

Moody's Analytics & The Institute of Banking Symposium

Risk Strategies for Basel III Compliance & Beyond *Extracting Business Value from Regulatory Change*

Welcome & Opening Remarks

Mr Jamaan Al Wagdany

Director General of the Institute of Banking

His Excellency Dr Abdulrahman Al Hamidy

The Vice Governor of SAMA

Agenda Outline

- 09.00 Welcome & Opening Remarks**
»» *Welcoming note: Director General - IOB, Mr. Jamaan Al Wagdany*
»» *Opening remarks: H.E. Dr. Abdulrahman Al Hamidy, The Vice Governor – SAMA*
- 09.15 Basel III & Beyond**
»» *Mr. Robert King, Managing Director, Moody's Analytics EMEA Region*
- 09.45 Stress Testing – Understanding a Bank's Vulnerabilities**
»» *Dr. Christian Thun, Moody's Analytics*
- 10.30 Coffee Break**
- 10.45 Managing Liquidity Risk Under Regulatory Pressure**
»» *Mr. Nicolas Kunghehian, Moody's Analytics*
- 11.30 Regulatory Capital Management & Reporting: The Impact of Basel III**
»» *Mr. Charles Stewart, Moody's Analytics*
- 12.00 Prayer Time & Coffee Break**
- 12.30 ICAAP/Economic Capital Management – Is this is still relevant?**
»» *Mr. Charles Stewart, Moody's Analytics*
- 13:15 Panel Discussion: Views and Perspectives from the market**
- 14:00 Closing**
»» *Mr. Wael Jadallah, Moody's Analytics*
- 14:15 Lunch**

Basel III and Beyond: Embracing Enterprise Risk Management

Your co-hosts today...

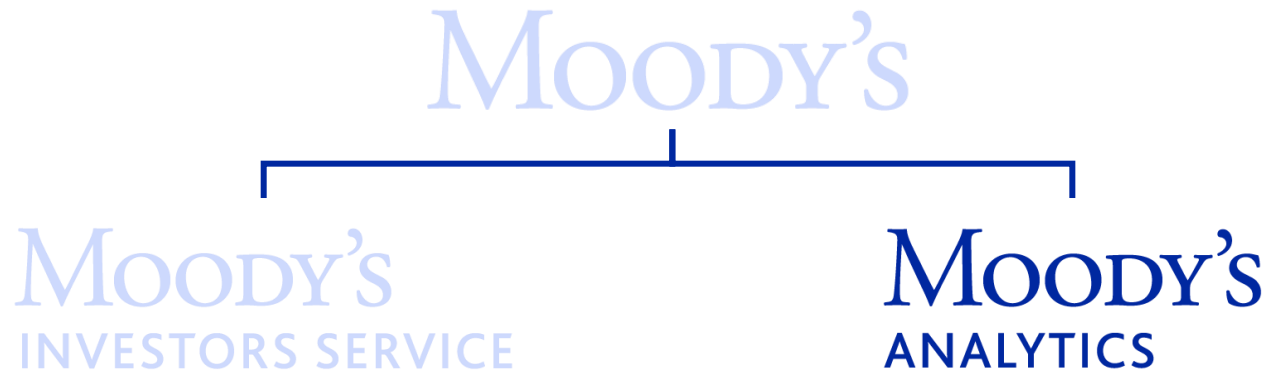
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Your hosts today...

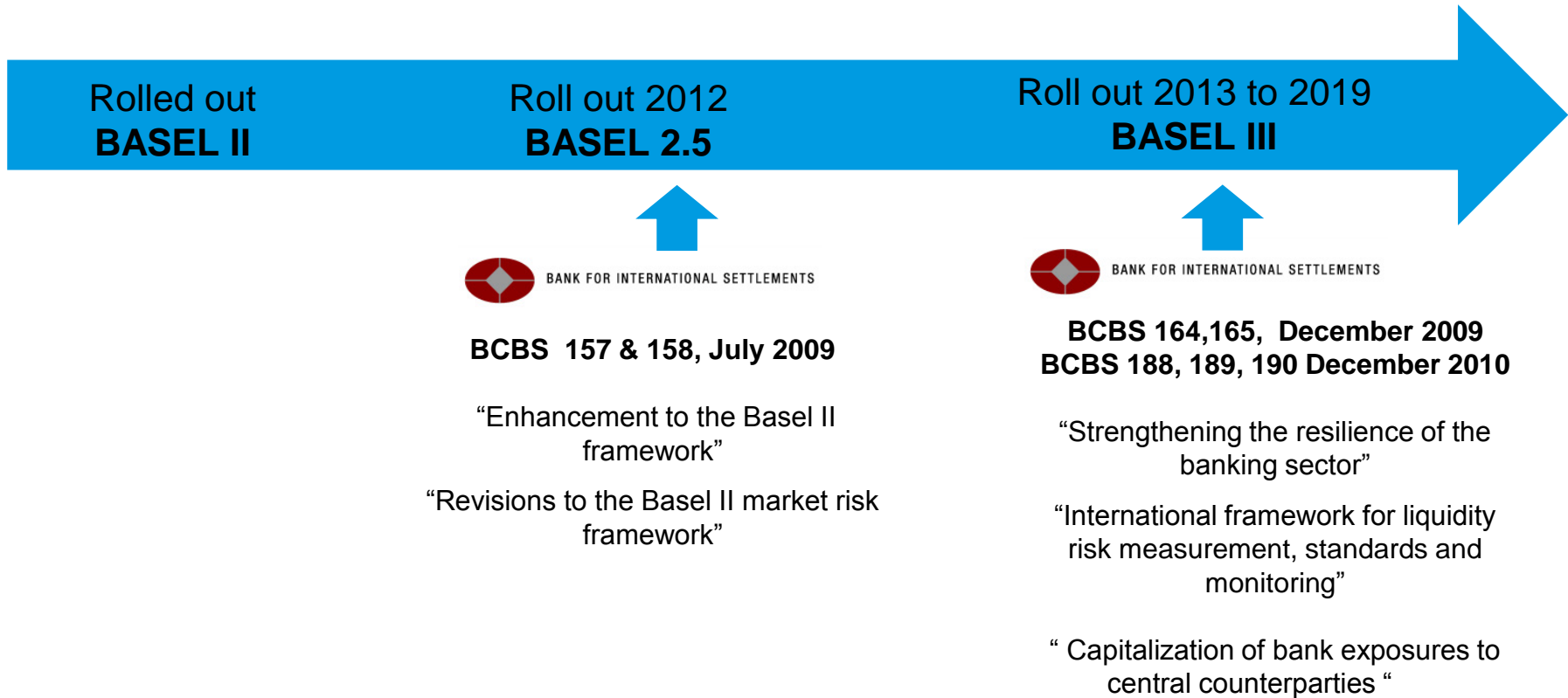


Agenda

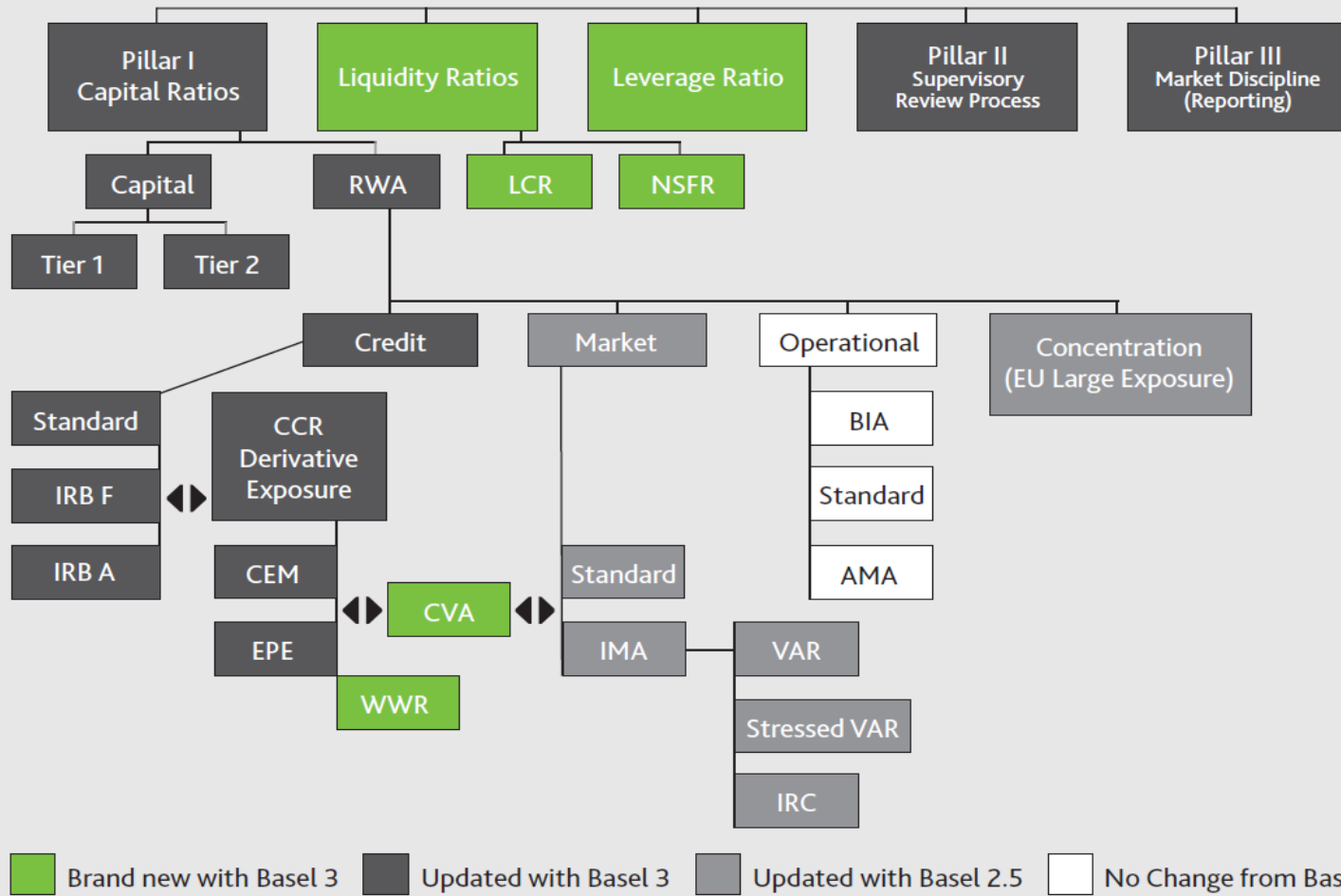
1. Basel III and Beyond: Embracing Enterprise Risk Management

- » An Overview of Basel III
- » Challenges and the Pillars of Success
- » Embracing Enterprise Risk Management

Regulatory Roadmap

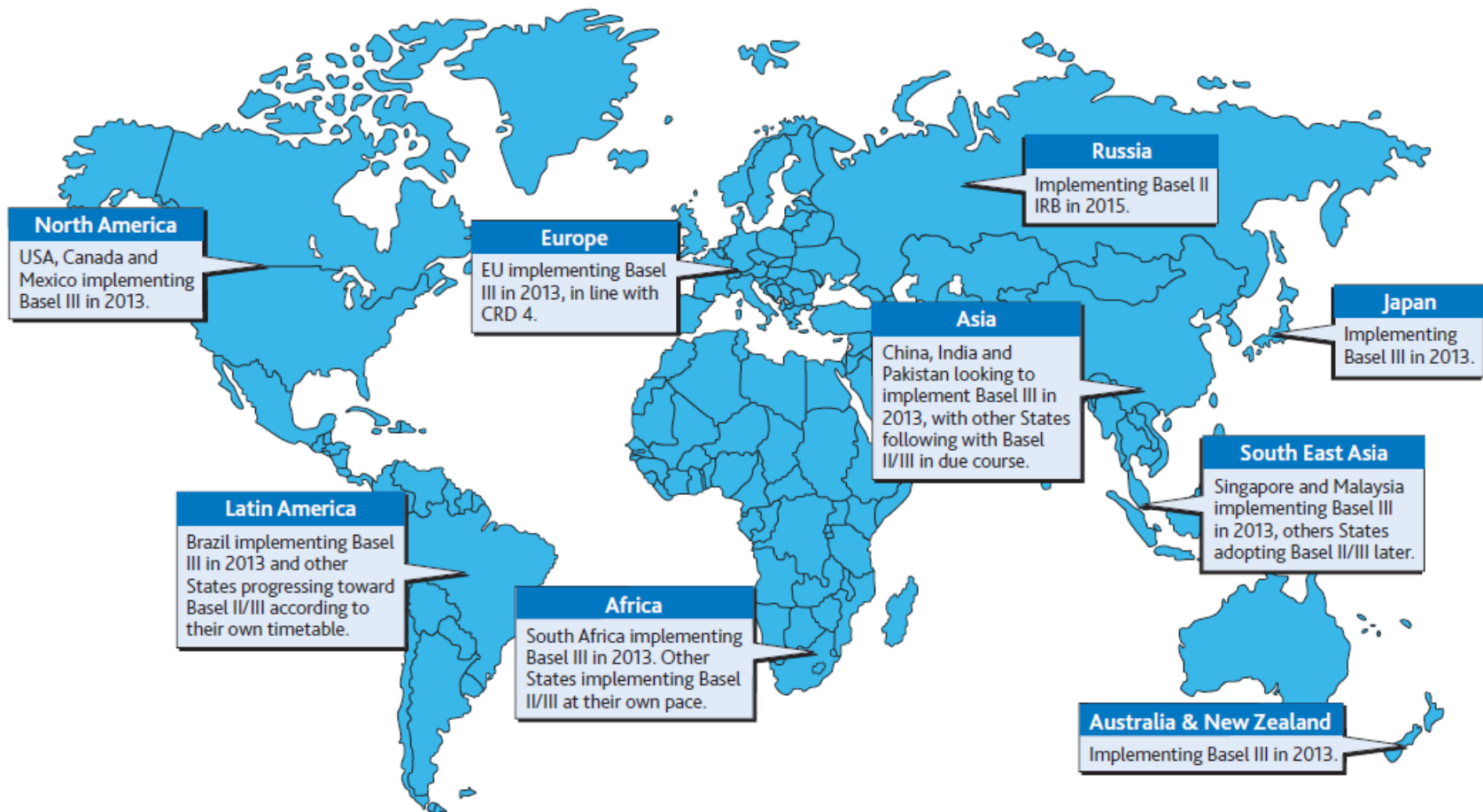


Basel III - Framework



Which Countries are Implementing Basel III?

All G20 countries members are committed to implement Basel III in 2013



Basel III squeezes capital !

Basel III has a significant impact on capital requirements

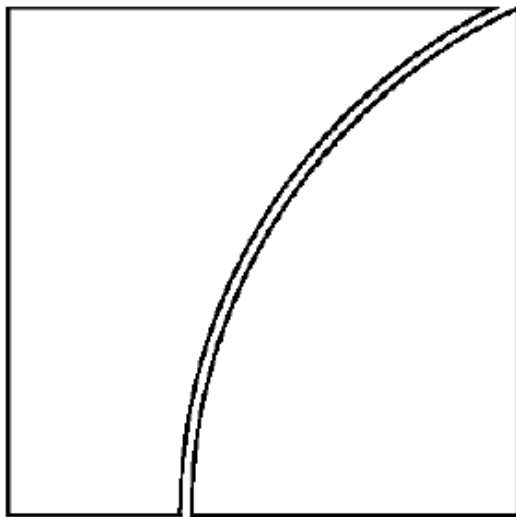
- More strict rules on eligible capital
- Risk Weighed Assets increased for some asset classes
- Increased capital ratios (Core Tier 1, Tier 1, Conservation buffer, Countercyclical buffer)

$$\text{Minimum Capital Ratios} \uparrow \leq \frac{\text{Eligible Capital} \downarrow}{\text{Risk Weighed Assets} \uparrow}$$

The figures behind the reform

Basel 3 requires just a little more capital?

» €600bn to start...

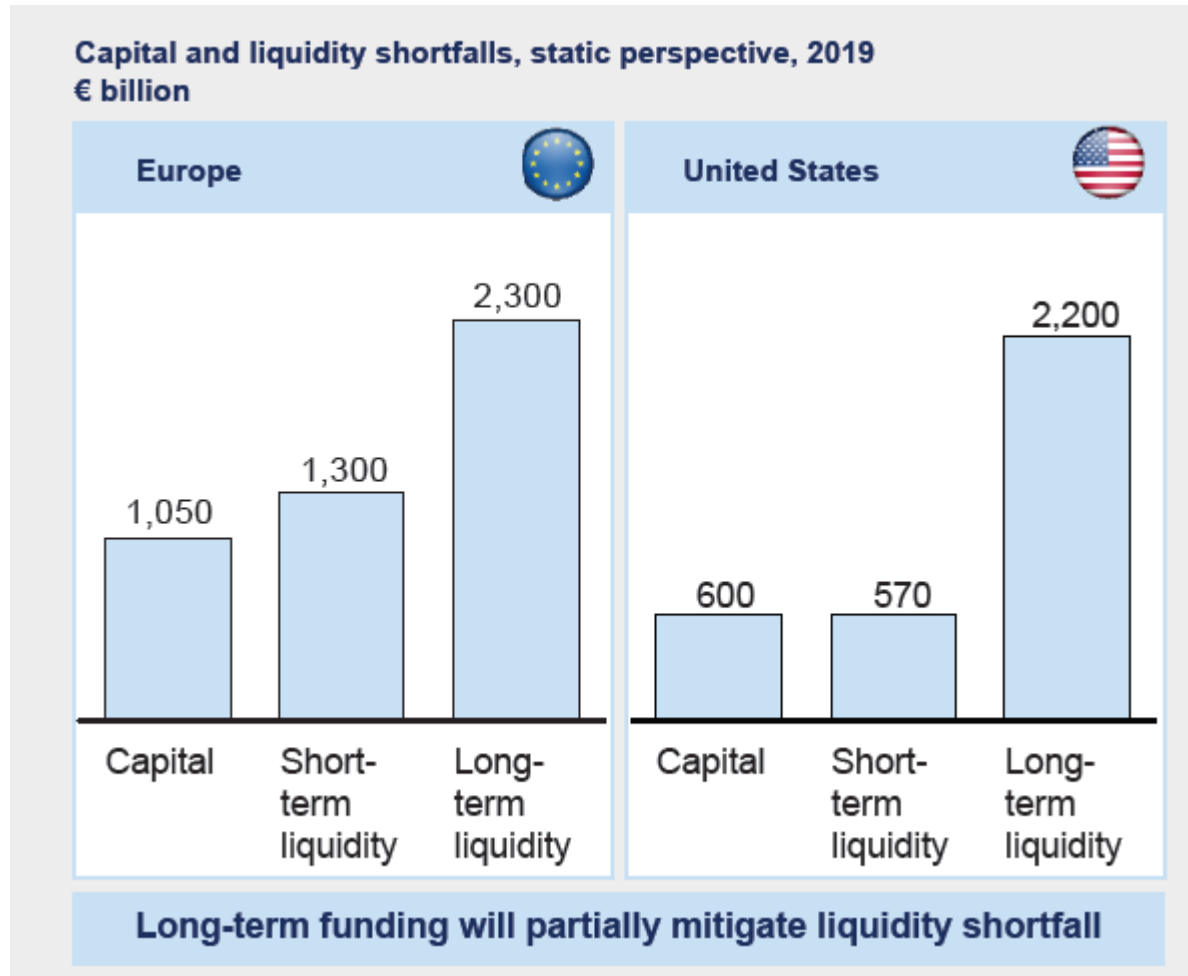


**Results of the
comprehensive
quantitative impact study**

December 2010

Source: Results of the Basel Committee's global quantitative impact study (<http://www.bis.org/publ/bcbs186.pdf>)

But no doubt a lot more...



Sources: McKinsey Working Papers on Risk, Number 26

Where next?

What Basel III is aiming to achieve?

- ***Better risk/return management***
- ***Greater business discipline***
- ***Revived trust in the banking system***
- ***Potential for competitive advantages via better risk management***

Basel III: Numerous Implementation Challenges

- **Convergence Between Risk and Finance**
- **Streamlined and Integrated Regulatory Reporting**
- **Single Data Source for Capital and Liquidity Risk**
- **Increased Regulatory, Board and Shareholder Pressure**
- **Holistic Stress Testing**
- **Regulatory Uncertainty**
- **Multi-Jurisdictional Compliance**
- **Trading Book Market Risk and CCR Requirements (for IMM)**
- **Pressure to Reduce Capital Requirements and Increase Returns**
- **“Hypothetical” Capital Computation by CCPs**

Basel III: Implications for Saudi Arabian Banks

- Meeting Basel III capital requirements is not an issue for Saudi Banks.

“The (Saudi) banking system remains resilient with strong fundamentals. Liquidity levels are comfortable.” *Moody's Investors Service*

“Saudi banks are among the worlds best positioned in terms of solvency capital and quality of capital. “ *Standard & Poor's*

“SAMA's prudent regulatory oversight is equally important. In our view, SAMA is one of the best regulators in emerging markets.” *Moody's Investors Service*

But the global macro economic slowdown has led to;

- Asset quality has deteriorated
- A slow down in business generation and balance sheet growth
- Increased funding costs

Basel III: Challenges for Saudi Arabian Banks

1. Efficient use and allocation of Capital
2. Meet the evolving stress testing requirements
3. Significantly enhanced reporting

And the Project challenge....

3 Pillars for meeting the Basel III Challenge

1. Robust Data Management

2. Institutional Commitment

3. Investment in People

1. Robust Data Management: it's easier said than done

- » Find the right information
 - Relevant data is buried into disparate systems and unit
 - Silos need to get synchronized

- » Transform disparate data into meaningful information
 - Silos have a partial version of the truth
 - Information structure is never homogeneous across systems
 - Data consistency is a challenge

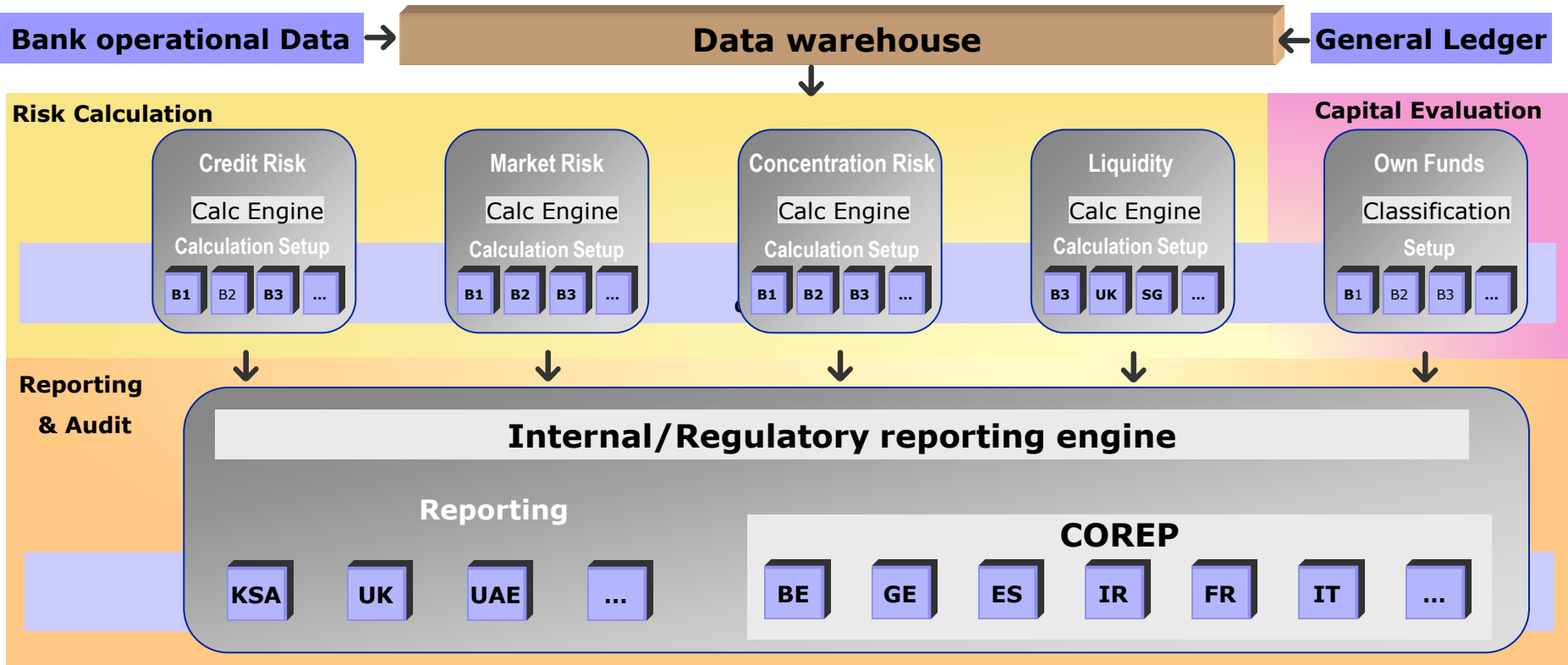
- » Present the right information to the right people
 - Risk Metrics cannot be simply added. KRIs vs KPI's
 - Group reporting vs country reporting (how many jurisdictions? Can data be exported?)
 - Static indicators vs Dynamic indicators :
 - It's not just about reporting
 - What level of aggregation/detail should be available ?

Flexible functional architecture: the key to ensuring a safe implementation amidst rapidly changing regulations

A single data warehouse to gather data mapped from the banks source system and GL

Capital Requirement Calculation Engines for all risk types, for any changes in regulation

An integrated regulatory reporting solution for supervisory reports, drill-down audit features and reconciliation



2. Institutional Commitment: business performance not compliance

» Collective Responsibility

- » C-level sponsorship beyond the CRO
- » Involvement of front-line lending staff and credit officers
- » Establish an institution-wide Risk Appetite

» Partnership between Risk Management and Finance

- » Required by Basel III

» **Warning signals! =**

- Vendor reliance
- An isolated Basel II/III project group staffed only by risk managers
- Regulatory goals not linked to business goals

“This is an exercise in good risk management, not compliance”

- Basel Committee

3. Investment in People

- » Staff training is an essential investment, otherwise other investments will be unrealised
- » Fosters institutional buy-in and helps establish a Risk Culture
 - “The financial crisis has highlighted absence of a healthy risk management culture at all levels of certain financial institutions” European Commission
- » People manage risk not systems

Best Practices include;

- » A structured & long term training and development programme
- » Recognition and reward linked to training
- » Tailored training for different parts of the organisation

3 Pillars for meeting the Basel III Challenge

1. Robust Data Management
2. Institutional Commitment
3. Investment in People

Drivers for increased investment in *Enterprise Risk Management*

Strategic & Tactical Advantages



Sustainable Growth



Regulatory Compliance

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www.moody.com

Stress Testing: Understanding a Bank's Vulnerabilities

Dr. Christian Thun, Senior Director

Topics for discussion

1. Introduction to stress testing
 - Common approaches and pitfalls
 - Embedding stress testing into a bank's risk culture
2. Stress testing step-by-step
 - Defining stress scenarios
 - Stressing EDF levels & portfolio capital
3. Results of Moody's Analytics 2011 survey: Best practices in stress testing
4. Concluding remarks

1

Introduction to stress testing

Stress Testing: Lessons learnt

Definition :

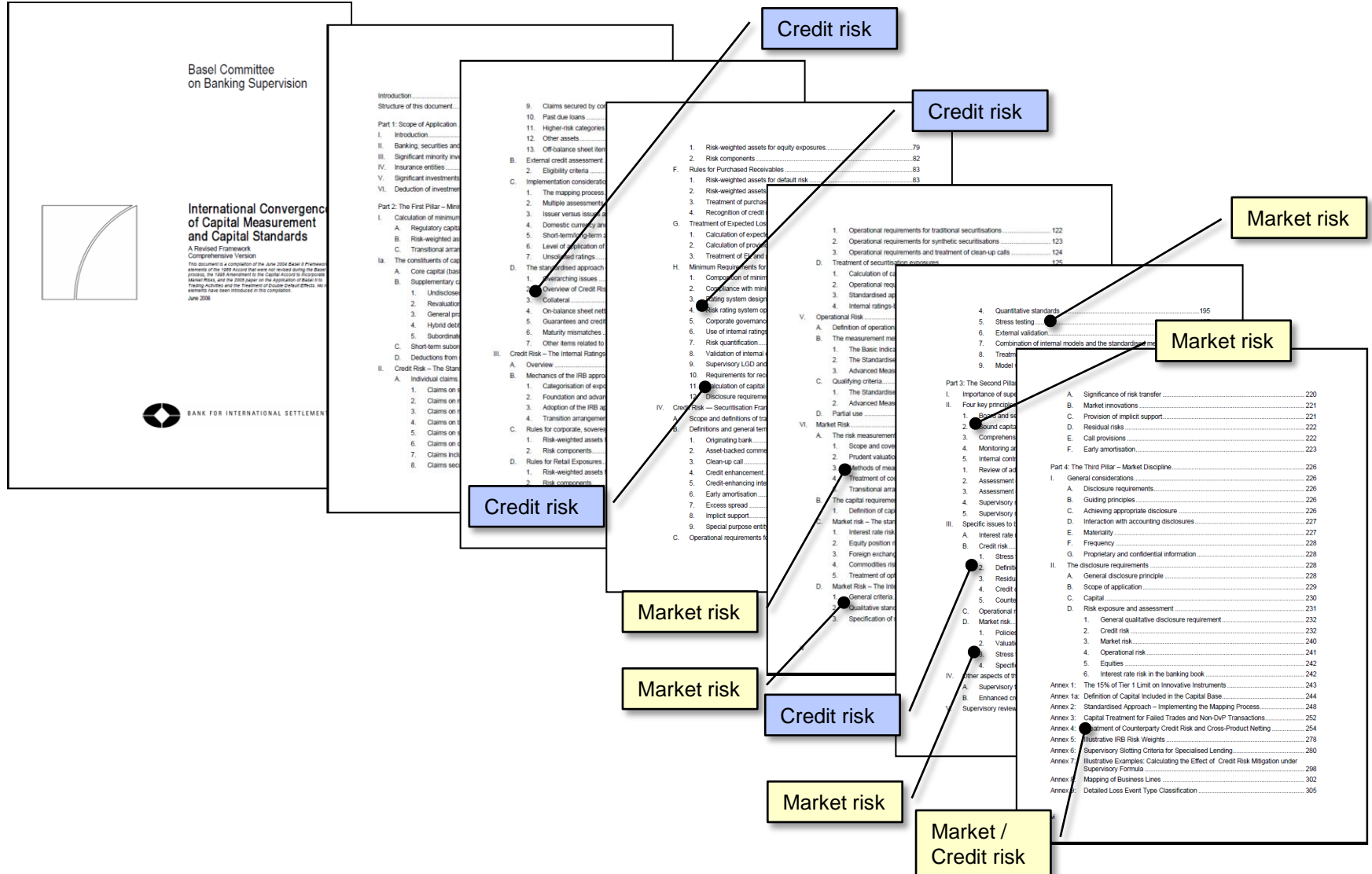
A stress test is commonly described as the evaluation of the financial position of a bank under a **severe but plausible scenario** to assist in decision making within the bank

The financial crisis has highlighted weaknesses in current stress testing practices.

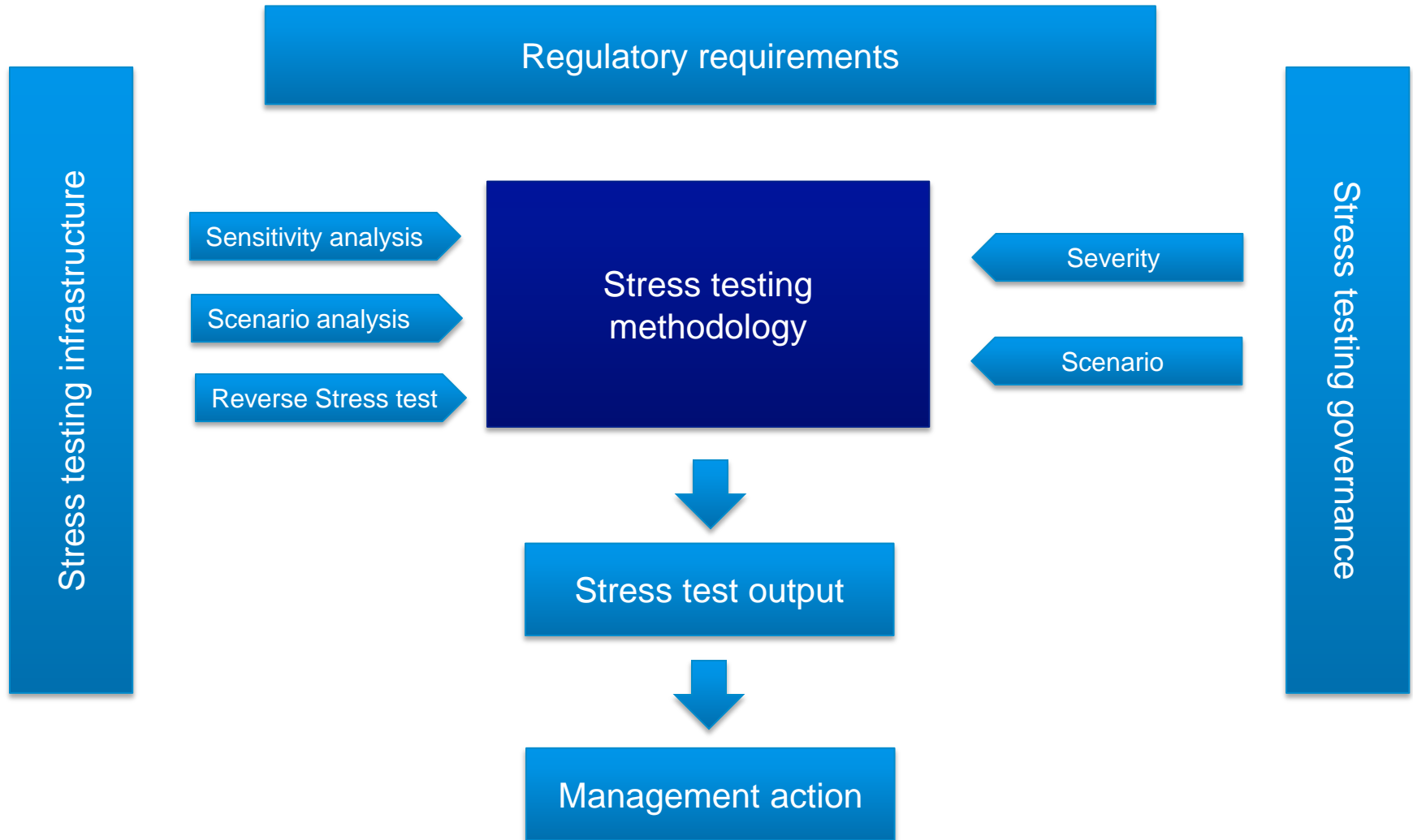
- » Use of stress testing and integration in risk governance
- » Stress testing methodologies
- » Scenario selection
- » Stress testing of specific risks and products

Source: BIS, Principles for sound stress testing practices and supervision, 2009

Locating Stress Testing by risk



Stress Testing Framework



Types of Stress Tests

Stress Testing

Single Factor / Sensitivity Analysis

- » Assess effect of a large move in one risk factor
- » E.g. Increase of PD by 10% or LGD to 80%
- » Easily understood, established and simple to apply
- » Not capturing dependencies

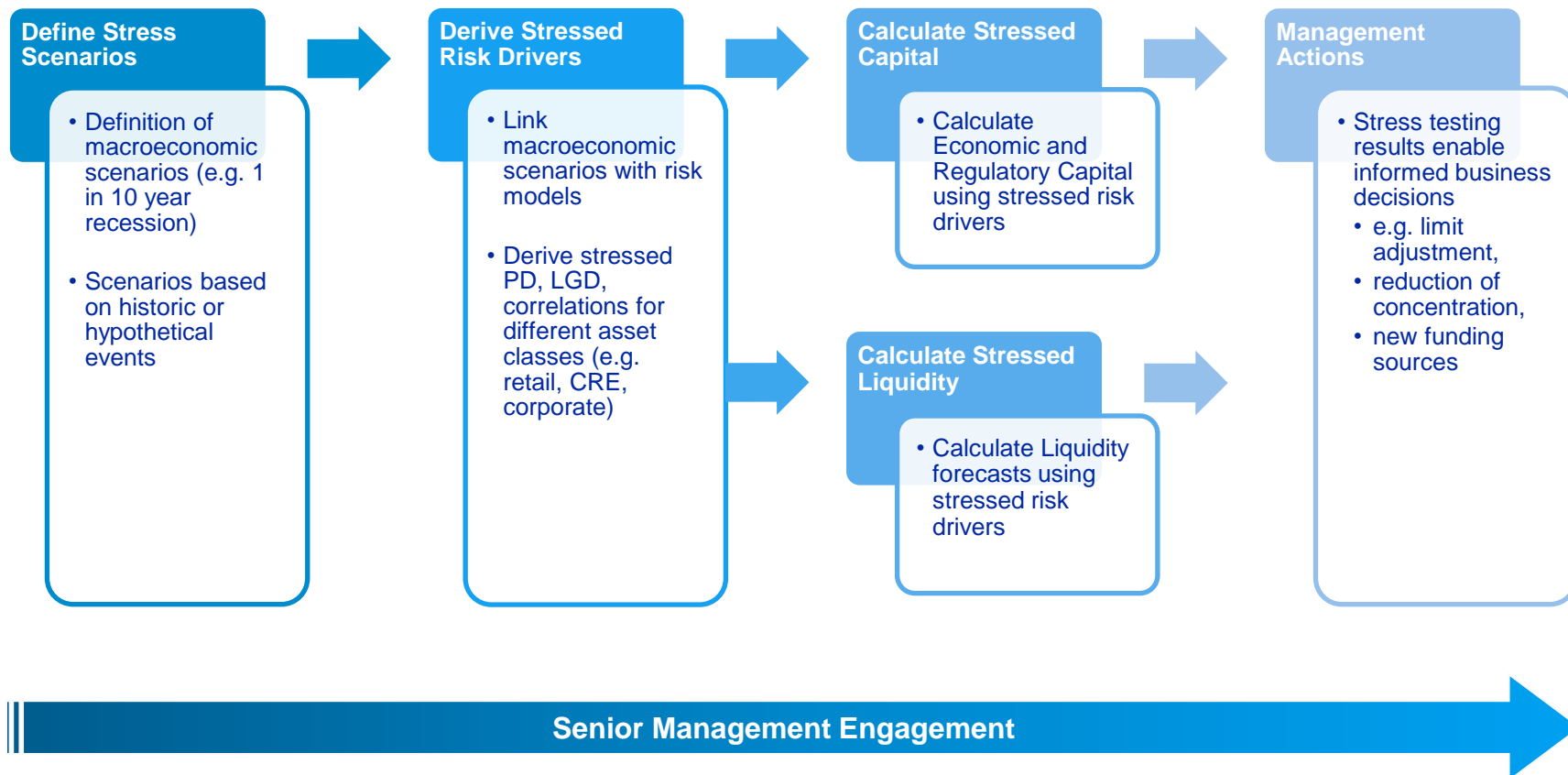
Multi Factor / Scenario Analysis

- » Historical Scenarios (e.g. recession early 90s)
- » Hypothetical Scenarios or hybrid forms
- » Capture dependencies among risk factors

Reverse stress testing

- » Scenario that would make a business model unviable
- » For firms to better understand vulnerabilities
- » Allow for better capital planning

Stress Testing – in a nutshell



A large, light blue world map is visible in the background of the left side of the slide. A large white number '2' is centered over the map.

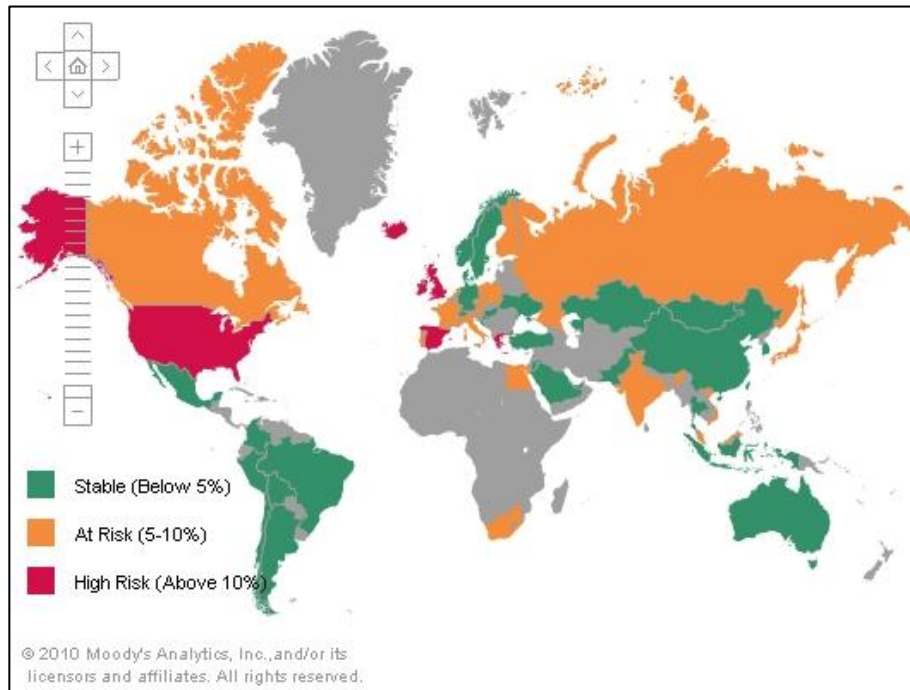
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Stress testing step- by-step

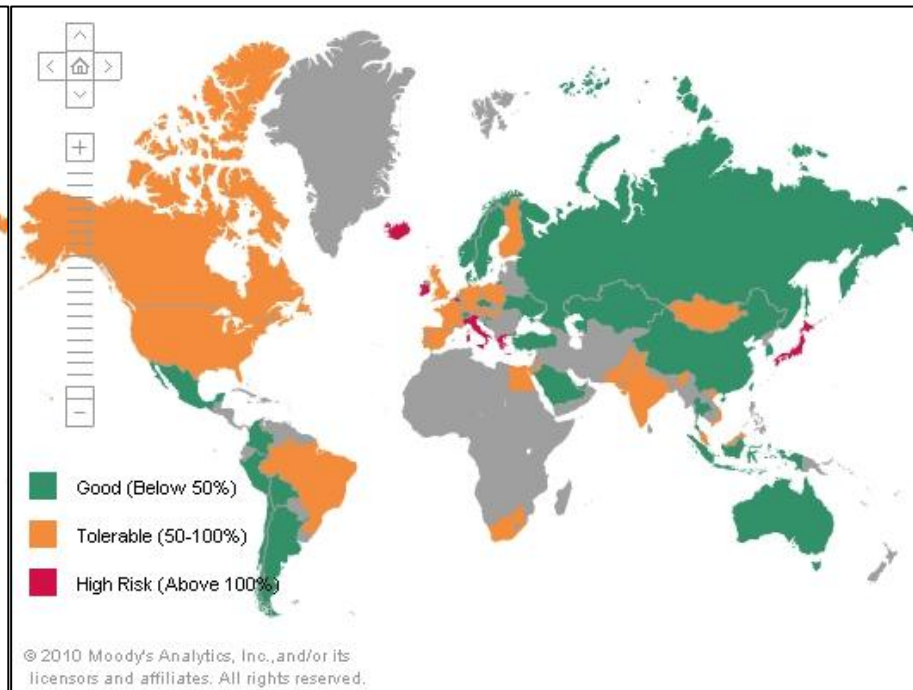
Defining stress scenarios

Moody's Analytics – Global Credit Watch

Deficit



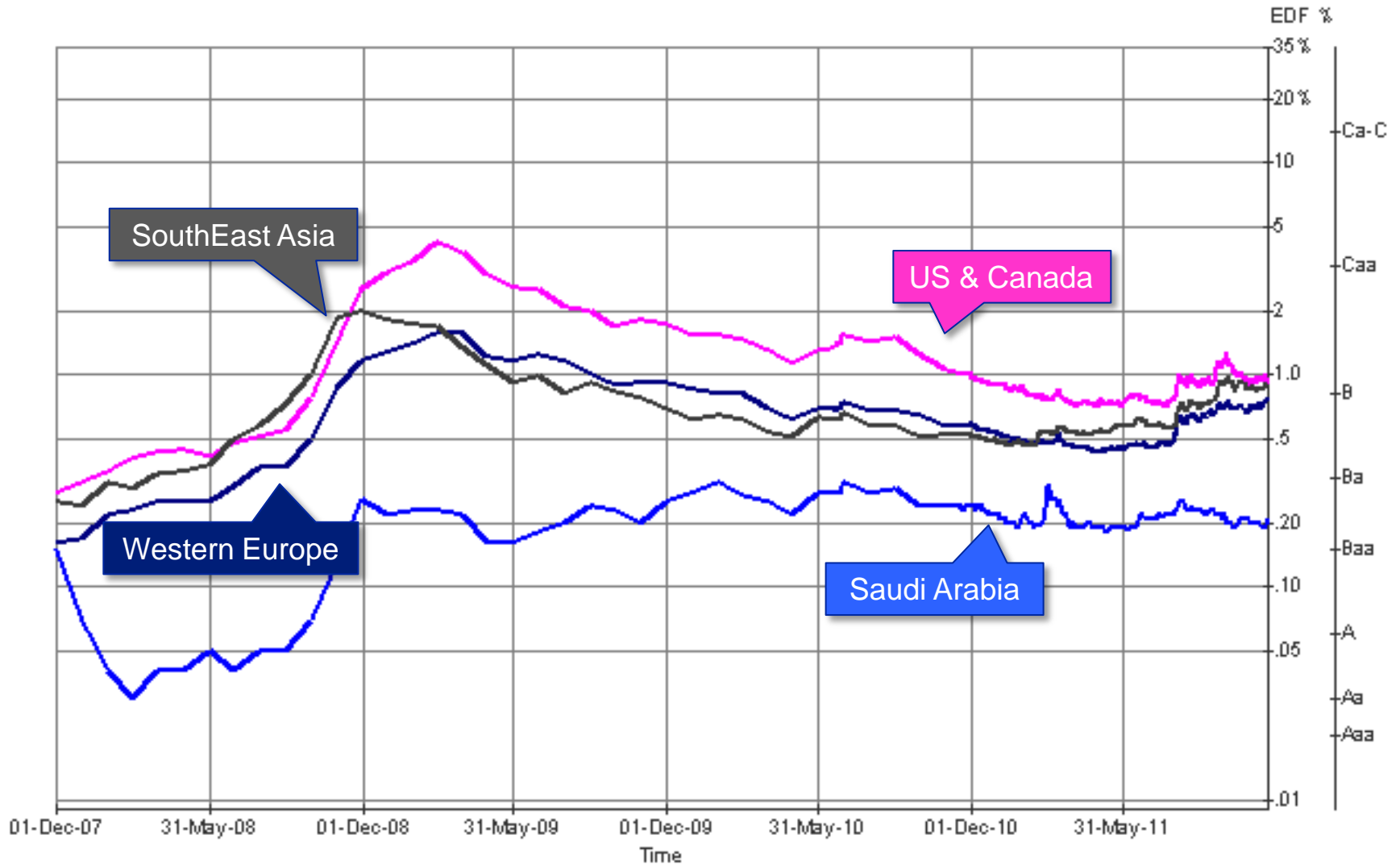
Debt



The maps provide a snapshot of the current situation. The two images rank countries according to their government deficits and debt levels, measured as ratios of gross domestic product.

Source: Moody's Economy.com

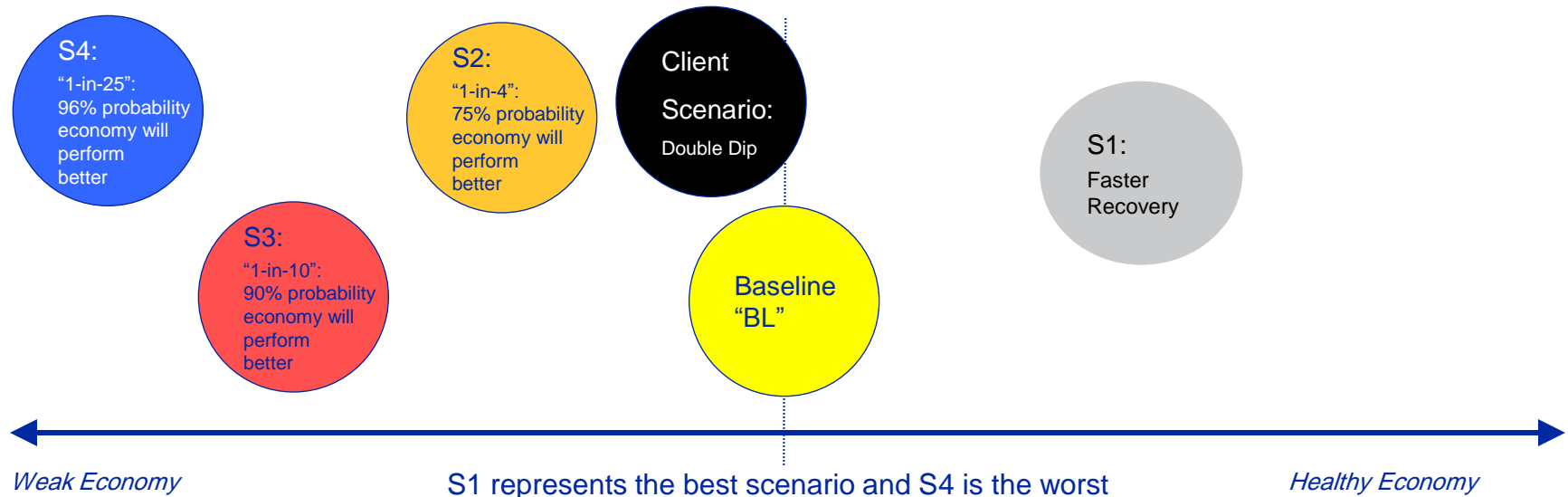
Default risk remains elevated around the world



Source: Moody's Analytics CreditEdge, 1yr EDFs for publicly listed firms

Alternative Scenarios Key for Stress Testing

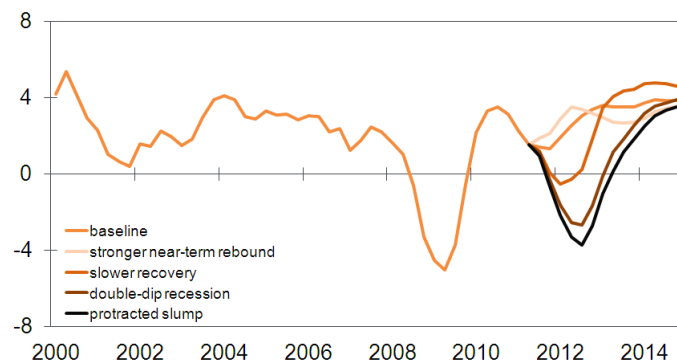
- » On a monthly basis our economists produce the baseline forecast, which represents the estimate of the most likely path for the respective economy through the current business cycles (50% probability that economic conditions will be worse and 50% probability that economic conditions will be better)
- » Standard economic scenarios are developed around the baseline forecast and are updated on a quarterly basis



Stressed dynamics of some macroeconomic variables

Chart 1. GDP

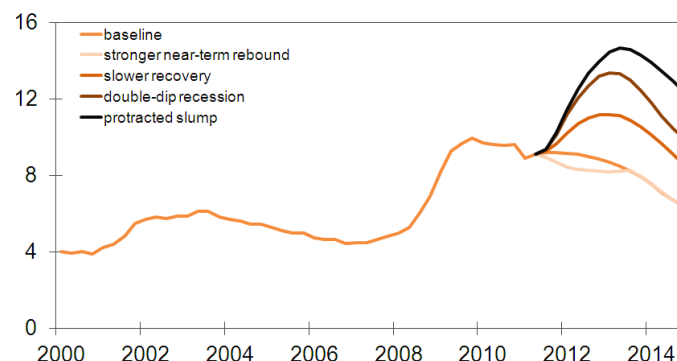
SAAR: annual growth rate, %



Source: Moody's Analytics

Chart 2. Unemployment rate

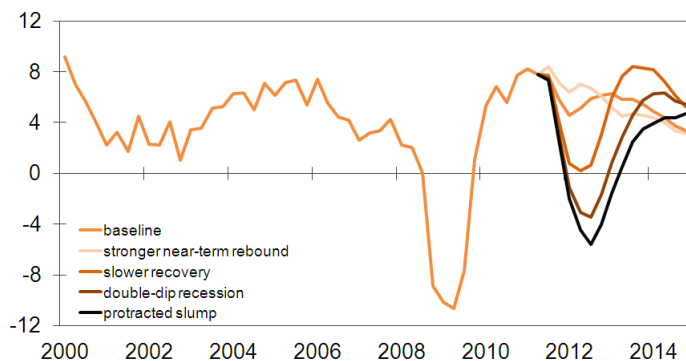
% of workforce, SA



Source: Moody's Analytics

Chart 3. Retail sales

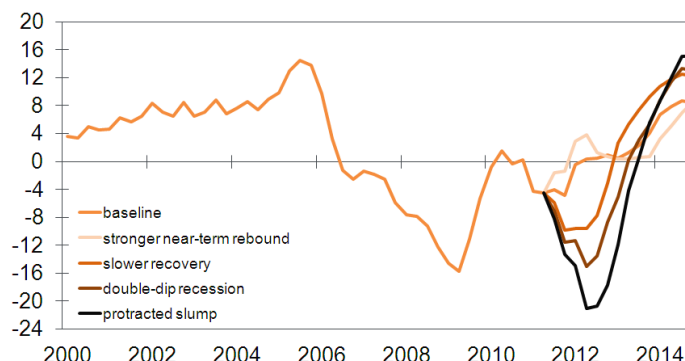
SAAR: annual growth rate, %



Source: Moody's Analytics

Chart 4. Median home price

Existing Single-Family Home, SA: annual growth rate, %



Source: Moody's Analytics

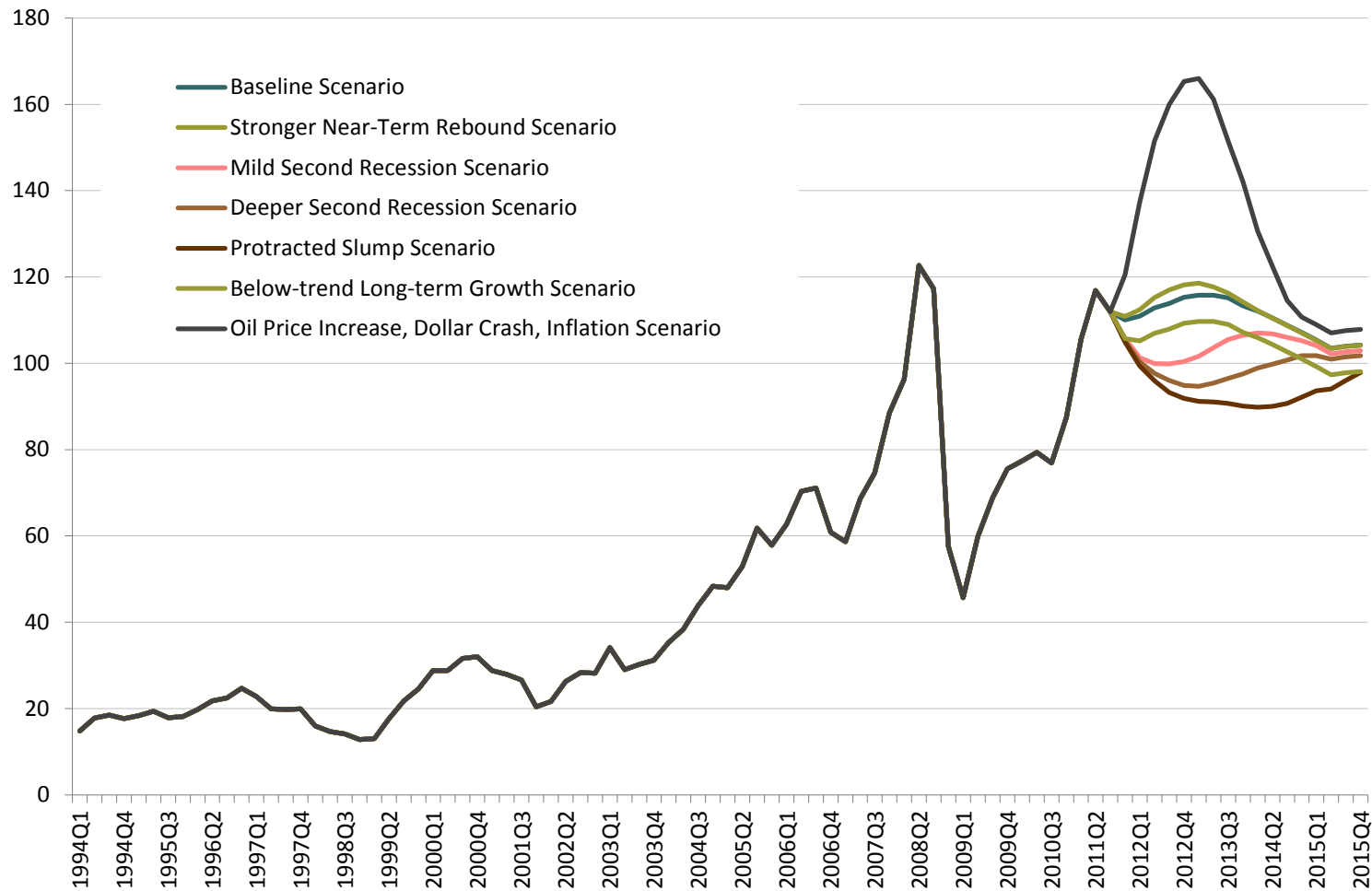
A closer view on Saudi-Arabia's economy



- Saudi Arabia has an oil-based economy. The petroleum sector accounts for roughly 80% of budget revenues, 45% of GDP, and 90% of export earnings.
- Credit strengths of Saudi Arabia are:
 - Very low government debt
 - High external liquidity
 - Geostrategic importance as the lynchpin of OPEC
 - Prudent financial system regulation
- Credit challenges for Saudi Arabia are:
 - Narrow tax base vulnerable to oil price volatility
 - Relatively high unemployment
 - Regional geopolitical threats

Source: Moody's Investors Service, Credit opinion Oct 31, 2011

Oil Price Forecasts - Baseline and Alternative Scenarios





Stress testing step-by-step

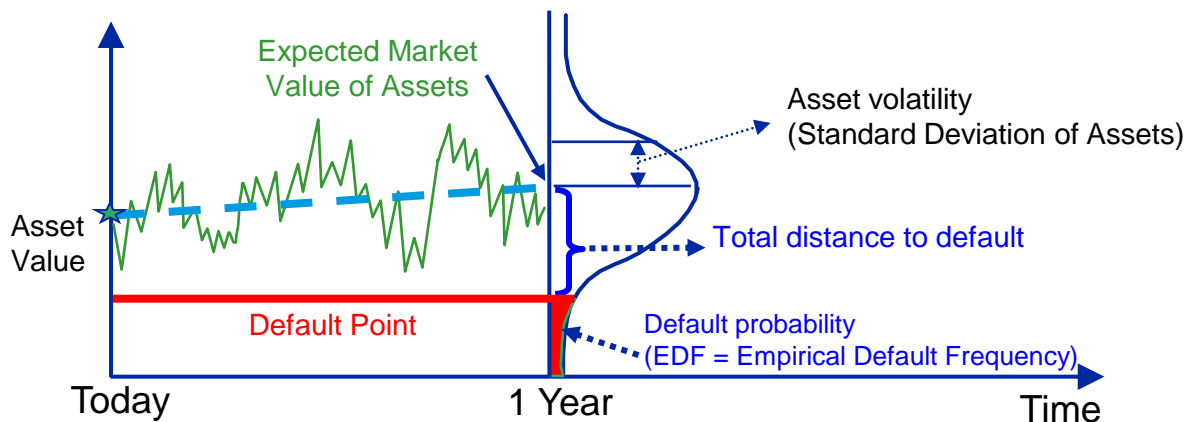
Stressing EDF levels & portfolio capital

Translating scenarios into changes in risk drivers

A borrower's probability of default is a function of the borrower's Distance-to-Default (DD)

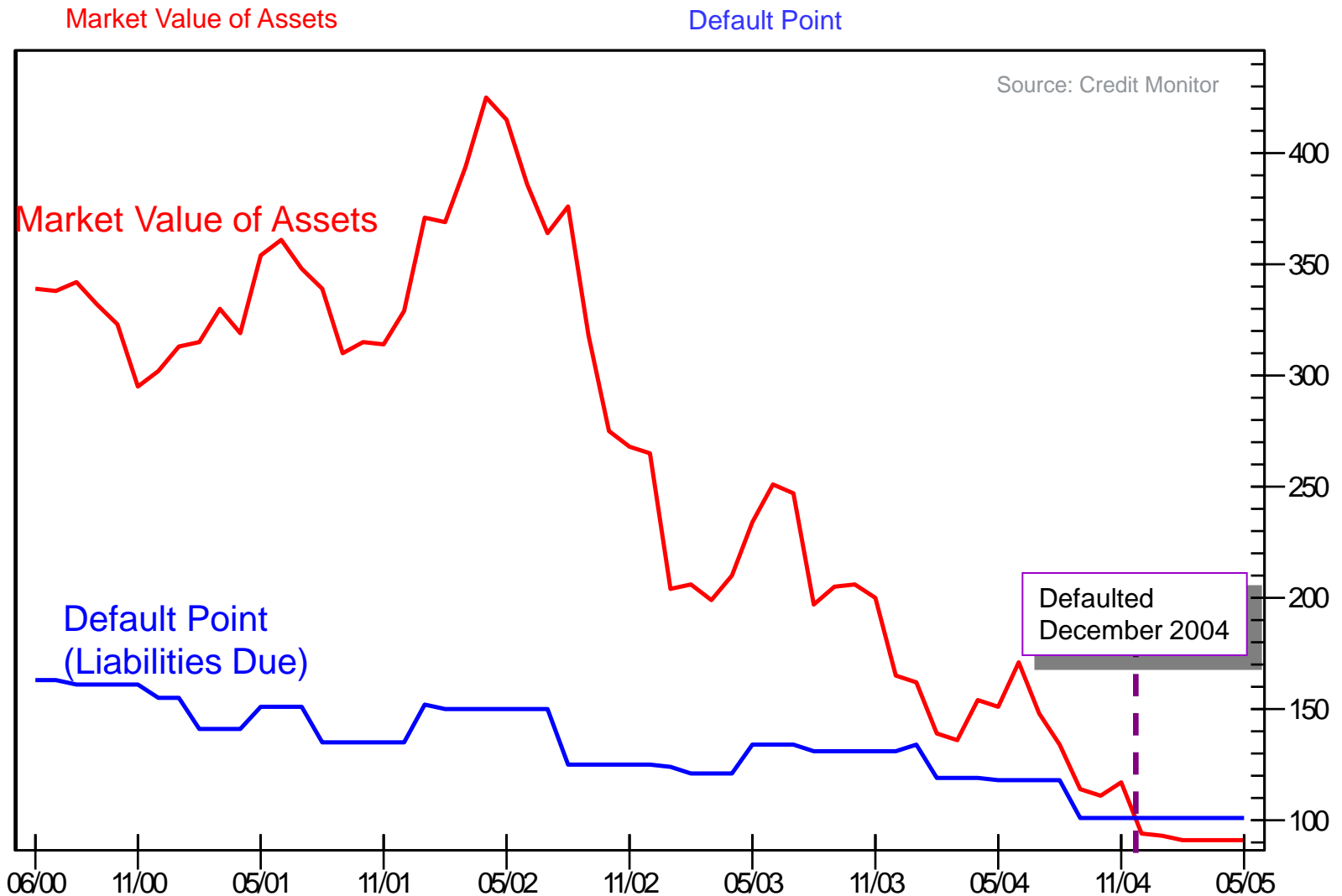
A *stressed* Distance-to-Default for each borrower can be determined by calculating an econometric relationship between changes in borrowers' Distance-to-Default with factor returns and changes in factor variance.

Stressed Factor Variance and Stressed Factor Return $\Rightarrow DD_k^{stressed} \Rightarrow PD_k^{stressed}$

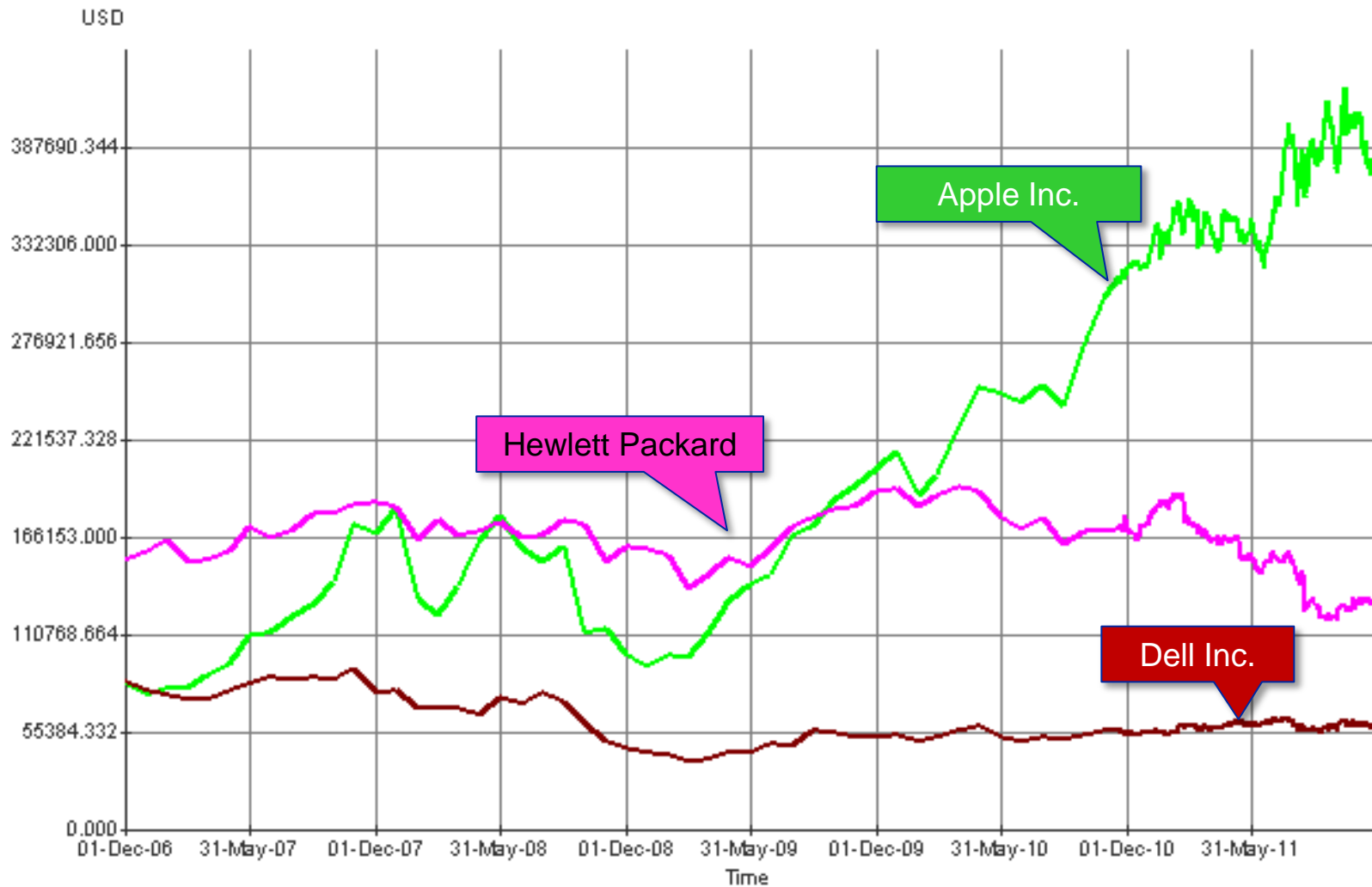


The "Distance to Default" is the distance between the Market Value of Assets and Default Point, expressed as a multiple of Asset Volatility:

Default Example: Tropical Sportswear Intl.

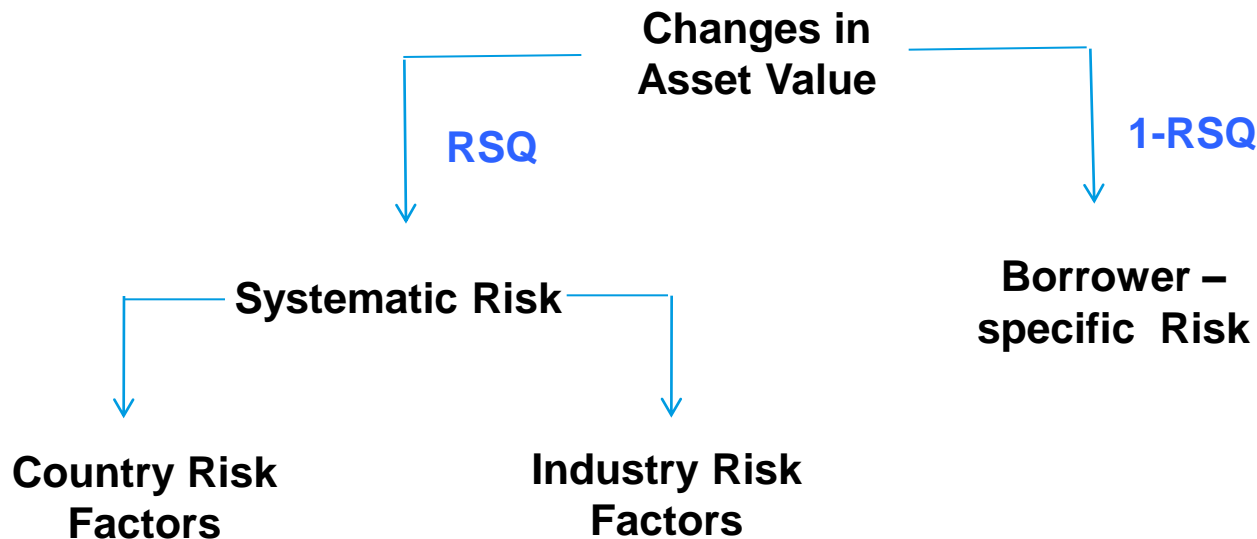


What drives changes in asset value?

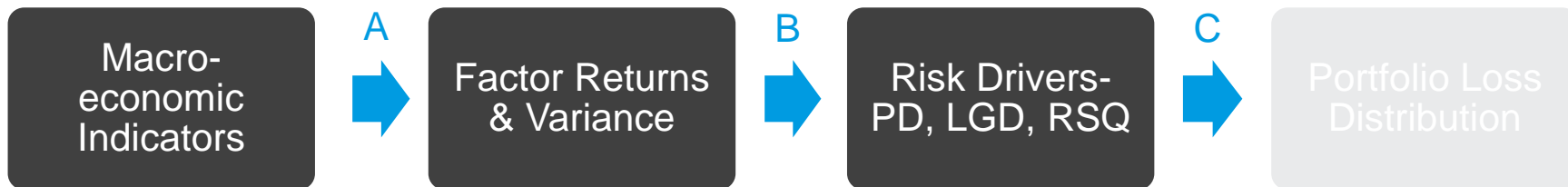


Understanding stressed asset values

- Moody's Analytics uses a factor model to measure asset return correlations between firms
- The factor model approach imposes a structure on the correlation of asset returns, which implies that the correlation between the asset returns of any pair of firms can be explained by the firms' relationships to a set of common factors
 - A composite company specific factor (systematic risk)
 - Country and industry factors



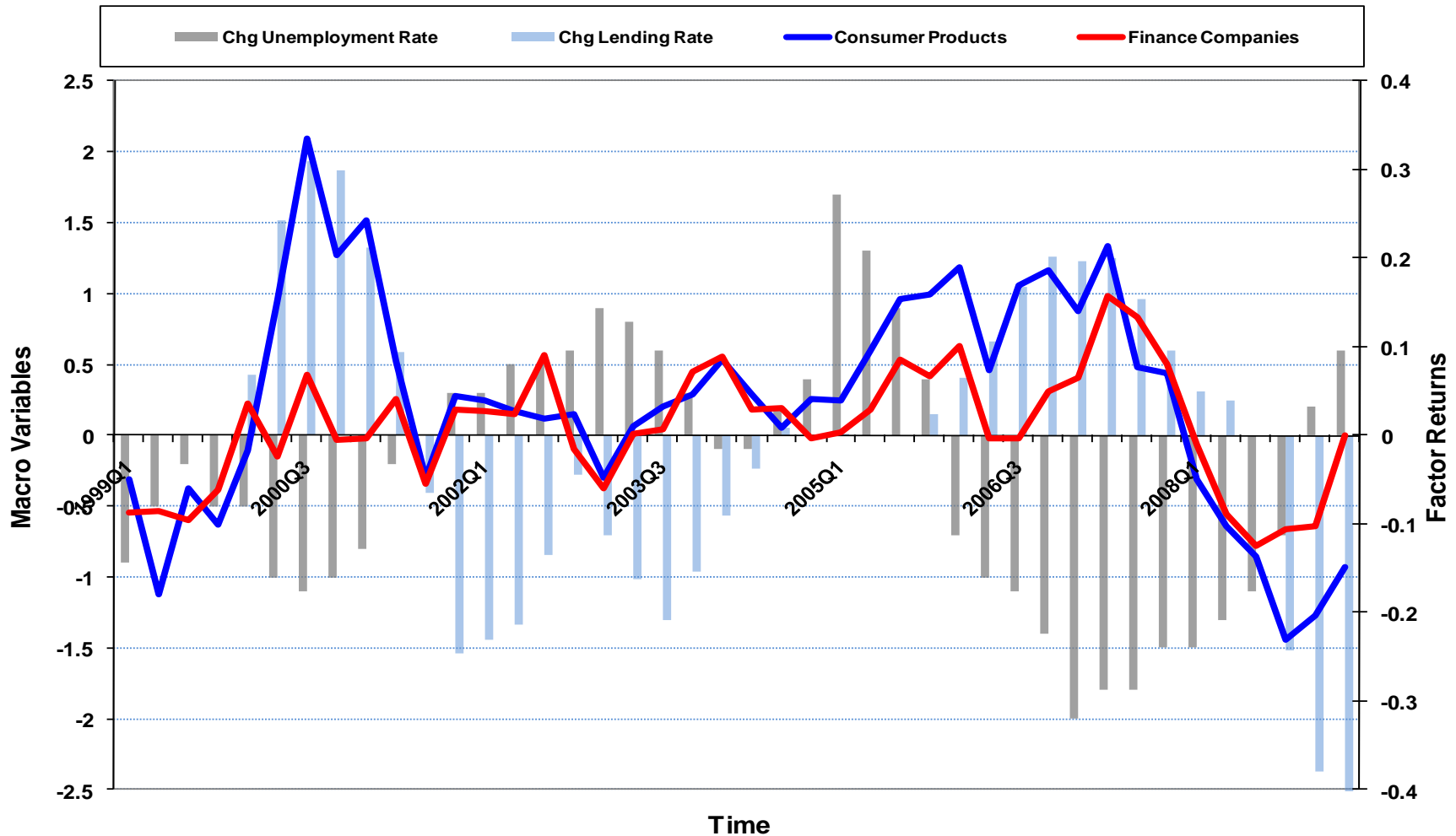
Three Basic Steps Connecting Macroeconomic Indicators to Conditional Loss Distribution



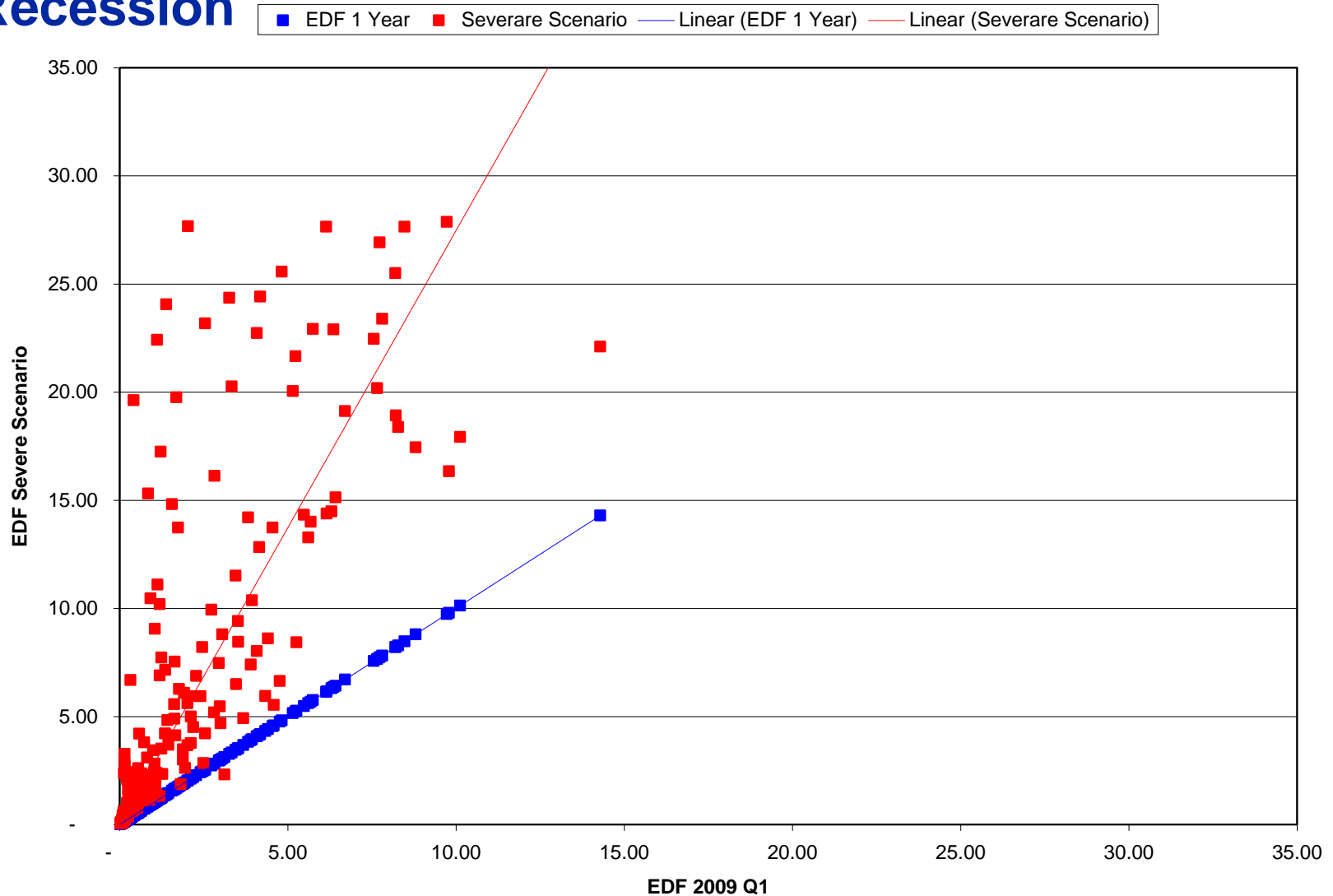
- A. Link a set of Macro Factors (say: GDP, Unemployment etc.) to the time series of Factor Variance and Factor Returns underlying correlations
- B. Calibrate the sensitivity of the factor time series to PD, LGD and RSQ using the empirical realizations
- C. Apply a stress scenario to solve for new PD, LGD and Correlations; use these as inputs to estimate portfolio credit risk using a portfolio model

Connecting Factor Returns and Macro Variables

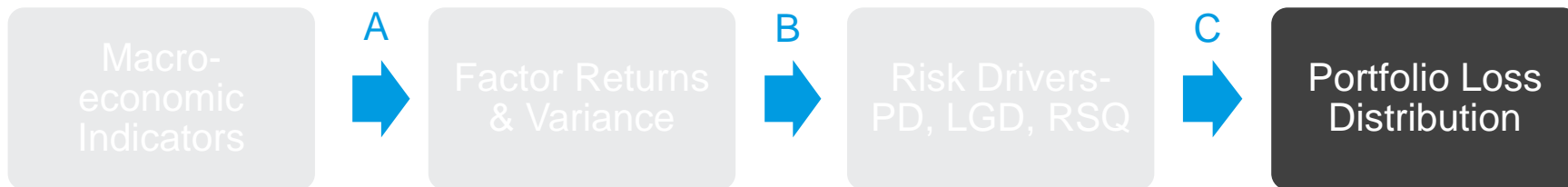
- for Two Industries in Germany



EDF Measures in a Stress Scenario: 1-in-a-25 Year Recession

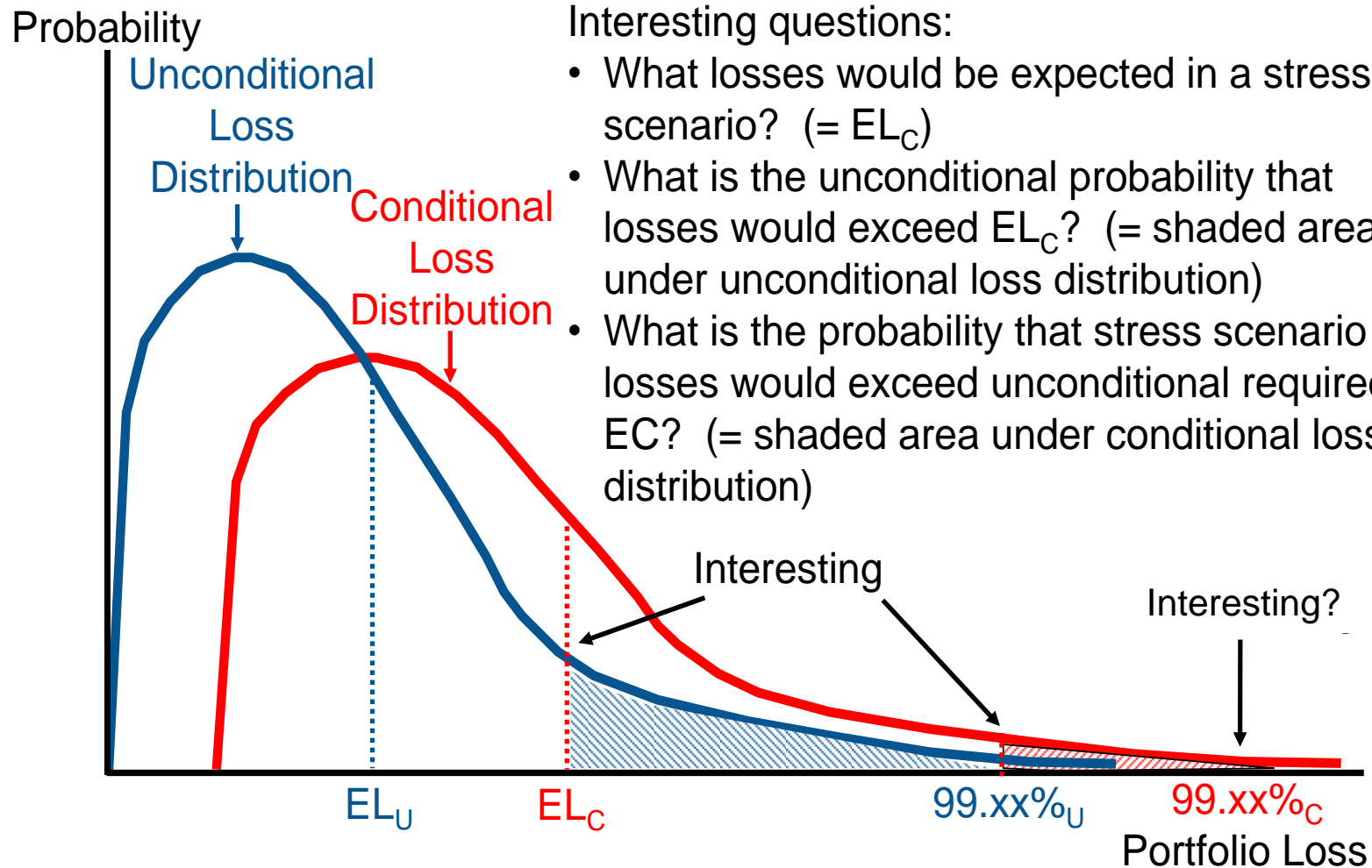


Three Basic Steps Connecting Macroeconomic Indicators to Conditional Loss Distribution



- A. Link a set of Macro Factors (say: GDP, Unemployment etc.) to the time series of Factor Variance and Factor Returns underlying correlations
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Visualizing the Impact of Stress Conditions on a Portfolio



Portfolio Case Study: Summary

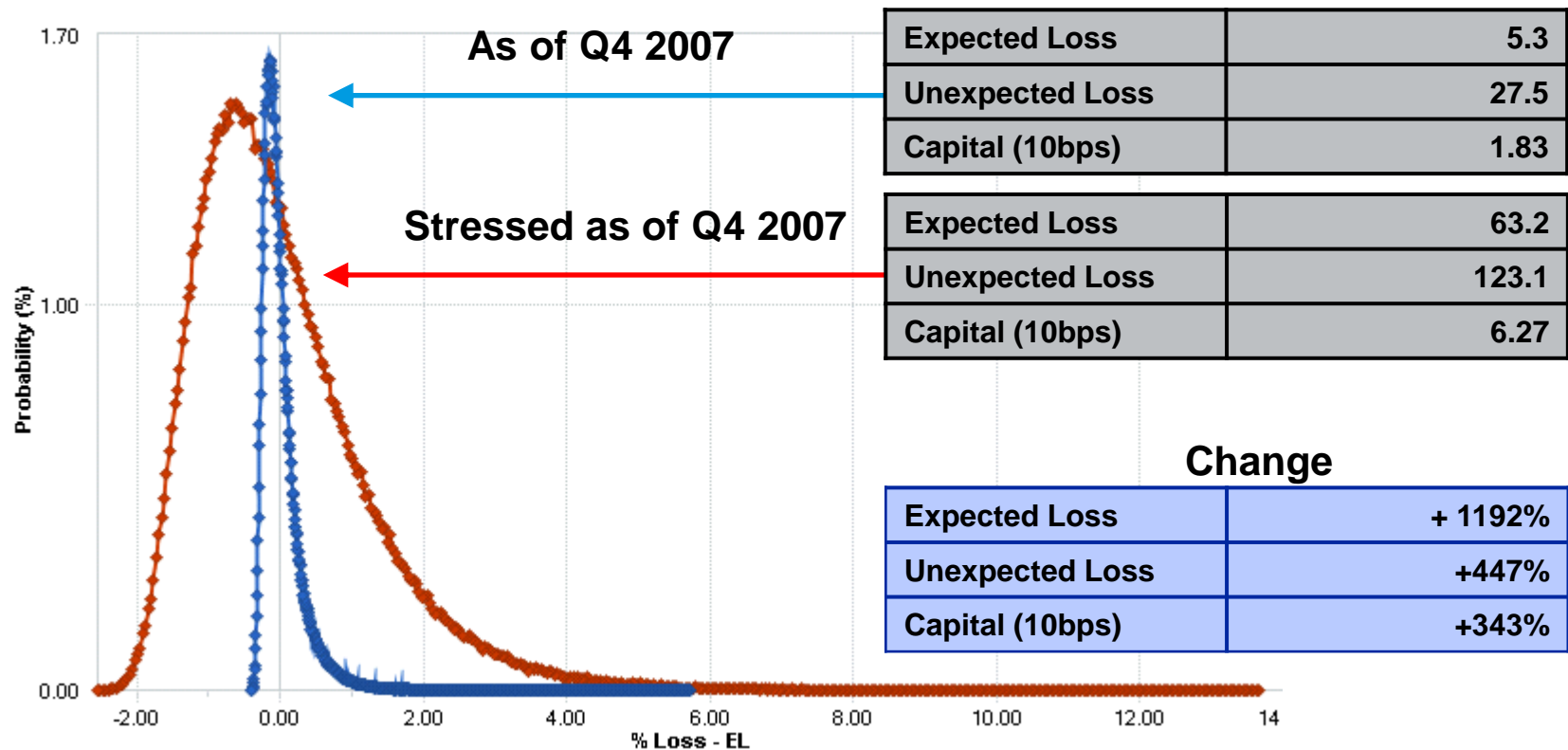
Sample of 1200 European financial and industrials firms

Portfolio Statistics as of Q4 2007 base and stressed:

Median	As of Q4 2007	Stressed Q4 2007	Q4 2007→ Q4 2007 Stressed
PD	0.05%	0.22%	340%
LGD	34.12%	38.28%	12%
RSQ	22.04%	31.43%	42%

Portfolio Case Study: Loss Distribution

Changes in a credit portfolio risk measures (Expected Loss, Unexpected Loss, Capital) if the credit portfolio experienced the financial/economic shock of the fourth quarter 2008 based on changes in risk drivers over one quarter:



A large, light blue world map is visible in the background of the left side of the slide. A large white number '3' is centered over the map.

3

Moody's Analytics Stress Test Survey

2011 Stress Testing Survey Demographics

Tier by total assets	Very big (>\$500bn)	Big (>\$100bn)	Medium (>\$20bn)	Small (<\$20bn)	Total
Number of banks	15	7	9	11	42

Geographies covered:

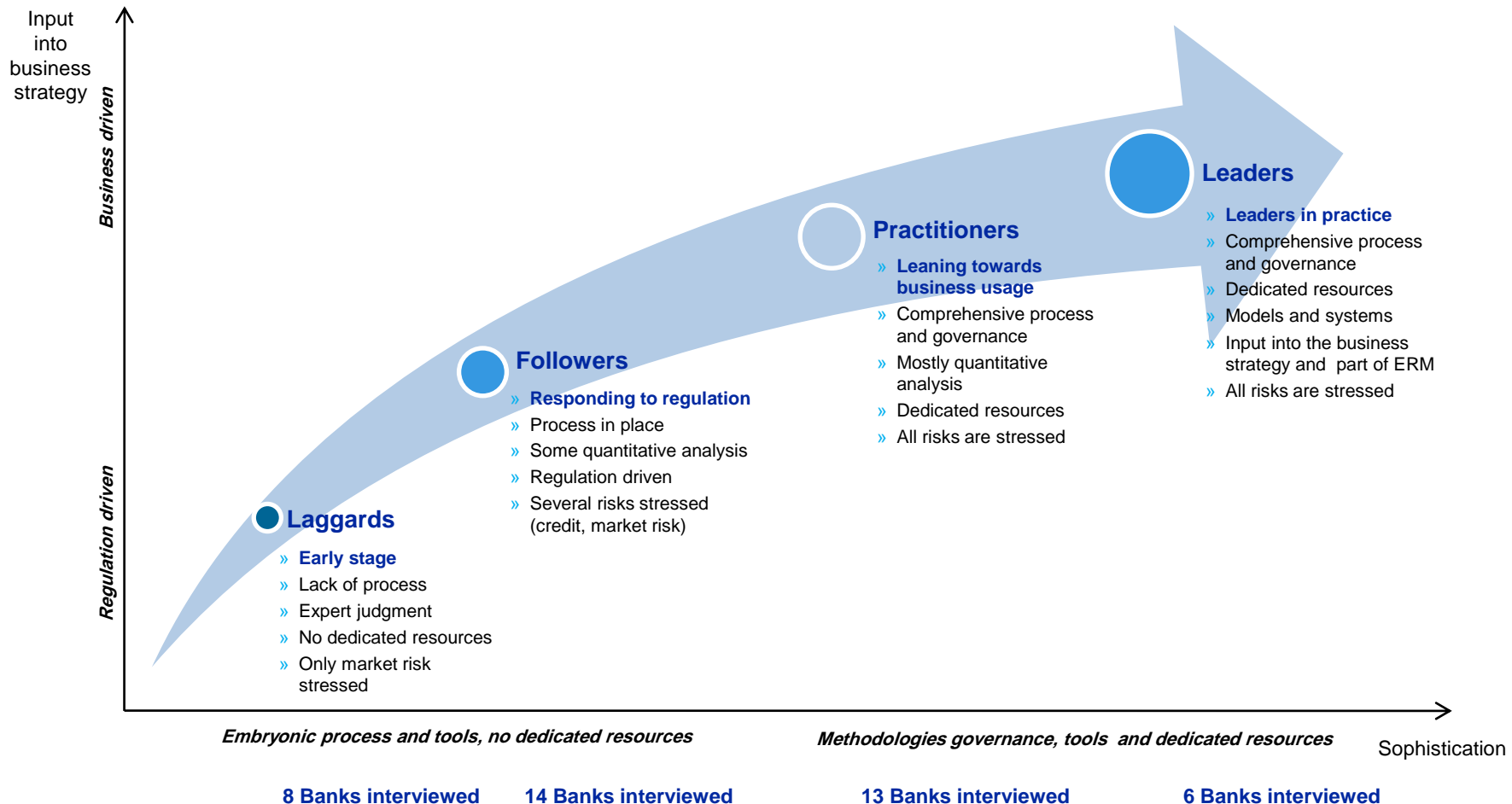
- ✓ UK
- ✓ Netherlands
- ✓ France
- ✓ Belgium
- ✓ Denmark
- ✓ Austria
- ✓ Switzerland
- ✓ Luxembourg
- ✓ Germany
- ✓ Poland
- ✓ Spain

Industries covered:

- 76% commercial banks
- 15% retail banks, building societies, investment banks
- 8% development banks, asset managers, others

Maturity levels varies according to regulatory requirements and bank overall risk management sophistication

Illustration of market maturity levels



Overview of best practices best on market research and own analysis



	1 Define scope and governance	2 Define Scenarios	3 Data and Infrastructure	4 Model the impact of scenarios on key risk parameters	5 Calculate Stressed KPI	6 Reporting	7 Management actions
Description of Activities							
Frequency							
Output							

Visit our website to learn more about the survey

www.moodyanalytics.com/stresstest

The screenshot shows the Moody's Analytics website page for the 2011 Banking Industry Survey on Stress Testing. The page features a blue header with the Moody's Analytics logo and navigation links. The main content area includes a title, a sub-headline, a paragraph of text, a 'DOWNLOAD NOW' button, and a 'RELATED RESOURCES' section with two links. A 'FOLLOW US' section with LinkedIn and Twitter icons is also present. The background of the main content area is a photograph of a road sign showing a car skidding, set against a backdrop of trees.

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Home » Moody's Analytics 2011 Banking Industry Survey on Stress Testing

Moody's Analytics 2011 Banking Industry Survey on Stress Testing

Moody's Analytics' 2011 Stress Testing Banking Survey identifies 7 steps to stress testing excellence.

Stress testing has become more important than ever, fuelled by regulatory requirements and a weakening economic environment. As stress tests become more comprehensive and greater in scope, the practice of stress testing poses significant challenges to banks and other financial institutions.

A follow up to Moody's Analytics 2010 Stress Testing Banking Survey, this report aims to provide an overview of current best practices and remaining challenges within the banking industry. It is based on more than 40 one-on-one interviews with practitioners across the risk and finance functions in Europe.

[DOWNLOAD NOW](#)

One encouraging development highlighted by Moody's Analytics 2011 Stress Testing Banking Survey report is the increase in instances of banks embedding stress testing into their business planning and strategy.

Despite this, the survey also identifies substantial remaining challenges before stress testing becomes a true best practice.

This paper provides valuable insight into stress testing best practices and serves as a useful benchmarking tool across risk and finance functions at financial institutions. If you have any questions or would like further information, please contact us at stresstesting@moody.com.

RELATED RESOURCES

- » [Our Stress Testing Solution](#)
- » [2011 Stress Testing Survey Report](#)

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Concluding remarks

- Stress testing is a key ingredient of sound risk management and business planning
- Management involvement is of paramount importance
- Applying macroeconomic scenarios and stressing portfolio losses has become best practice
- But results of Moody's Analytics 2011 survey show that stress testing is still work-in-progress especially in the areas of
 - Data
 - Modelling
 - Software / IT platform
 - Communication / risk culture

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Refreshment Break

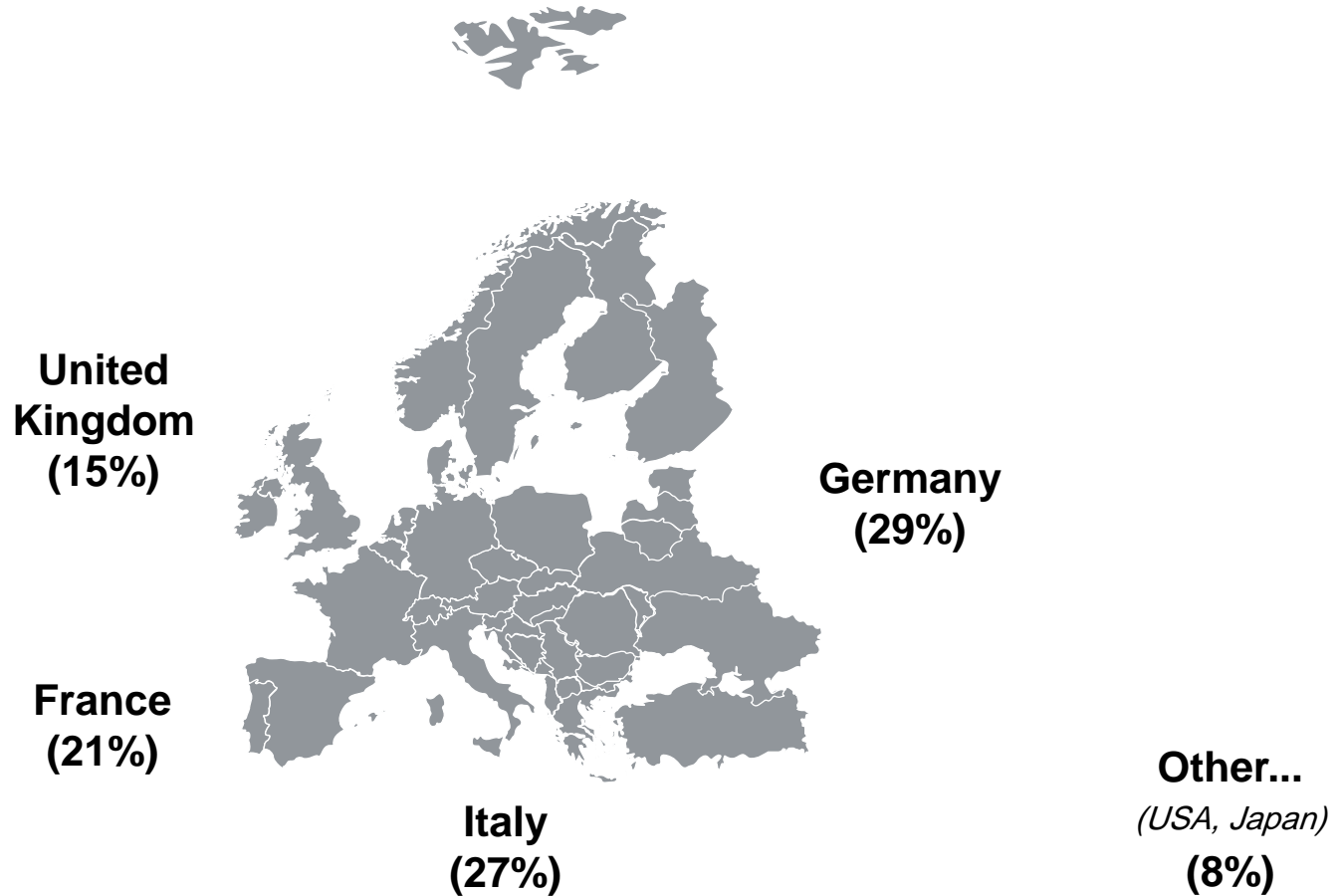
Managing liquidity risk under regulatory pressure



Impact of the new Basel III regulation on the liquidity framework

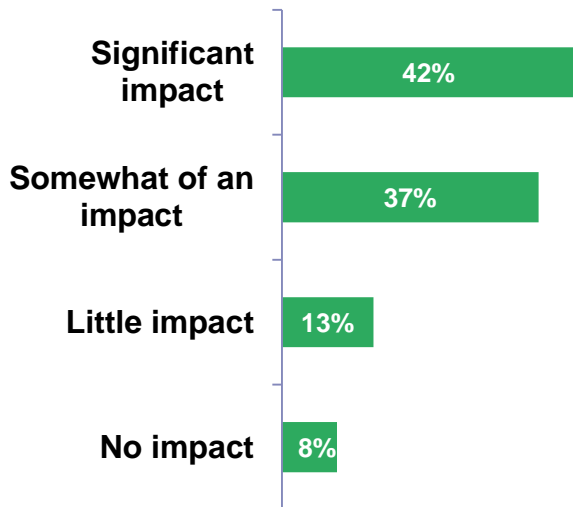
Research participants

Participating organizations headquartered in...

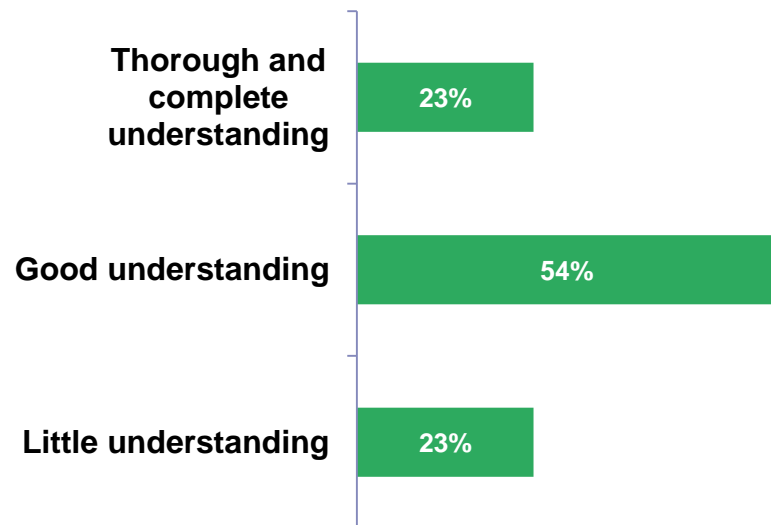


Liquidity and business strategy alignment

79% of respondents felt that the new regulatory rules for liquidity are expected to have a strong impact on business operations and strategy of organisations



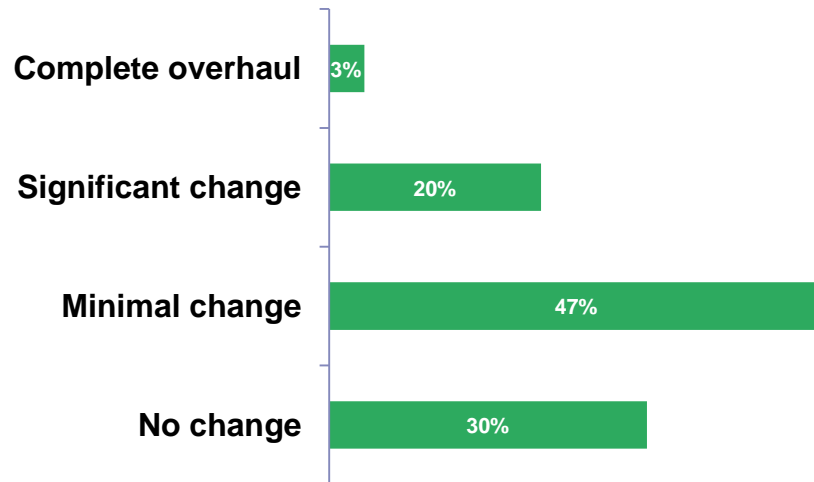
77% of respondents felt that the board & senior management have a thorough understanding of the roles of liquidity and funding risks in shaping the business strategy



Liquidity and business strategy alignment: going forward

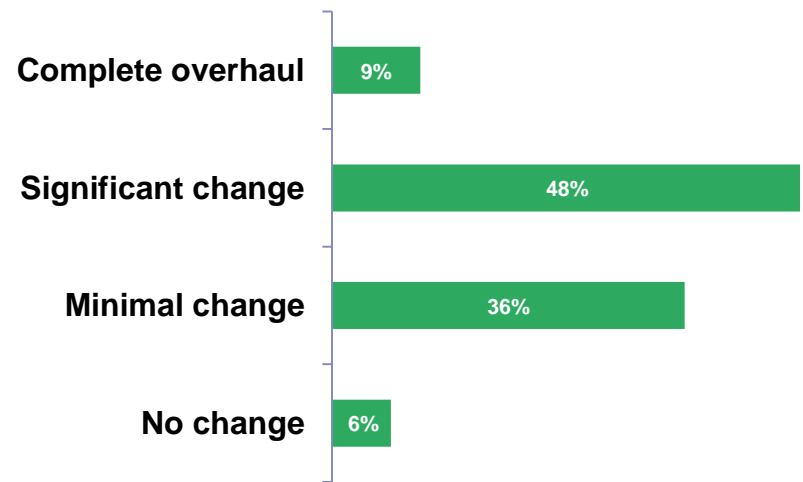
70% of organisations have seen changes implemented to their liquidity risk tolerance due to Basel III requirements

Thus far:



94% expect their liquidity risk tolerance to change further as a result of Basel III requirements

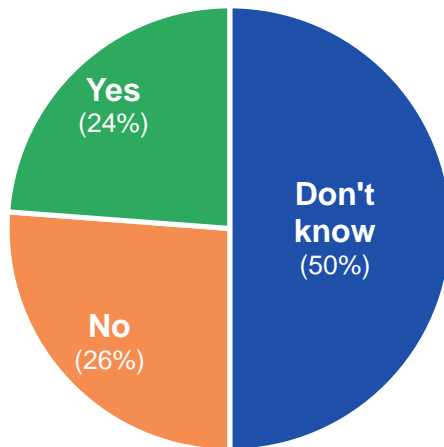
Going forward:



And yet, the alignment between strategy and processes is unclear

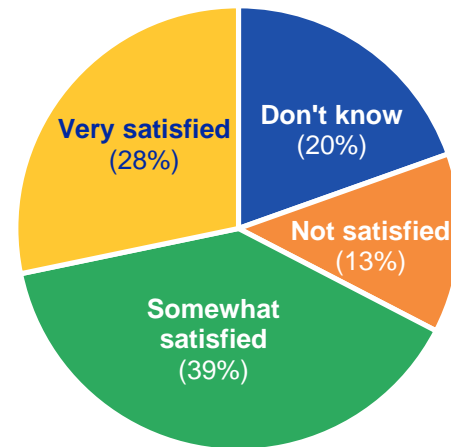
76% of respondents are unclear how the new rules have been incorporated into their organisation's key business processes and pricing

Has the impact of the new liquidity rules on profitability been factored into key business processes and pricing?



72% of respondents do not feel fully confident that their organisation's liquidity position is well understood

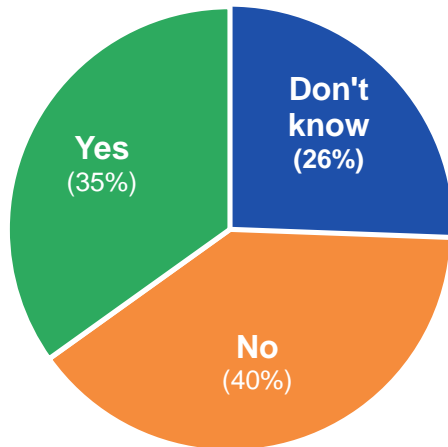
Are you satisfied that your organisation currently understands its liquidity position in sufficient detail and knows where the stress points are?



Liquidity: seeing the full picture

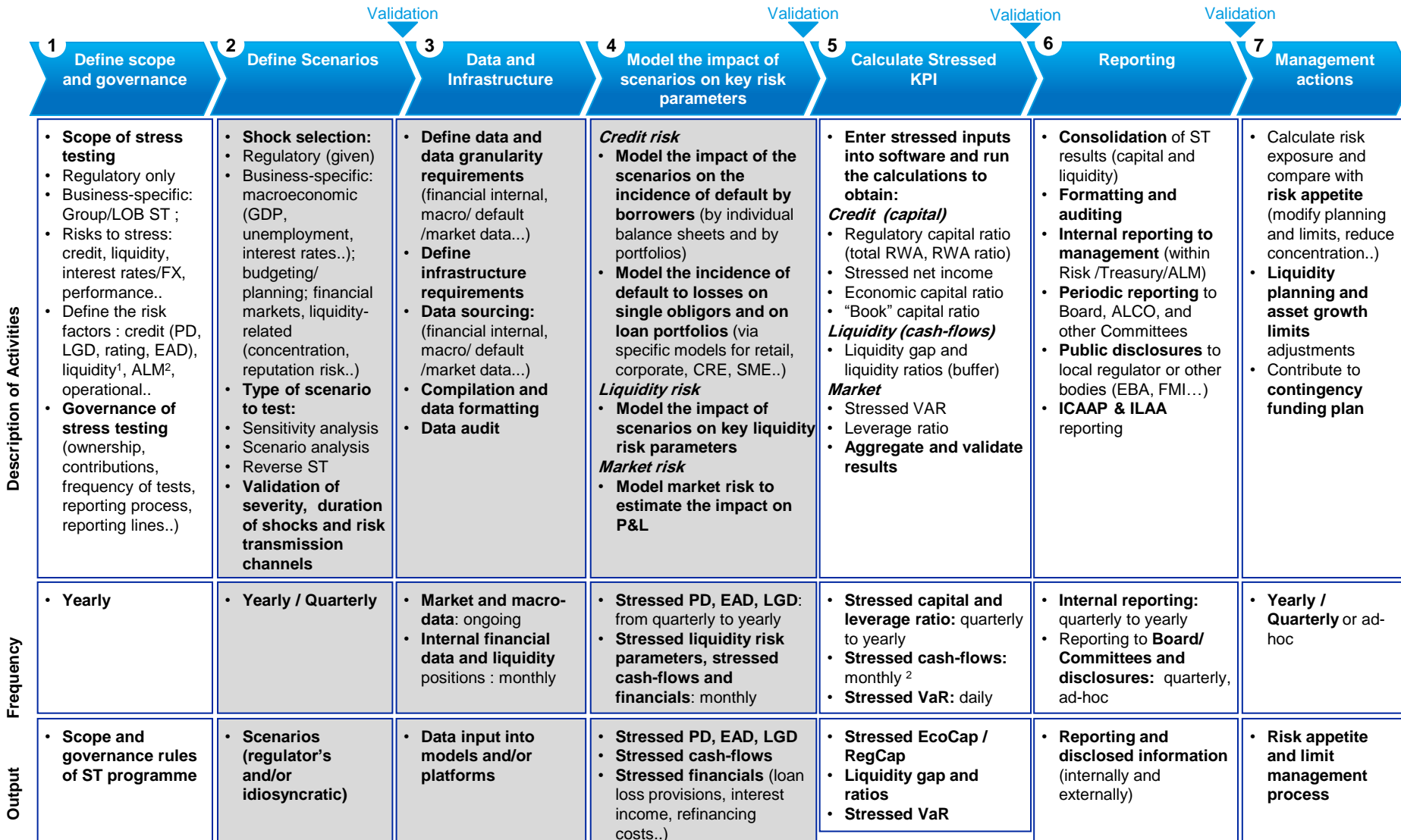
61% of respondents are unsure whether the new liquidity measures are sufficient in providing a holistic view of liquidity

Is the liquidity regulation is too simplistic as only two key ratios are being introduced?



- » Compliment regulatory requirements with additional measures to give a full picture of liquidity and funding positions
- » Ensure that there is a close dialogue between strategy / risk / treasury / finance
- » Understand the impact of strategy on day-to-day operations and processes and focus on top-down / bottom-up communication

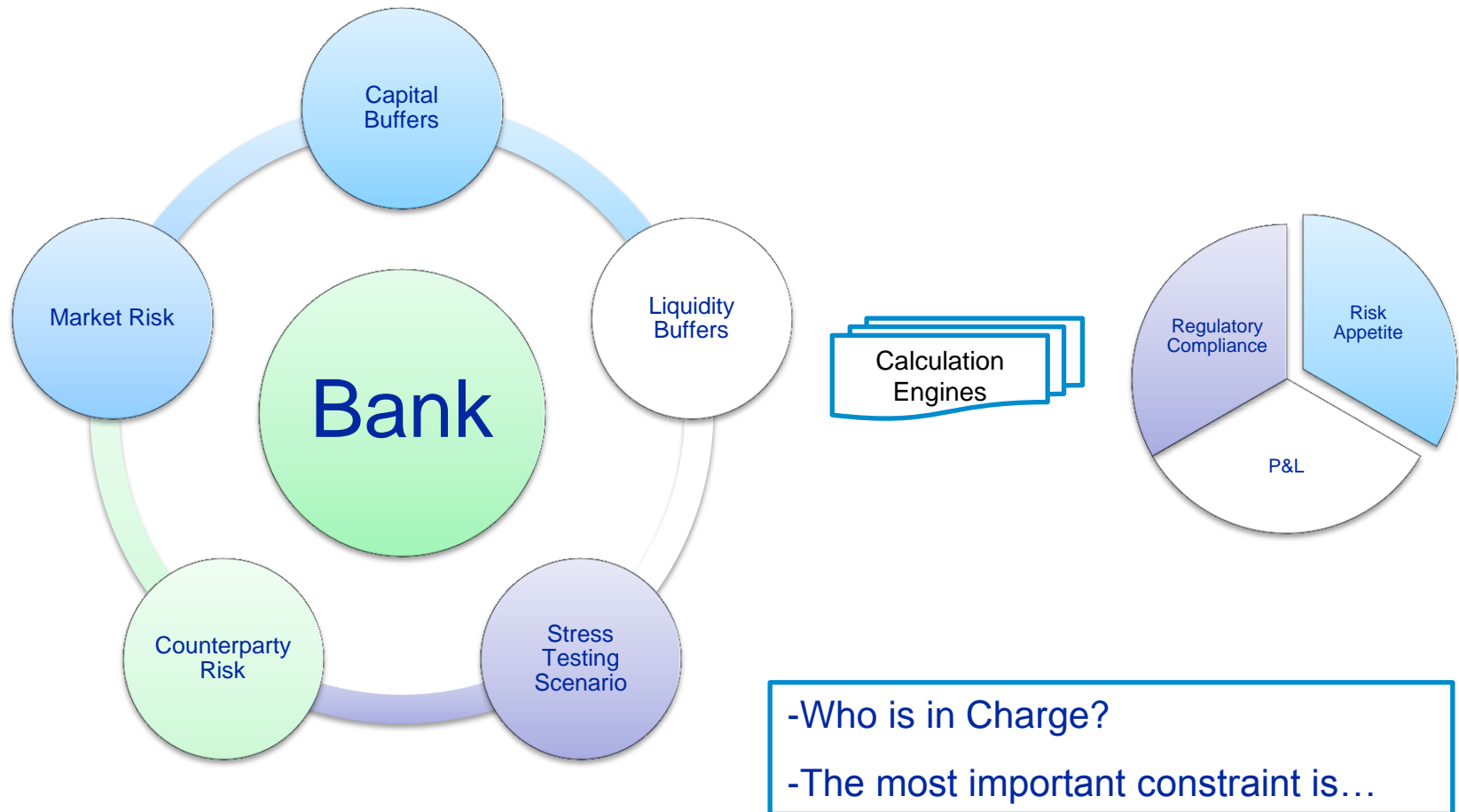
Modeling and data/infrastructure are recurrent pain points





Basel III and best practices for Asset & Liability Management

ALM within a regulatory framework



Liquidity coverage ratio (LCR) – example

Assets		470				
Cash	50	}	Stock of high quality liquid assets			150
Gov. Bonds	100					
Financial Institution Bonds	50					
Loans	270					
Liabilities and Equity		470	Run-off factor	Outflows*	Inflows**	Net outflows
Stable retail deposits	100	}	7.50%	7.5		
Less stable retail deposits	100		15%	= 15	-	
Unsecured Wholesale Funding (Non fin. Corporate with no operational relationship)	170		75%	127.5		
Equity	100					
				150.0	20	130
					LCR	115%

*Additional requirements are also considered as outflow (e.g. 100% of outstanding liquidity facilities to non fin. Corporate, etc)

** 100% of planned inflows from performing assets

Higher costs... and a better allocation

Cost of holding these assets:

$$C = X\% \text{ per year} \times 150$$

Stock of high quality liquid assets

150

Stable retail deposits	100	} x
Less stable retail deposits	100	
Unsecured Wholesale Funding (Non fin. Corporate with no operational relationship)	170	
Equity	100	

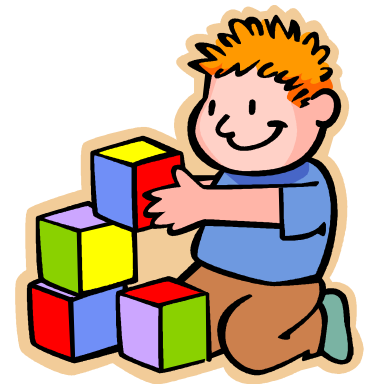
Run-off factor	Outflows*
7.50%	7.5
15%	15
75%	127.5
	150.0

C is allocated depending on the outflows generated by the instrument

ALM/Liquidity Risk and Stress Testing

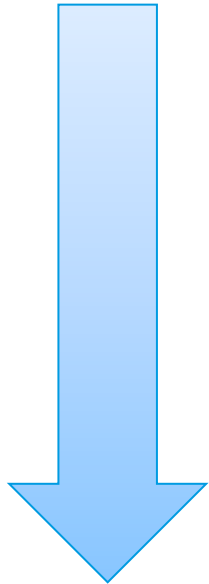
Contingency Funding Plans

- The ALM/Treasury point of view
 - Different sources of funding are available
 - Which one is the less expensive?
- Stress tests for ALM
 - Data is available in the Bank
 - Scenarios and behaviors
- How to
 - Build plausible scenarios
 - Link all the liquidity risk drivers

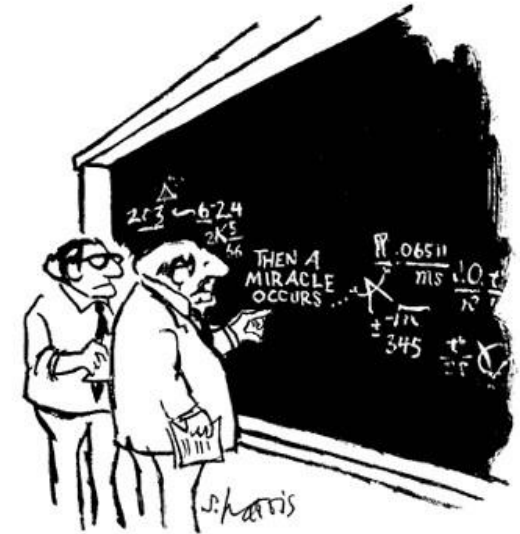


Liquidity management and liquidity risk

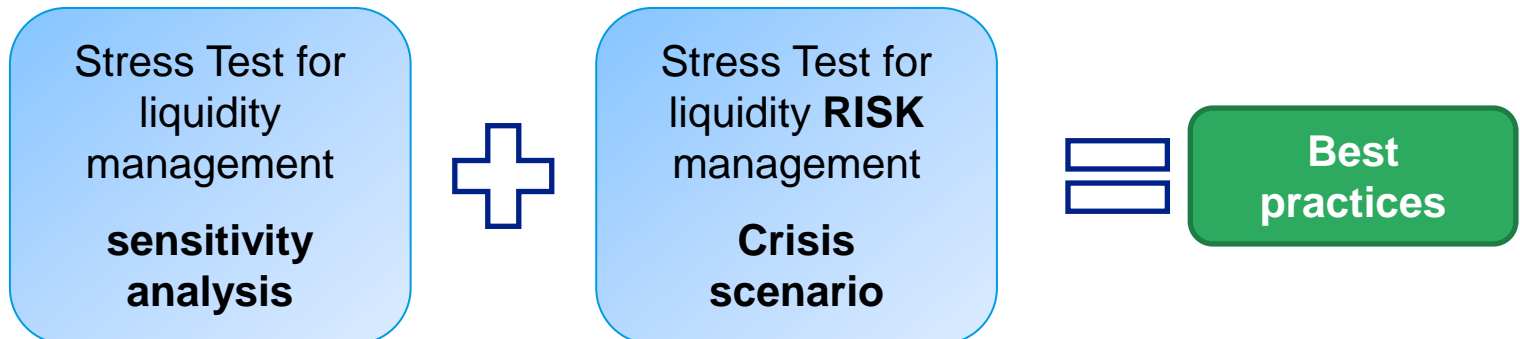
ALM scenarios are not Stress Tests



- Stress test calculation for Liquidity
 - Stressing market data
 - Behavioral models (data is needed)
 - Cash flow generation
- Adding the impact of the Contingency Funding Plan
 - See how the Bank will behave during the crisis
 - Estimate the cost



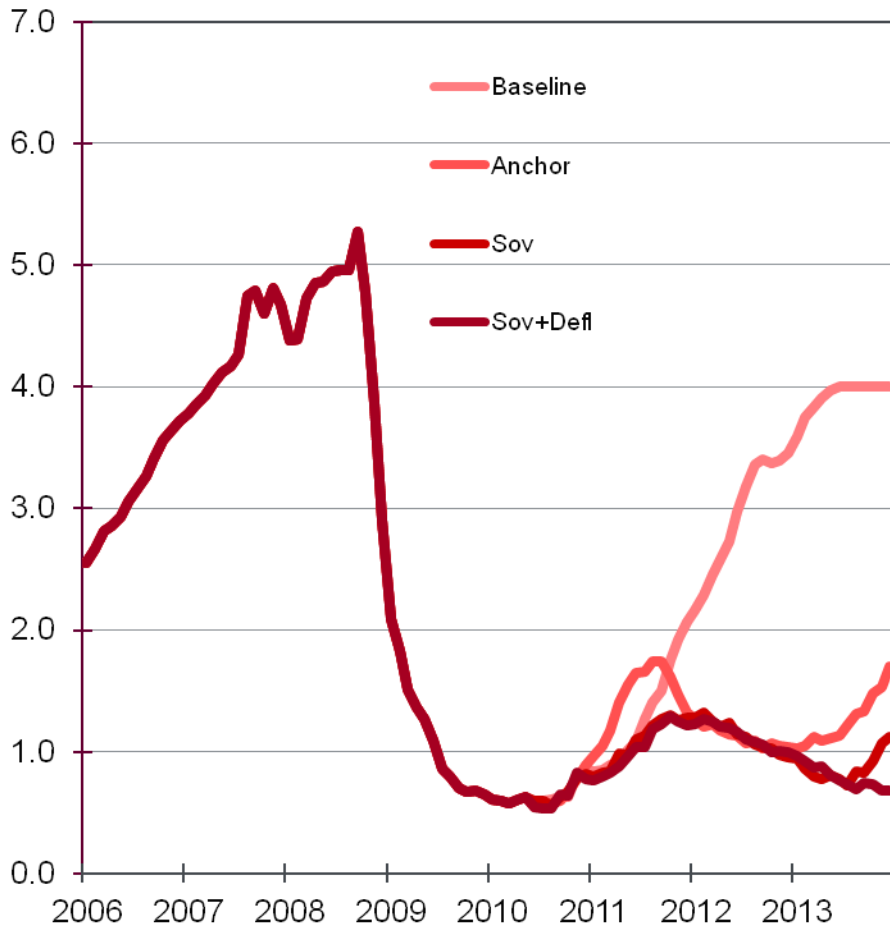
"I think you should be more explicit here in step two."



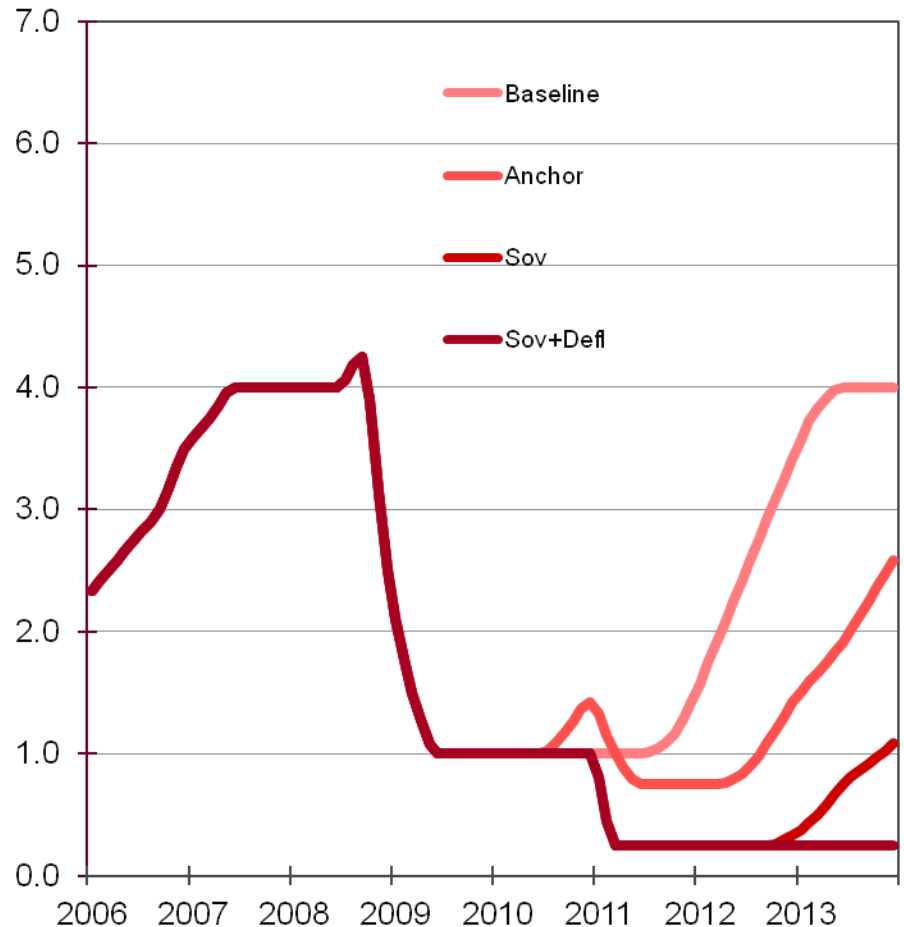


Economic scenario generation and calculation techniques

Financial Models: Money Market Rates



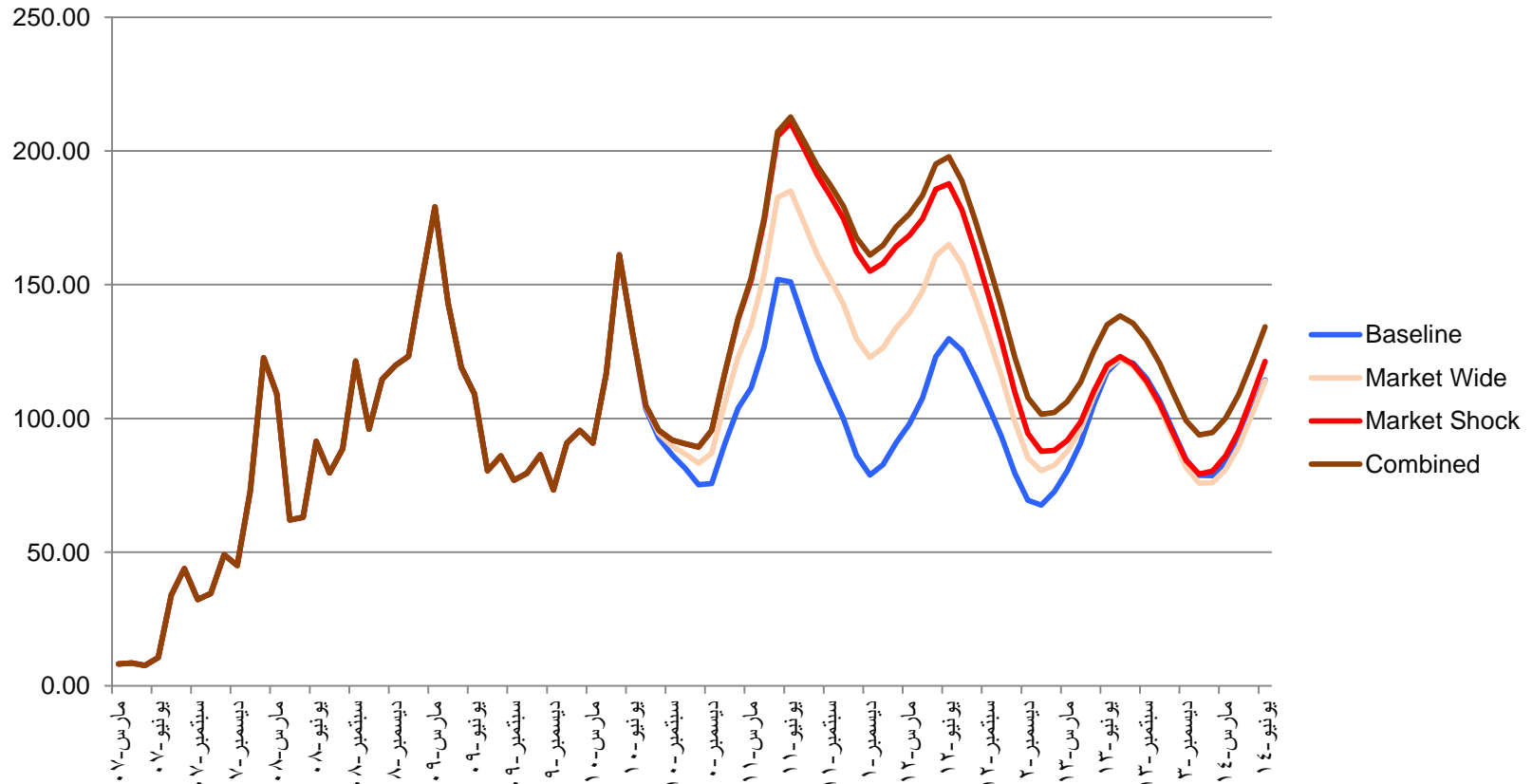
3-month Libor, EUR



ECB policy rate

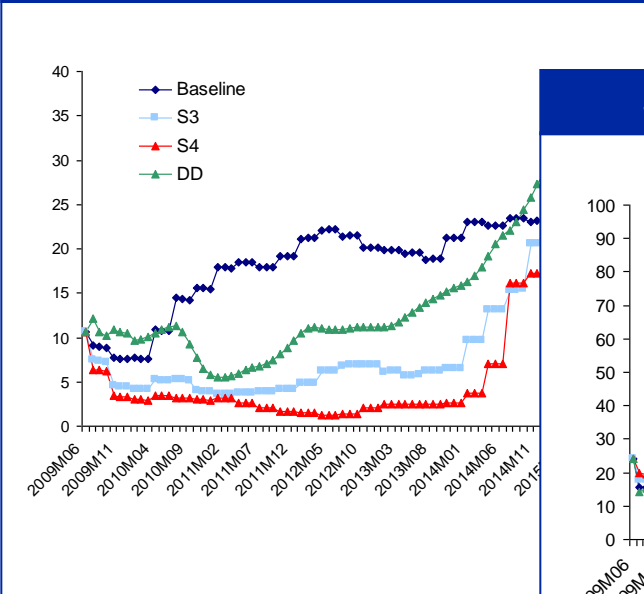
Financial Models: CDS Spreads

Index CDS Spread - Investment Grade Bonds Financial Corporations

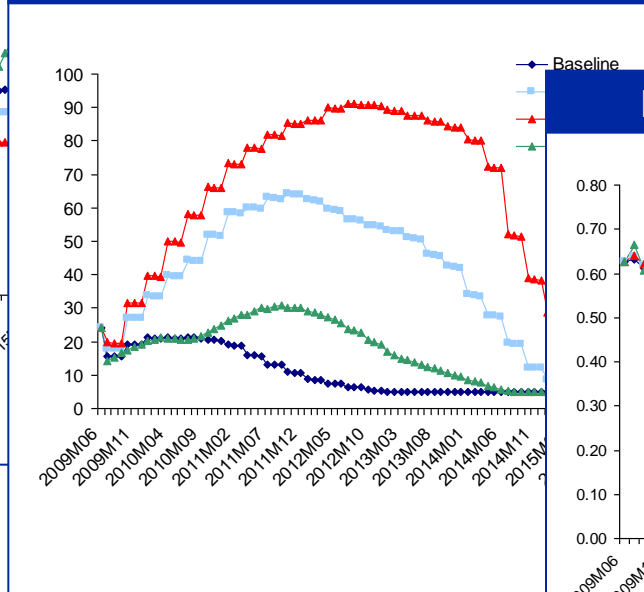


Key Output Vectors of Econometric Model

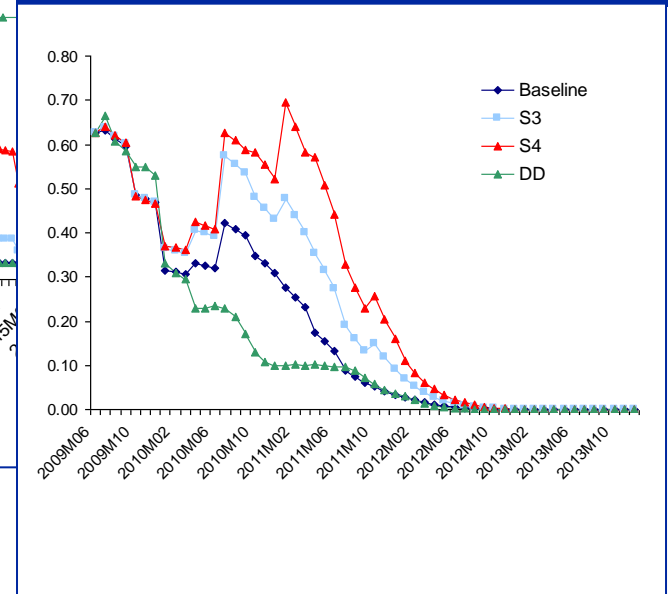
Constant Prepayment Rate (CPR)



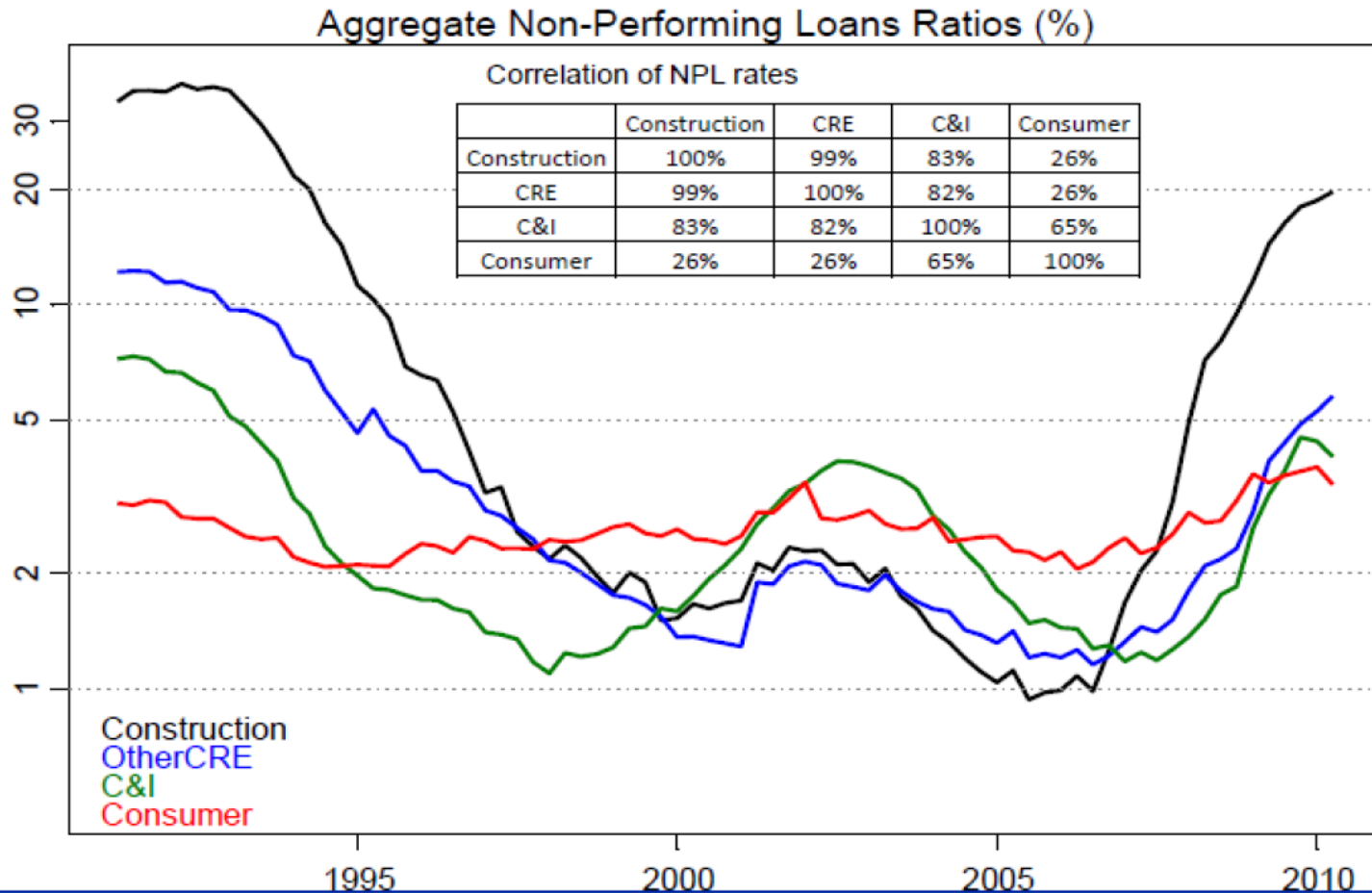
Severity of Losses (LGD)



Probability of Default (PD)



All asset classes are correlated: Importance of measuring correlations & concentrations



Sovereign Correlations by Geographic Proximity

Classification

AuNZ - Austr + New Zealand EEu - Eastern Europe NEu - Northern Europe
 DEAs - Developed East Asia (Japan + HK) LA - Latin America SEu - Southern Europe
 EEAs - Emerging East Asia MEAf - Middle East and Afr. WEu - Western Europe

Average Correlations (Equal Weights), Values Above 60% Highlighted

	AuNZ	DEAs	EEAs	EEu	LA	MEAf	NEu	SEu	USA	WEu
AuNZ	72.9% <small>Corr(Au,NZ)</small>									
DEAs	43.9%	42.2%								
EEAs	48.3%	48.9%	73.7%							
EEu	47.4%	46.4%	54.9%	67.5%						
LA	41.1%	43.7%	63.3%	52.4%	60.3%					
MEAf	44.9%	45.1%	68.6%	59.5%	63.4%	67.2%				
NEu	43.7%	31.6%	35.9%	41.4%	30.7%	31.6%	39.9%			
SEu	49.7%	42.4%	53.2%	59.4%	51.0%	57.9%	40.5%	73.6%		
USA	40.2%	26.4%	39.4%	38.6%	29.6%	35.1%	42.9%	40.4%	100.0%	
WEu	47.0%	35.2%	47.8%	53.3%	41.7%	47.2%	45.8%	58.1%	47.1%	60.6%
Overall Mean	45.8%	43.0%	56.5%	54.5%	52.0%	57.0%	37.5%	54.1%	37.6%	48.5%

Observation: Average correlations above 60% - (1) within and among EEAs, LA, MEAf, (2) within EEu, (3) within SEu, (4) within WEu, (5) Au-NZ

European Contagion Banking/Corporates

Default correlations
ranges: 0.2% - 15%

		<u>Greece</u>		
Greece, Bank	Eurobank	14 %		
Italy, Bank	Intesa San Paolo	7%	4%	National Bank of Greece
Spain, Bank	Banco Pastor	11 %	6.5%	Intesa San Paolo
France, Oil & Gas	Total SA	2%	1.5%	Banco Pastor
Portugal, Bank	Banco Espirito Santo	10 %	1.3%	Total SA
Spain, Telephone	Telefonica	2.5 %	1.7%	Banco Espirito Santo
Italy, Automotive	Fiat	10 %	1.6%	Telefonica
Germany, Phamaceuticals	Bayer AG	1.7%	1%	Fiat



Managing the Basel III ratios

Two effects of the prepayment option

The borrower's option to prepay results in two adverse effects to the lender:

1. Loss of potential income – when the borrower prepays in favorable credit states

Captured by the option spread component of the FTP

2. Asset-liability mismatch – the funding cost is quoted for a fixed maturity loan whereas the client loan can terminate prematurely

Captured by the funding liquidity component of the FTP

Funding cost: computing spread in a one-period model

Borrower	Cash Flow to Bank Shareholder
ND	$1+r_{Borrower}-1$
D	$(1-LGD_{Borrower})-1$

$$V_{BankShareholder} = \Pr^Q \{ ND_{Borrower} \} (1+r_{Borrower}) + \Pr^Q \{ D_{Borrower} \} (1-LGD_{Borrower}) - 1$$

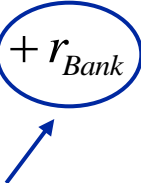
break even rate $\longrightarrow r_{Borrower} \approx PD_{Borrower}^Q \cdot LGD_{Borrower}$

Funding cost: what if the bank faces default risk?

Bank	Borrower	Cash Flow to Shareholder
ND	ND	$(1+r_{Borrower})-(1+r_{Bank})$
ND	D	$(1-LGD_{Borrower})-(1+r_{Bank})$
D	ND or D	0

$$V_{BankShareholders} = \Pr^Q\{ND_{Bank}\} \left[\begin{array}{l} \Pr^Q\{ND_{Borrower}\}(1+r_{Borrower}) + \\ \Pr^Q\{D_{Borrower}\}(1-LGD_{Borrower})-(1+r_{Bank}) \end{array} \right]$$

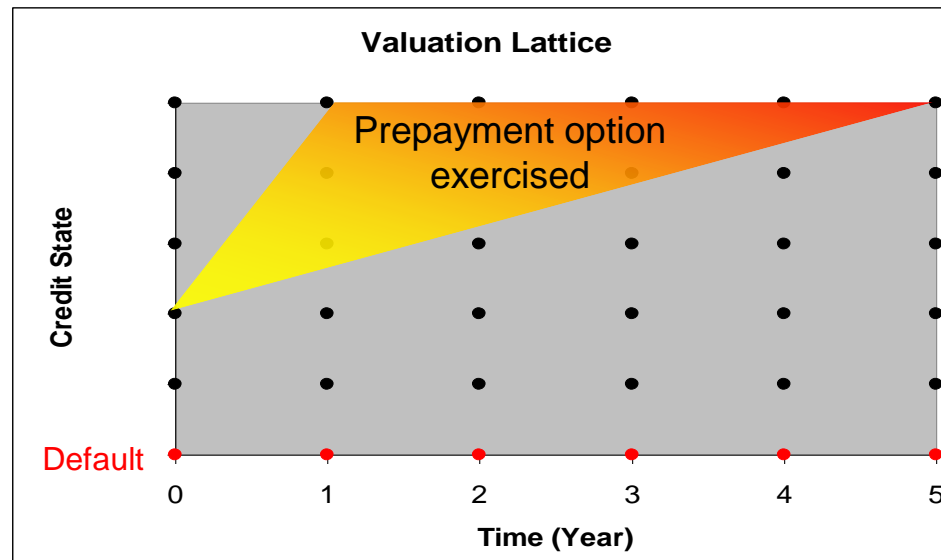
break even rate $\longrightarrow r_{Borrower} \approx PD_{Borrower}^Q \cdot LGD_{Borrower} + r_{Bank}$



Funding liquidity premium (captured by the funding cost) is encapsulated in the client rate

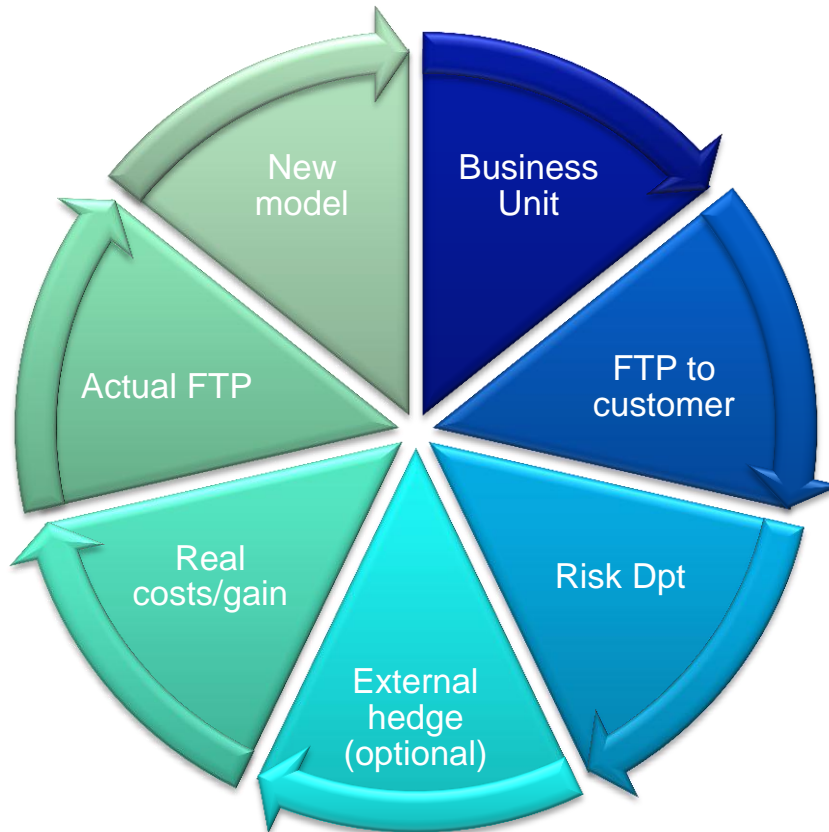
Multi-period setting: prepayment option

- In general, a pre-payable loan should have a higher fee to offset the value of the option – a prepayment premium.
- With the funding liquidity premium priced in, the likelihood of prepayment increases.
- The lattice valuation model facilitates the modeling of credit-contingent cash flows, which include loan prepayment, dynamic utilization of revolving lines, and grid pricing.



Overview of the FTP process

Using the stress test scenarios



SCENARIO	
BL	Baseline Current
S2	Deeper Recession Weaker Recovery
S3	Prolonged Credit Squeeze Very Severe Recession
S4	Complete Collapse Depression

MoodysEconomy.com scenarios



Conclusion

Next steps

- Liquidity Risk has been underestimated in many countries
- Basel III provides an efficient framework for liquidity management
- Include Senior management in the project
- Reconcile P&L and risk and having a longer term strategy



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Regulatory Capital Management & Reporting: The Impact of Basel III

Agenda

1. **Summary of key changes under Basel III and their impact**
2. **Focus on Enterprise Risk Management**

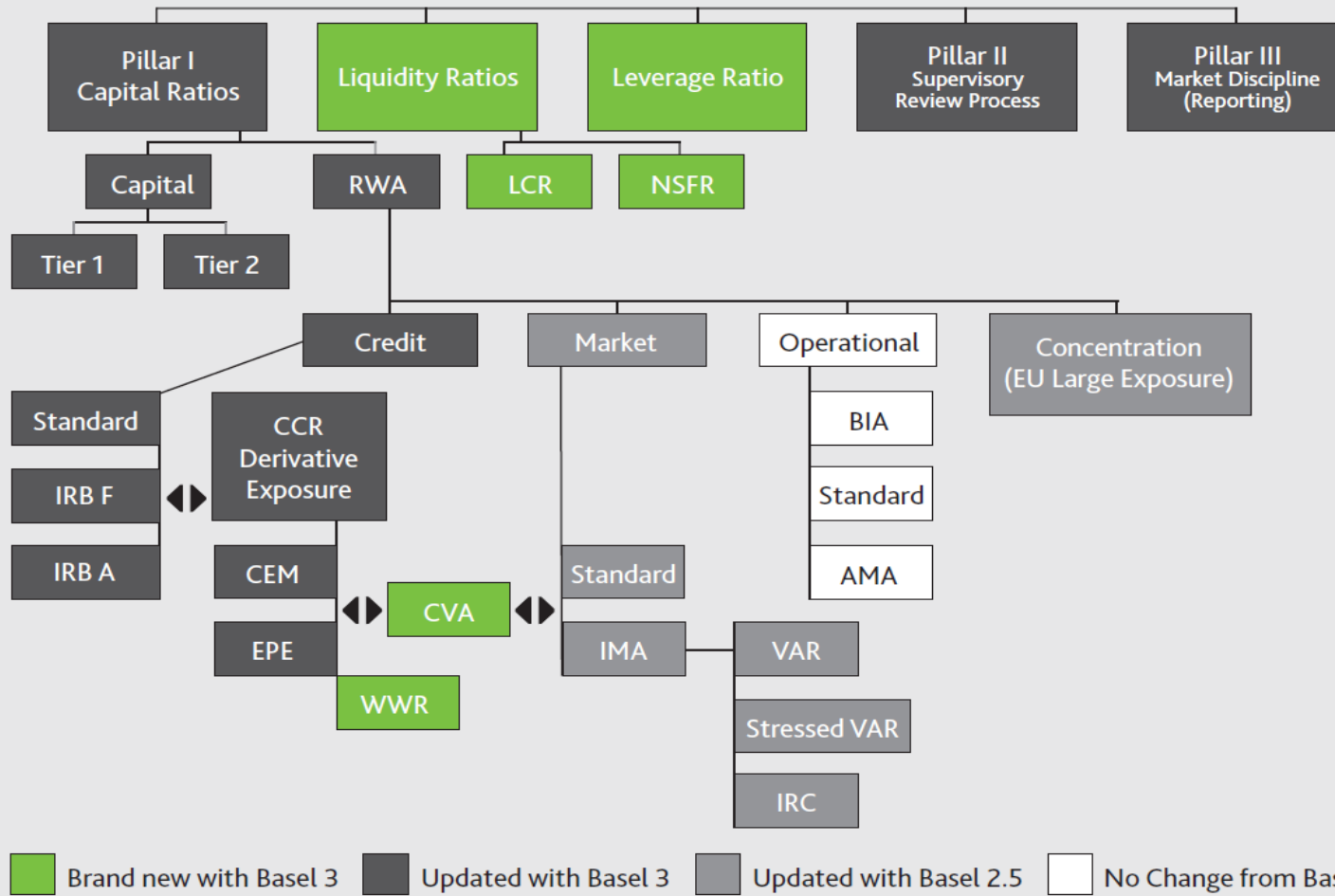
Agenda

- 1. Summary of key changes under Basel III and their impact**
2. Focus on Enterprise Risk Management

Basel III...

- » More information and the need for greater transparency
- » Focus on strengthened capital buffers, stronger risk management and governance practices, etc.
- » Spotlight on structured credit and off-balance sheet activity
- » Spotlight on liquidity risk
- » Counterparty credit risk – market risk
- » Leverage
- » Countercyclical measures
- » Attention to macro-prudential supervision

Basel III - Framework



Implementation progress?

1 = draft regulation not published; 2 = draft regulation published; 3 = final rule published; 4 = final rule in force.

Per BIS, as of end September 2011:

» *Status of Basel II adoption*

- USA = 4, Canada = 4, EU (inc UK) = 4, Japan = 4, China = 4, Singapore = 4
- **Saudi Arabia; 4 = final rule in force... implementation completed**

» *Status of Basel 2.5 adoption*

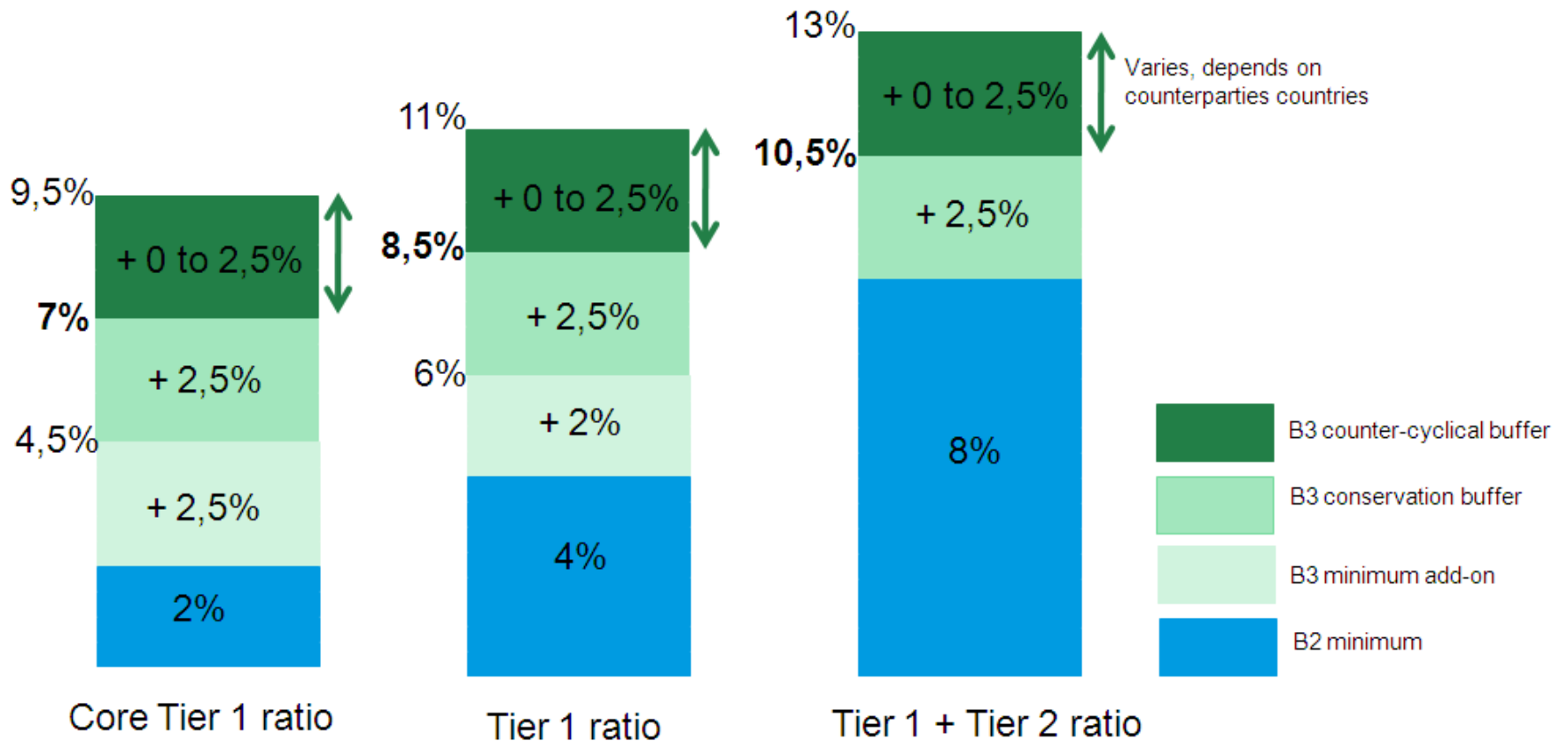
- USA = 1/2, Canada = 2, EU (ex UK) = 4, UK = 2, Japan = 3, China = 4, Singapore = 3/4
- **Saudi Arabia; 3 = final rule published**

» *Status of Basel III adoption*

- USA = 1, Canada = 1, EU (inc UK) = 2, Japan = 1, China = 2, Singapore = 1
- **Saudi Arabia; final regulation issued to banks, i.e. 3 = final rule published ... the most advanced**

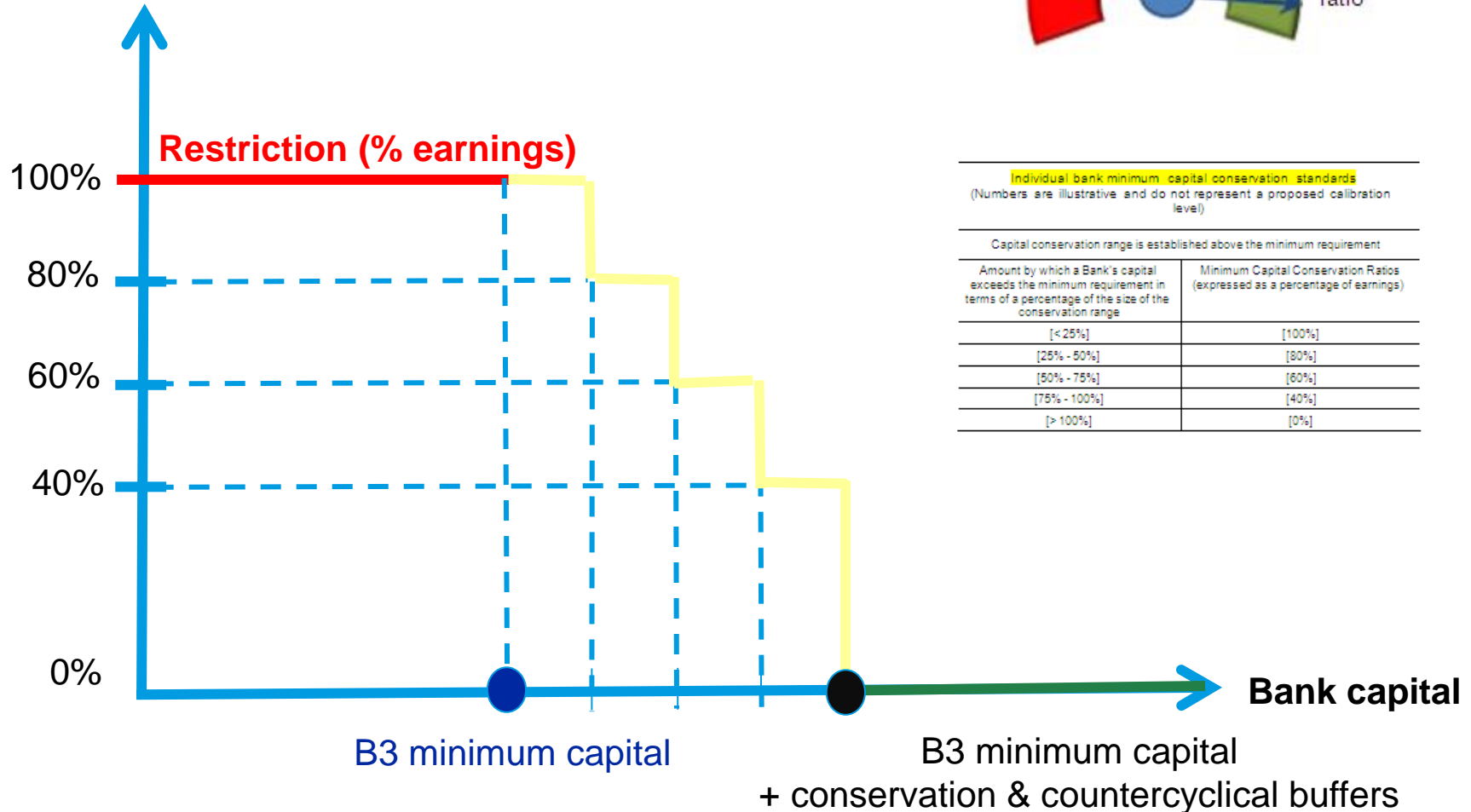
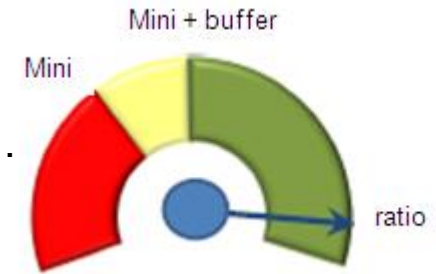
Basel II vs Basel III capital ratios

Plus additional capital ratio buffer for SIFIs (G-SIB)



Restriction on earnings distribution

Restriction on dividends, compensation bonuses, equity buy back ... if capital ratios do not exceed minimum + buffers



G20 G-SIBs named

Bank of America
Bank of China
Bank of New York Mellon
Banque Populaire CdE
Barclays
BNP Paribas
Citigroup
Commerzbank
Credit Suisse
Deutsche Bank
Dexia
Goldman Sachs
Group Crédit Agricole
HSBC
ING Bank

JP Morgan Chase
Lloyds Banking Group
Mitsubishi UFJ FG
Mizuho FG
Morgan Stanley
Nordea
Royal Bank of Scotland
Santander
Société Générale
State Street
Sumitomo Mitsui FG
UBS
Unicredit Group
Wells Fargo

Source: Financial Stability Board 04.11.11

- » G20 endorsed a **core T1 capital requirement surcharge starting at 1%** of risk-weighted assets and **rising to 2.5 percent** for the biggest banks (plus an empty bucket of 3.5% CET1 as a means to discourage banks from becoming even more systemically important) -- to be phased in over three years from 2016; capital categories to be outlined from November 2012
- » The banks will also have to meet ***resolution planning requirements ("living wills") by end-2012*** (National authorities can extend this requirement to other banks at their discretion)

Increasing capital for Counterparty Credit Risk

- » Additional capital charge to cover CVA for OTC derivatives (and possibly SFTs)
 - Standardized approach formula defined (closed function)
 - Credit Derivatives can be used to hedge such charge
 - Internal Model can also be used integrating CVA in EPE model

- » Increased IRB RWA for exposures toward large financial institutions (e.g. banks, insurance companies) and unregulated ones (e.g. hedge funds)
 - Asset Value Correlation factor multiplied by 1.25 in IRB risk weighting function

- » New haircuts defined for securitization products used as collateral

Increasing capital for Counterparty Credit Risk, cont.d

- » More strict capital deductions rules (e.g. deduction from Core Tier 1)
 - ⇒ Incentive to reduce OTC activities and to go through clearing houses
- » But exposures to “Qualifying” Central Counterparties -CCP- (e.g. clearing houses) not risk free anymore (2% Risk Weight proposed)
- » Capital requirements for clearing members contribution to CCPs defaults funds based on the CCP “hypothetical” regulatory capital

Compliance Starting from 2013 – The Pressure is On!

Full Compliance Required

» Capital

- 2013 – Counterparty Credit Risk
- 2015 – Minimum Core Tier 1 Ratio
- 2018 – Capital deductions
- 2019 – Conservation buffer

» Leverage

- 2018 – Leverage Ratio

» Liquidity

- 2015 – Liquidity Coverage Ratio
- 2018 – Net Stable Funding Ratio

Annex 4										
Phase-in arrangements										
(shading indicates transition periods - all dates are as of 1 January)										
	2011	2012	2013	2014	2015	2016	2017	2018	As of 1 January 2019	
Leverage Ratio	Supervisory monitoring		Parallel run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015					Migration to Pillar 1		
Minimum Common Equity Capital Ratio			3.5%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%	
Capital Conservation Buffer						0.625%	1.25%	1.875%	2.50%	
Minimum common equity plus capital conservation buffer			3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%	
Phase-in of deductions from CET1 (including amounts exceeding the limit for DTAs, MSRs and financials)				20%	40%	60%	80%	100%	100%	
Minimum Tier 1 Capital			4.5%	5.5%	6.0%	6.0%	6.0%	6.0%	6.0%	
Minimum Total Capital			8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	
Minimum Total Capital plus conservation buffer			8.0%	8.0%	8.0%	8.625%	9.25%	9.875%	10.5%	
Capital instruments that no longer qualify as non-core Tier 1 capital or Tier 2 capital			Phased out over 10 year horizon beginning 2013							
Liquidity coverage ratio	Observation period begins				Introduce minimum standard					
Net stable funding ratio	Observation period begins							Introduce minimum standard		

BUT....continuing uncertainty

- » Local rules / interpretation
 - E.g. Dodd Frank, G-SIBs, EBA, UK Independent Commission on Banking
 - E.g. Pillar II negotiations
 - E.g. BIS reviews

- » E.g. Global bank regulators eased parts of bank-capital rules to counter concerns from lenders that the measures may harm international trade:
 - The BCBS waived some rules on the reserves lenders must hold against guarantees for importers and exporters... so as to protect growth in emerging markets (October 2011)

- » Basel IV...

Agenda

1. Summary of key changes under Basel III and their impact
- 2. Focus on Enterprise Risk Management**

Basel III Top 10 Implementation Challenges

Convergence Between Risk and Finance

- New liquidity ratios
- Integrated liquidity and risk data sourcing, consolidation and management

Streamlined and Integrated Regulatory Reporting

- Increased urgency (some reports starting 2013) and depth (need for data granularity)
- Regional regulatory gold plating

Single Data Source for Capital and Liquidity Risk

- Single data source to feed calculations and regulatory reports prevents mismatch errors downstream
- Banks need Basel III credit risk data to compute the new Basel III liquidity risk ratios

Increased Regulatory, Board and Shareholder Pressure

- Internal pressure to understand and improve – shareholders, C-suite, Non-Executive Directors (NEDs) and other stakeholders
- Political uncertainty

Holistic Stress Testing

- Define and run scenarios across risk types

Basel III Top 10 Implementation Challenges (Continued)

Regulatory Uncertainty

- Regulations are still being defined
- What will be the Dodd Frank impact
- Timing

Multi-Jurisdictional Compliance

- Calculations and reporting with different national discretion options

Trading Book Market Risk and CCR Requirements (for IMM)

- Enhancing existing VAR for new 10 day VAR and stressed VAR requirements, IRC to be added
- Enhancing EPE solutions to meet new requirements

Pressure to Reduce Capital Requirements and Increase Returns

- RWA optimization
- Internal pressure to improve operational efficiency

“Hypothetical” Capital Computation by CCPs

- Clearing members will need to capitalize their share of default funds

A direct impact on banks' profitability

- » Risk-adjusted return on capital (RAROC) is falling
 - The regulator requires more capital for each transaction
 - The cost of capital is higher due to the markets' risk aversion
 - » Market conditions are not conducive to higher margins on transactions
 - » Optimise use of available capital:
 - By refining models that affect RAROC (PD, LGD, FTP, etc.)
 - By analysing transactions ex-ante (profitability at origin)
 - By optimising regulatory calculations (IRBA, EPE, CRM allocation, etc.)
 - By giving management and business lines the indicators needed to steer the business in a very precise and more steady manner (selecting the best segments/customers/products, adapting prices)
- Need to integrate Business/Risks and Finance/Risks**

Solution: Flexible & Adaptable Infrastructure

Centralisation of business line/accounting data:

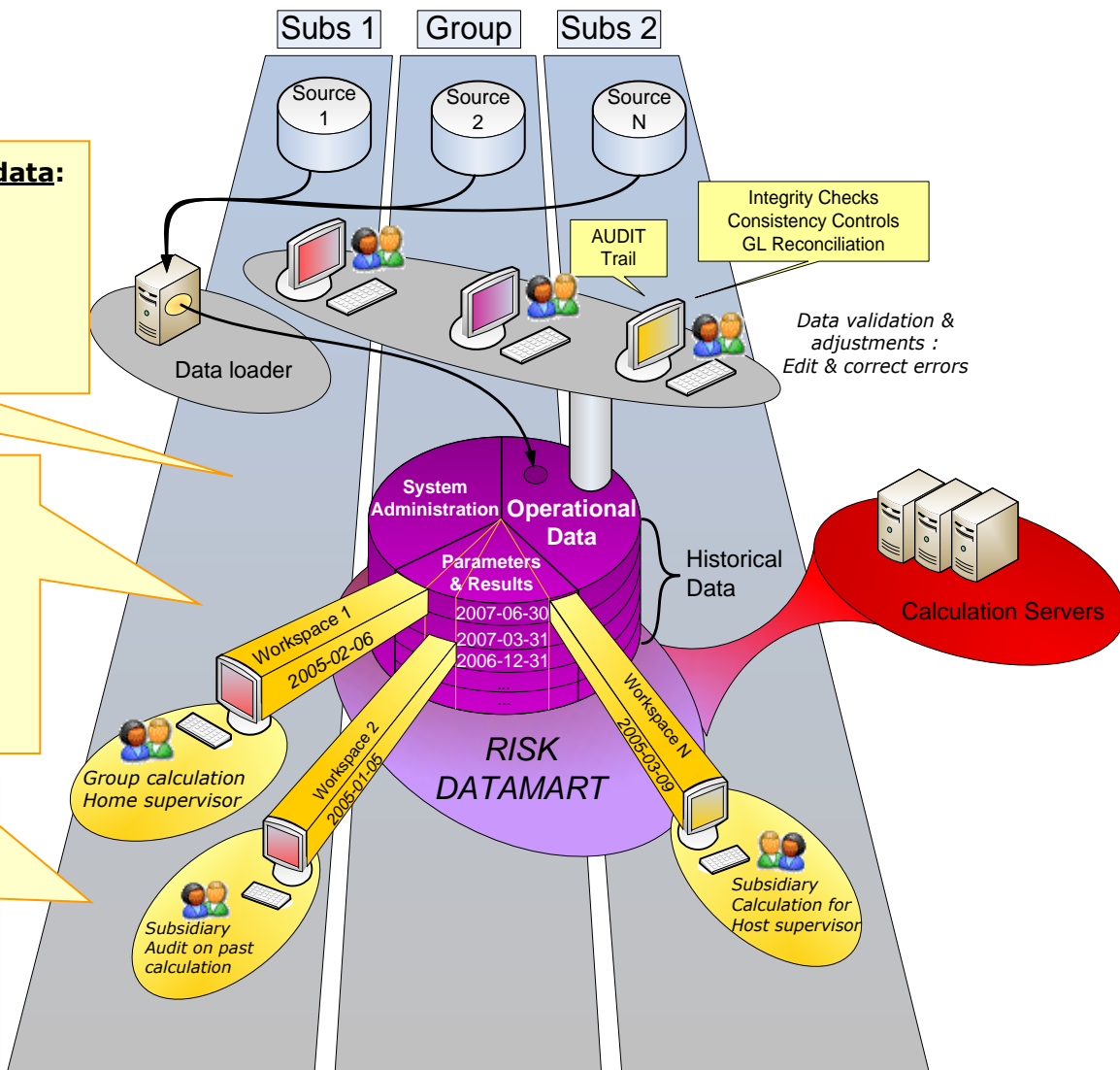
- ✓ Recording
- ✓ Loading, validating, reconciling
- ✓ Instrument modelling
- ✓ Client/product granular information

Calculation architecture enabling:

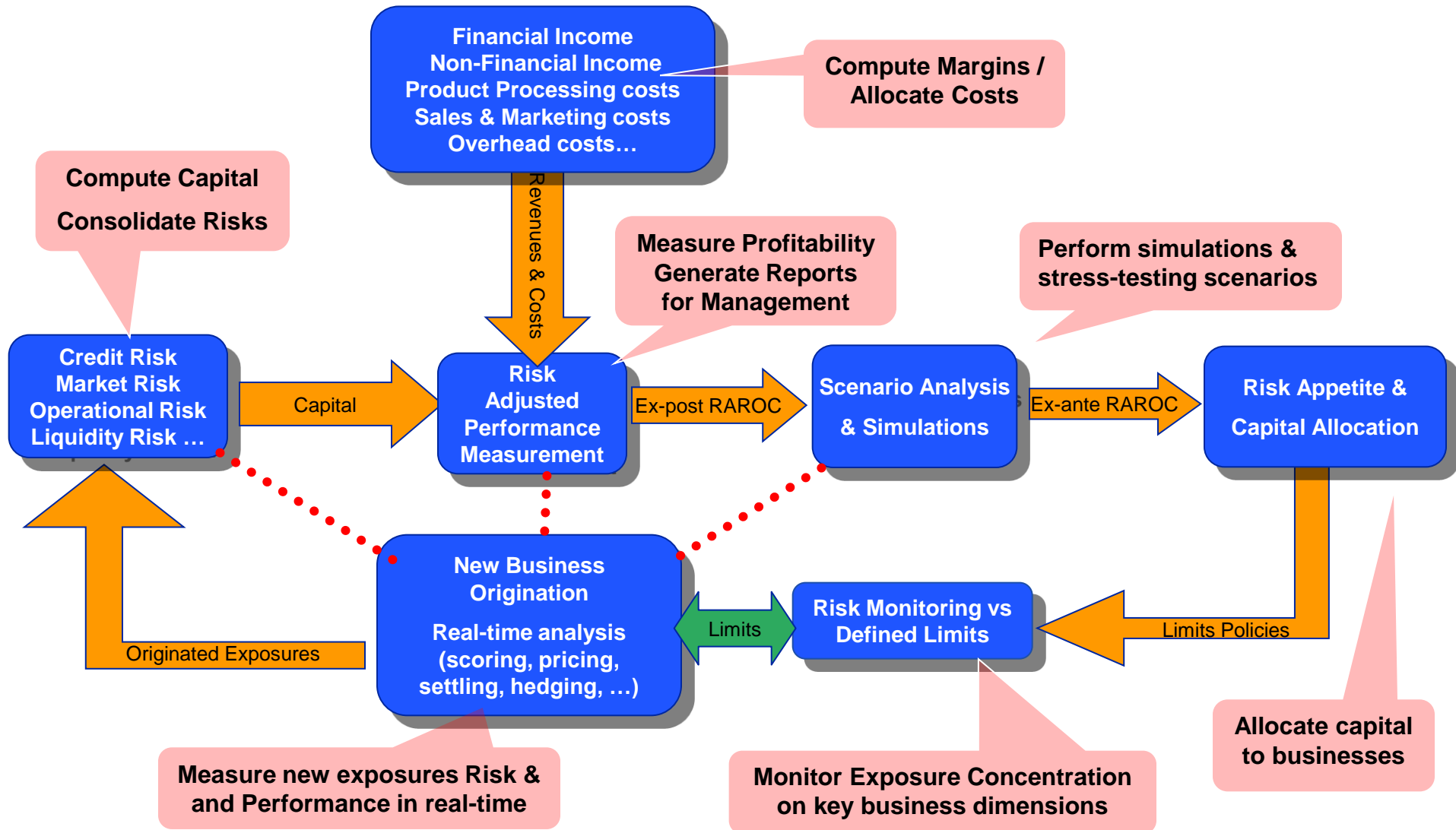
- ✓ Group/Subsidiary access
- ✓ Multi-regulations (home/host)
- ✓ Integration of internal models
- ✓ Support for stress testing
- ✓ Granularity of results

Reporting architecture offering:

- ✓ Regulatory reports by level of consolidation, by country and by date
- ✓ Drill-down of results analysis
- ✓ Summary reports for management (trend analyses, comparison of scenarios, dashboards)



Delivering an ERM Architecture



The benefits of Enterprise Risk Management

- » No "stop-gap" effect when implementing regulations
 - Avoids endless reconciliations between different "versions of the truth"
 - Puts focus on the key issues when making changes
 - Accelerates the creation of value by using what is currently in place

- » Offers benefits in terms of enterprise management
 - Risk/Reward analysis and stress tests on an industrial scale
 - Responsive to market fluctuations and one-off events
 - Very quick alignment of businesses to strategic decisions
 - Easier capital reallocation between business lines
 - Effective management of P&L related performance indicators
 - Better visibility for investors and rating agencies

Conclusions

- » Regulatory change continues apace
- » The cost is high... The opportunity cost is also potentially huge
- » ERM is the opportunity at stake

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Prayer Time & Refreshment Break

ICAAP / Economic Capital Management: Is this still relevant?

Agenda

Three questions:

1. Why bother?
2. Should the emphasis within Pillar 2 now change?
3. Can this be turned to competitive advantage?

Agenda

ICAAP/Economic Capital Management

1. Why bother?

Even banks perceived as leaders in risk management failed in the downturn...

Why bother?

- » A short history of Basel

A brief history of Basel regulations

Regulation issued →

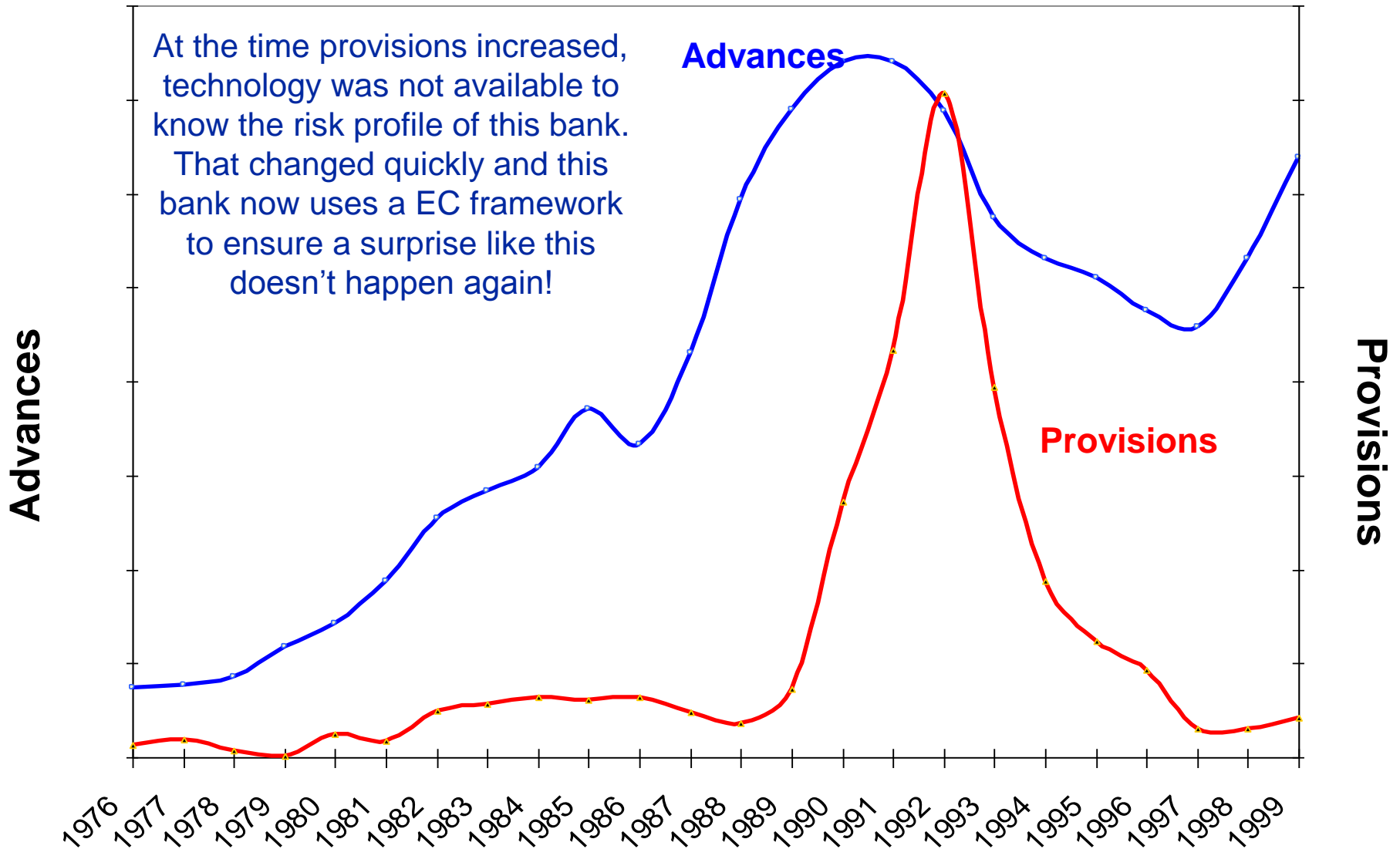
Jul 1988
Basel I
issued



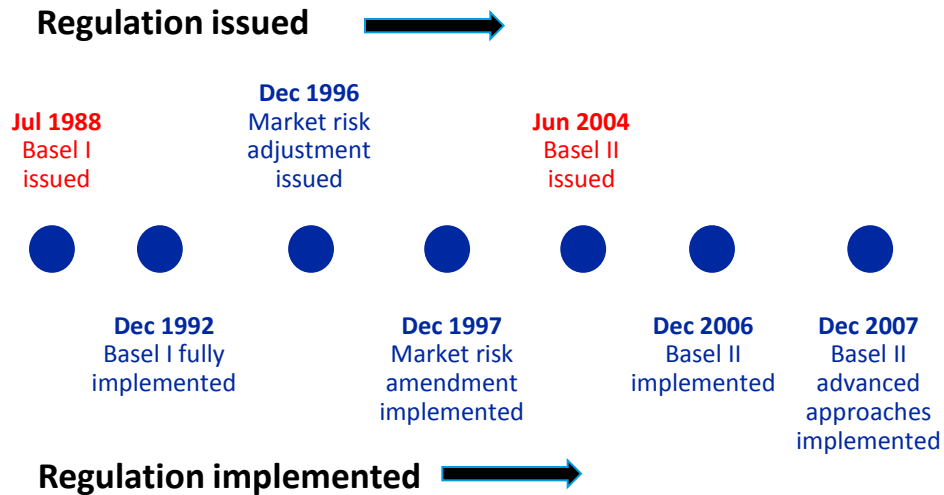
Dec 1992
Basel I fully
implemented

Regulation implemented →

Motivation for implementing Economic Capital



A brief history of Basel regulations



Why bother?

- » A short history of Basel
- » What went wrong

What went wrong...

- » Minimum target return on equity: e.g.15%
 - Unadjusted for risk?
- » What is the mindset at the helm of most important global banking institutions?
 - Leverage rules?

“Return on equity is the wrong target. Over the past 10 to 15 years it has helped to make many bankers rich and loyal shareholders poor. Moreover, it prompts banks to fight to keep loss absorbing capital low. This makes their enterprises vulnerable and our financial system fragile.”

Robert Jenkins, Member of the Financial Policy Committee of the Bank of England

Why bother?

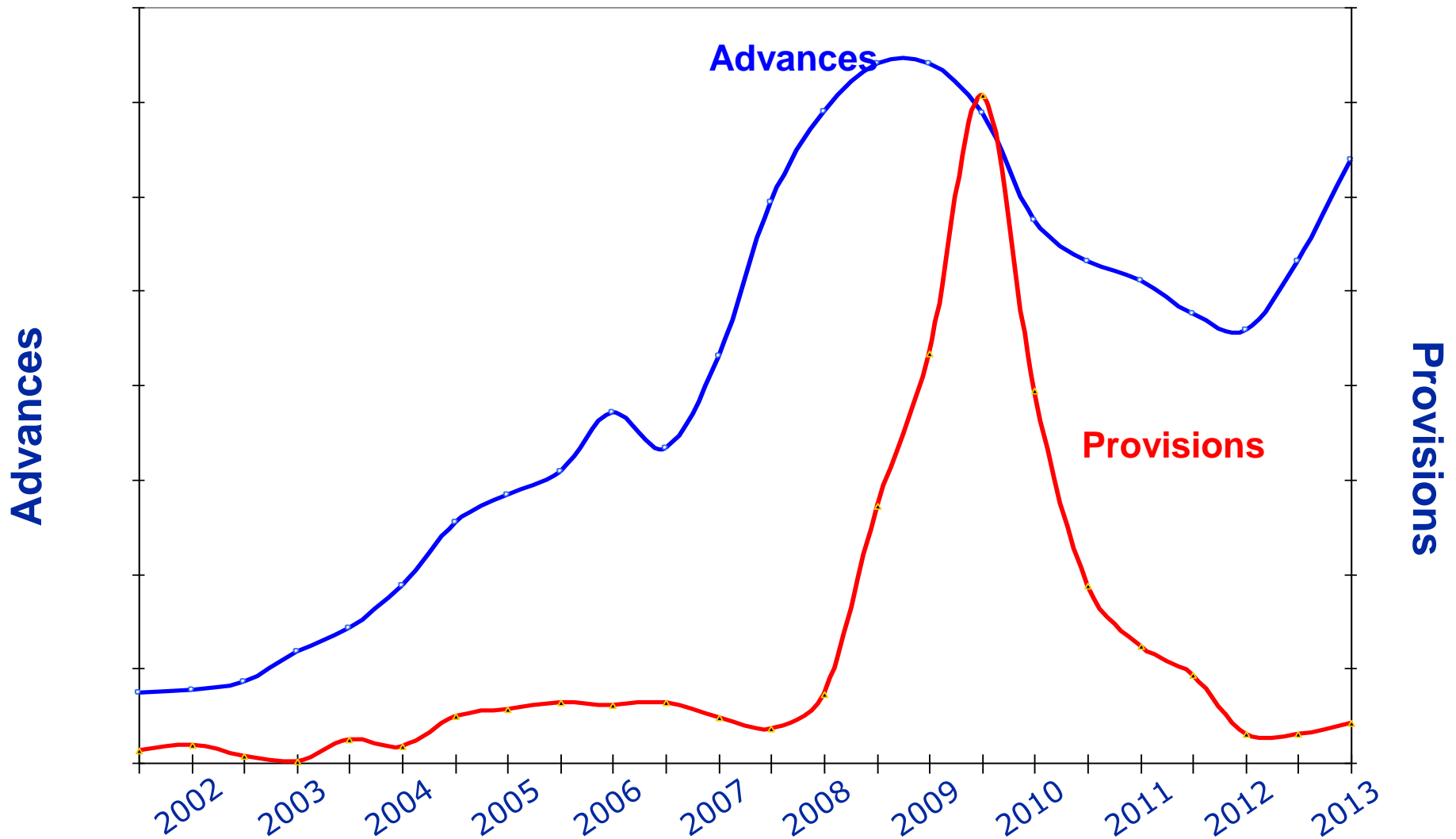
- » A short history of Basel
- » What went wrong
- » ...is this banking reality?

Reality.....

Bank Defaults in Asia, Europe and the Americas 1987-2007

HOKKAIDO TAKUSHOKU BANK LTD (THE)	NIPPON CREDIT BANK	BANCO RIO DE LA PLATA S.A.
HYOGO BANK	GOTA AB	BBVA BANCO FRANCES SA
SEOUL BANK	HAMBRO (GROUP) PLC	BANCO HIPOTECARIO SA
ASHIKAGA FINANCIAL GROUP INC	EB HYPOBANK BURGENLAND	CORPORACION FINANCIERA DEL VALLE S. BANCO LATINO
TOKYO SOWA BANK LIMITED (THE)	SAAMBOU HOLDINGS LIMITED	BANCO ECONOMICO
TMB BANK PCL	GONTARD & METALLBANK AG	KRUNG THAI BANK PUBLIC COMPANY LIM
BANK OF AYUDHYA PCL	ESBANK ESKISEHIR BANKASI T.A.S	KYUNGKI BANK LTD
TAIHEYO BANK LTD	BANCO ESPANOL DE CREDITO	CITYTRUST BANCORP INC
NIIGATA CHUO BANK	CHRISTIANA BANK	SIAM CITY BANK PCL
DONG HWA BANK	FIRST REPUBLICBANK CORP	GADEK CAPITAL BERHAD
BANGKOK BANK OF COMMERCE PCL	BANK OF NEW ENGLAND CORP	CALIF FEDERAL BANK
TOKUYO CITY BANK LTD	MCORP	GLENDALE FED BK FSB/CA
HANWA BANK	FIRST CITY BANCORP OF TX	LINCORP HOLDINGS INC
FIRST BANGKOK CITY BNK PCL	SOUTHEAST BANKING CORP	CENTRAL GUARANTY TRUST
BANGKOK METROPOLITAN BANK PCL	FIRST CITY BANCORP OF TX	AMER CAPITAL CORP
BANK DAGANG NASIONAL INDONESIA	TEXAS AMERICAN BANKSHARES	NEW VALLEY CORP
STANDARD CHARTERED NAKORNTHON BANK	EQUIMARK CORP	APLUS COMPANY LIMITED
TAITUNG BUSINESS BANK	NATL BANCSHARES CORP TX	FIRSTPLUS FINANCIAL GROUP
GLOBAL TRUST BANK LIMITED	LIBERTY BANCORP INC	MFN FINANCIAL CORP
CREDIT LYONNAIS	HAMILTON BANCORP	AMER BUSINESS FINL SVCS INC
RESONA HOLDINGS	BANCO DE GALICIA Y BUENOS AIRES	NICHIBOSHIN, LTD.
SHINSEI BANK		

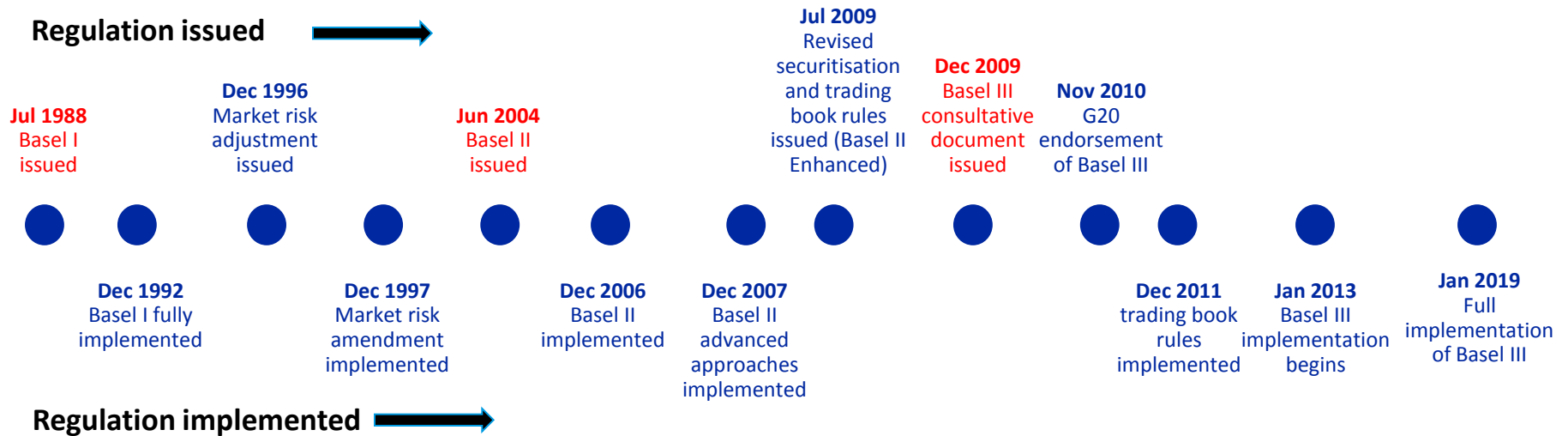
Déjà Vu: which banks in the Gulf?



Why bother?

- » A short history of Basel
- » What went wrong
- » ...is this banking reality?
- » And the Basel III opportunity?

A brief history of Basel regulations



Regulatory burden, or business opportunity?

- » Is there regret?
- » \$100m?
- » Operational investment?

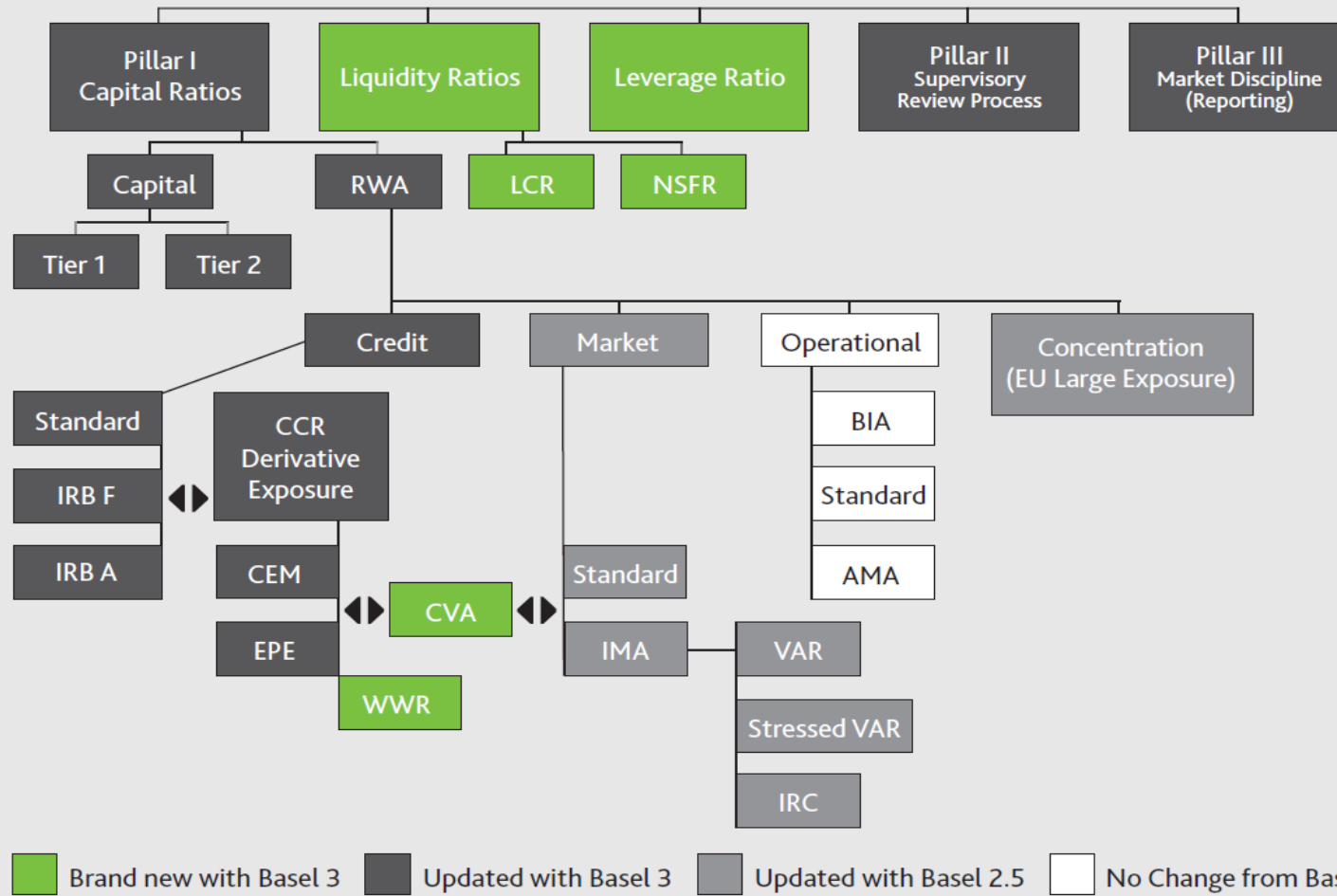
- » Sustainability (idiosyncratic & systematic)
- » Shareholder value

Agenda

ICAAP/Economic Capital Management

1. Why bother?
2. Should the emphasis within Pillar 2 now change?

Basel III - Framework



Pillar 2 Purpose

To:

- » Ensure a firm holds internal capital that is consistent with its risk profile and strategies
- » Encourage firms to develop and use **better** risk management techniques in monitoring and managing their risks
- » Focus on risks not fully captured under Pillar 1, e.g. credit concentration risk
- » Direct supervisors to review firms' processes and strategies, to determine appropriate prudential or other measures, if weaknesses or deficiencies are identified

Capital is not a substitute for strong and effective risk management and internal control processes

Basel's ICAAP requirements can be leveraged to define a best in class risk management framework

Basel 2: Capital accord

Pillar 1: Minimum capital requirements

- Minimum capital requirements:
 - Credit risk IRB
 - Market Risk
 - Operational risk

Pillar 2: Capital adequacy and supervisory review

- Supervisory assessment of the amount of capital considered necessary to cover Pillar 1 risks and Risks not included under Pillar 1

ICAAP

- The firm's own assessment of capital needs
- Calculated by reference to regulatory capital
- Key factors for considerations are amount, quality and depth of internal capital that the firm holds, at group & business unit levels, and the mechanisms as to how internal capital is allocated within the firm

Pillar 3: Market discipline

- Improved disclosure

Is Required Regulatory Capital Sufficient?

- » Banks must regularly calculate regulatory capital requirements and ensure that adequate regulatory capital is available to meet those requirements
- » Book and regulatory capital are accounting measures
- » Required regulatory capital even under Basel II can be very different from required internal / economic capital

Is Basel II required regulatory capital sufficient to make good credit origination, pricing and portfolio management decisions?

So then, what *is* Economic Capital?

- » Aggregate amount of equity capital required as a cushion for Unexpected Losses due to credit risks, given the institutions target financial strength
- » Risk is measured *objectively* in terms of economic reality using modeling techniques
- » Provides a *common yardstick* to measure, evaluate, manage, and price a wide range of risks
- » Economic Capital includes the effect of default risk and the changes in customer credit quality through time

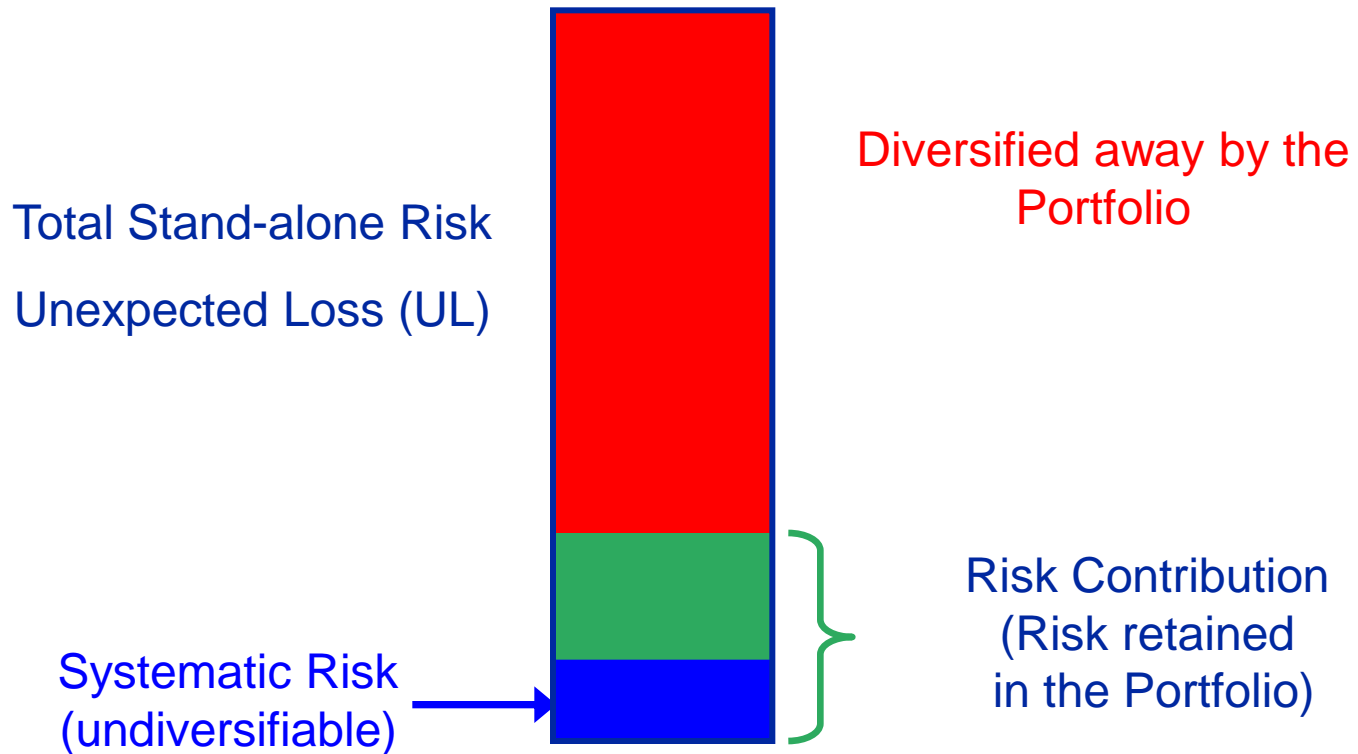
Correlation and.....

- » Banks need a common risk metric for e.g. the loan portfolio
- » Required across all asset classes and types
- » Economic Capital is the catch-all risk metric reflecting
 - *standalone risk*
 - *correlation risk*
 - *concentration risk*
 - *migration risk.....*

What is the right way of thinking about risk?

How do we allocate risk?

- » Portfolio Capital needs to be allocated to exposures to facilitate decision making
- » How should we allocate Portfolio Capital?



Economic Capital usage

Economic Capital is used for a variety of purposes:

- » **Pillar 2 / regulatory reporting**
- » **Capital adequacy assessment**
- » **External reporting (Rating Agencies, the market)**
- » **Strategic planning**
- » **Capital budgeting**
- » **Risk and performance measurement**
- » **Customer profitability analysis**
- » **Limit setting**
- » **Risk-based pricing**
- » **Incentive compensation**

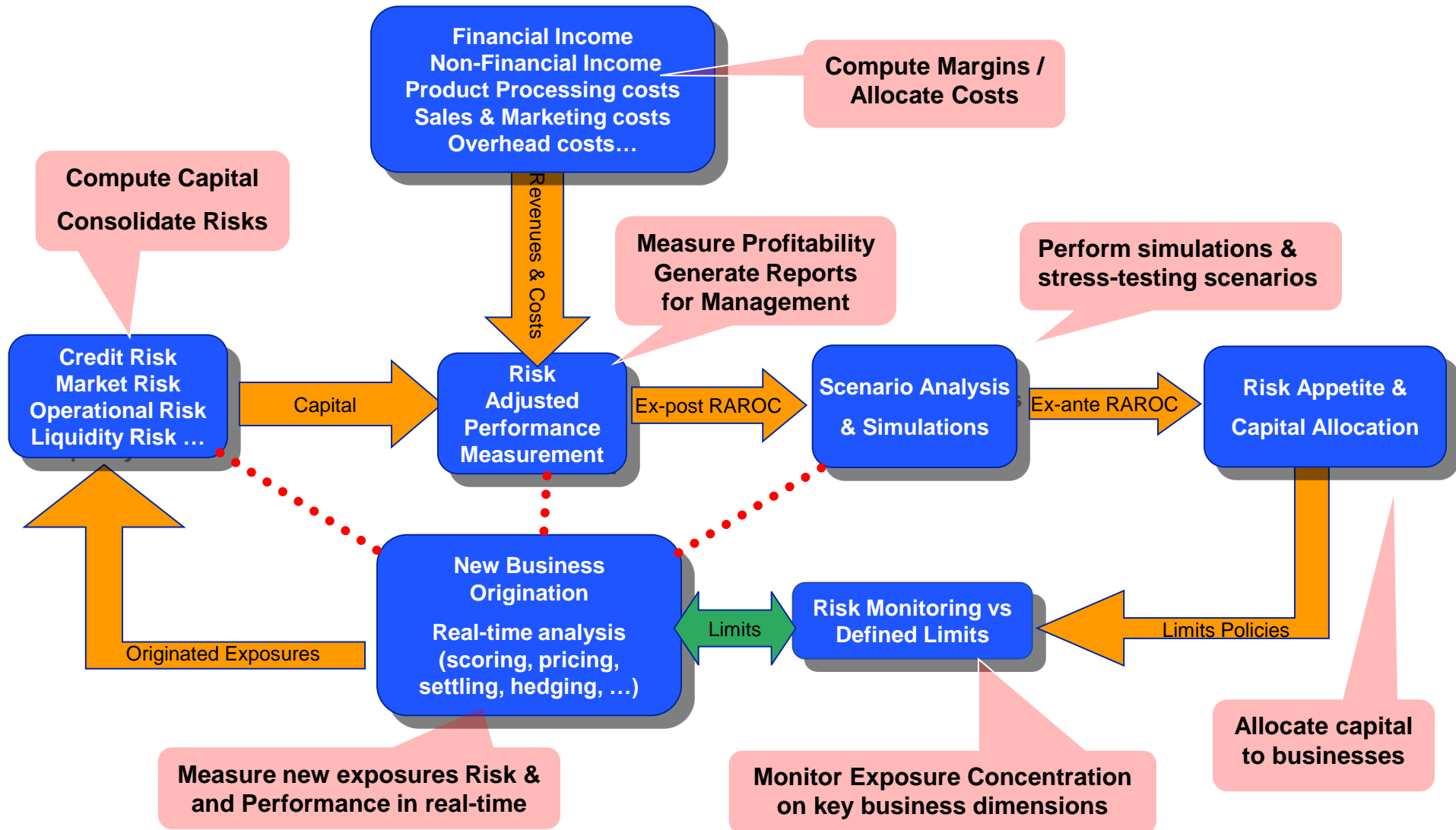
Those Financial Institutions that are calculating EC are more informed about their credit portfolios

Agenda

ICAAP/Economic Capital Management

1. Why bother?
2. Should the emphasis within Pillar 2 now change?
3. **Can this be turned to competitive advantage?**

Is there a silver lining?



An effective framework starts with the definition of risk appetite and establishes the governance to support it

Risk appetite

Risk policy principles

- Prevent conflict of interest
- When in doubt, apply prudence
- Definition of material risks
- Policies for specific risk types



Risk structure

- Relevance of specific risk types
- Distribution of risk concentrations among individual risk types
- Align target risk structure with risk appetite

Credit risk, **Market** Risk (Interest Rate Risk, Foreign Exchange Risk), **Operational** Risk, Settlement Risk, Residual Risk, Securitisation Risk, **Concentration** Risk, Reputation Risk, **Liquidity** Risk

Organization and governance

Assessing Critical Risk Factors

Credit risk	Market risk	Capital risk	Liquidity risk
Operational risk	Fraud risk	IT risk	Key People risk
Regulatory risk	Interest Rate risk	Legal risk	Taxation risk
Strategic risk	Residual risk	Settlement risk	Reputational risk

Source: CEBS CP03 2006

How will value be determined?

- » An opportunity to invest in streamlined operational efficiency;
Reduced costs = increased profitability
- » Reduced provisions / loss volatility
- » More sustainable profits
- » Increased shareholder returns
- » Better external perceptions of the bank's risk management capabilities
 - Reflected in increasing share price
 - Reflected in improved ratings
 - Reflected in increased market share
- » Indirect value
 - e.g. staffing impacts (in and out)

Memories are short...

- » “Despite the severity of the crisis, we are already seeing signs that its lessons are beginning to fade.”*

**Stefan Walter, Secretary General, BCBS
at the Financial Stability Institute, Basel*

6th April 2011

- » “The costs of banking crises are extremely high but, unfortunately, the frequency has been as well. Since 1985, there have been over 30 banking crises in Basel Committee-member countries*. Roughly, this corresponds to a **5% probability of** a Basel Committee member country ***facing a crisis*** in any given year – a one in 20 chance... Many countries ...have been affected by the ***global fall out***”

*(*out of 25 countries, only Saudi Arabia and Canada were observed as being crisis free)*

“Those who cannot remember the past, are condemned to repeat it”

George Santayana

Regulation:

- » The status quo cannot be maintained
- » Better availability and management of enterprise wide information is key

Sustainable growth:

- » Process and infrastructure need revisiting
- » Banks define themselves by processes... (processes describe cultures)

Strategic & Tactical

- » Economic Capital is a conduit for communicating and managing Risk Culture
- » Embedding a robust ERM framework is the solution....

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Panel Discussion:

SPEAKERS

Mr. Thalib Al-Shamrani, Riyad Bank

Mr. Beji Tak-Tak, SAMBA Financial Group

Mr. Syed Moiz, National Commercial Bank

Mr. Khaldon Al Fakhri, Al Rajhi Bank

FACILITATOR

Mr. Mark Laudeman, RiskMatrix

Views and perspectives from the market:

- Regulatory Change: challenges facing Saudi banks
- Evolution or revolution?
- Extracting business value from regulatory change

Thank you!

Please join us for lunch