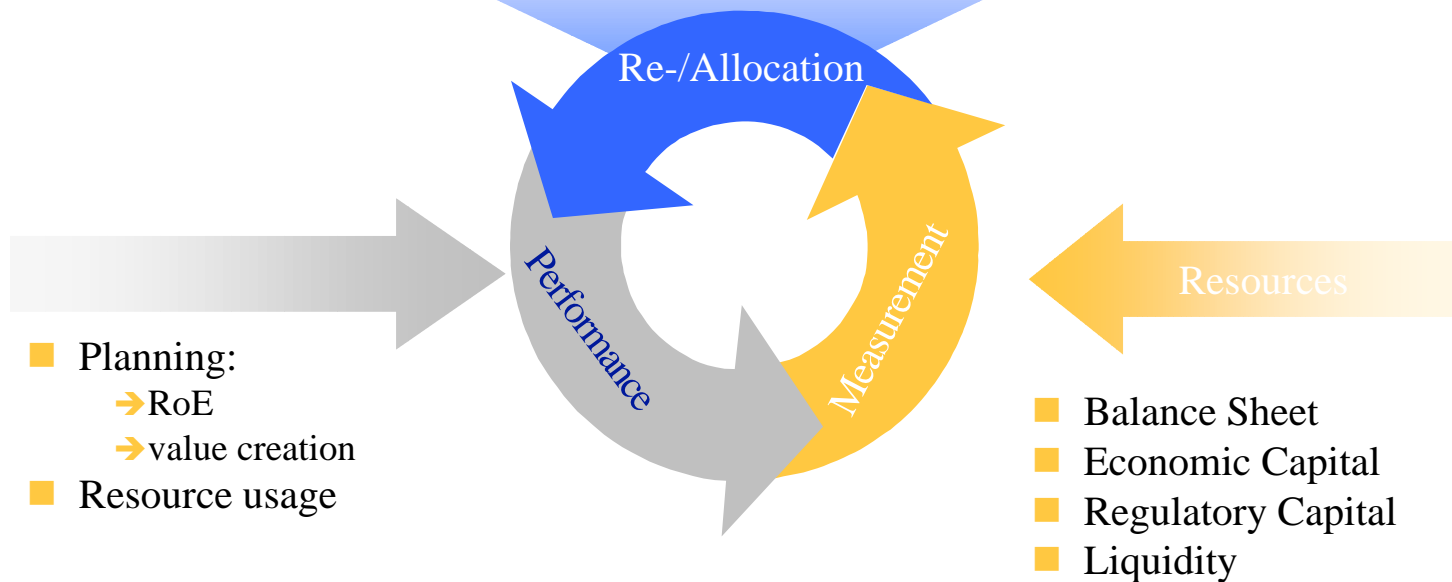
- RWA
- Liquidity
- Capital



The ALCO Process - Platform for Value Creation

Group ALCO

Allocation and re-allocation of resources based on:



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