DEMYSTIFYING THE PRO-CYCLICALITY OF BASEL II

Credit Teach-In

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Demystifying the pro-cyclicality of Basel II

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Basel II (Pillar 1) credit risk approaches

Four alternative approaches available for calculating credit risk capital requirements

STANDARDISED APPROACH (SA)	IRB FOUNDATION APPROACH (FIRB) (Available for non-retail only)	IRB ADVANCED APPROACH (AIRB)
• Risk-weights based on external risk ratings (with 100% risk-weight for unrated exposures)	• Risk weights differentiated by internal credit risk ratings (**PD**)	• Risk weights differentiated by internal credit risk ratings (**PD**)
• Treatment of collateral and guarantees (credit risk mitigation) set by supervisor • **Intended for smaller banks**	• Treatment of collateral and guarantees (credit risk mitigation) **set by supervisor** (i.e. for **LGD**), as well as for Exposure at Default (**EAD**)	• Internal parameters also used to estimate Loss Given Default (**LGD**) and Exposure at Default (**EAD**)
• **Similar to Basel I**	**The Internal Ratings Based (IRB)** approach requires banks to internally determine capital requirements based on their own statistical estimates of the key credit risk parameters, using a sophisticated internal ratings based system – **intended for larger banks**.	

The key IRB credit risk parameters

Expected Loss (EL) =

Probability of Default (PD) x **Loss Given Default (LGD)** x **Exposure at Default (EAD)**

Probability of Default (PD)

- Quantifies likelihood of borrower being unable to repay
- Rating models calibrated to long-term cycle averaged PD (central tendency)
- Rating grades are mapped to a ratings masterscale

Loss Given Default (LGD)

- Quantifies the % of the exposure at default that is lost in the event of default, including economic costs e.g. legal
- Generally depends on the collateral and product type
- "Downturn" applied (dLGD)

Exposure at Default (EAD)

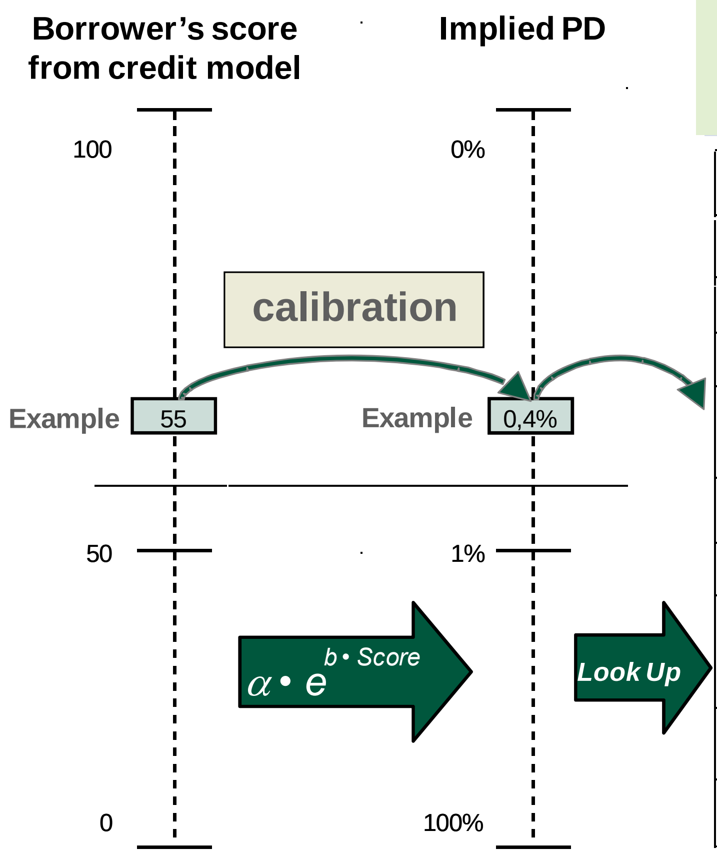
- Quantifies the exposure at risk in the case of default
- Calculation depends upon product type
- Key input parameters are utilisation and limits

Nedbank has approximately 80 credit rating models

Main inputs + Maturity ("M" factor) into the Basel II IRB formula for Unexpected Loss (UL) and calculation of RWA

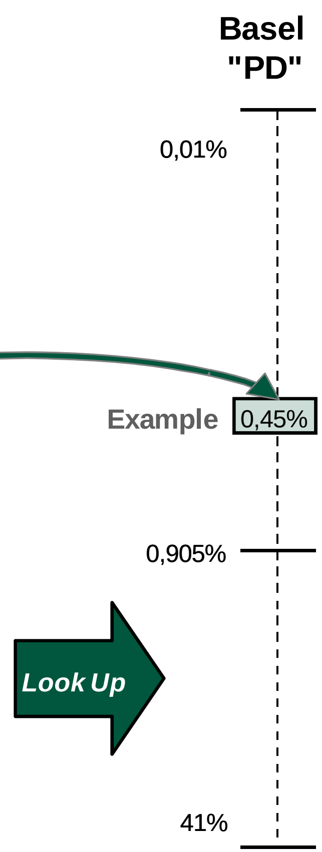
Probability of Default (PD)

Process of mapping a borrower’s score to a rating class and the Basel PD%



Master Rating Scale

	Lower range	PD	Upper range
P01	0,00%	**0,01%**	0,012%
P02	0,012%	**0,014%**	0,017%
…	…	**…**	…
P12	0,38%	**0,45%**	0,51%
…	…	**…**	
P14	0,76%	**0,905%**	1,08%
…	…	**…**	…
P24	24%	**29%**	34%
P25	34%	**41%**	49%

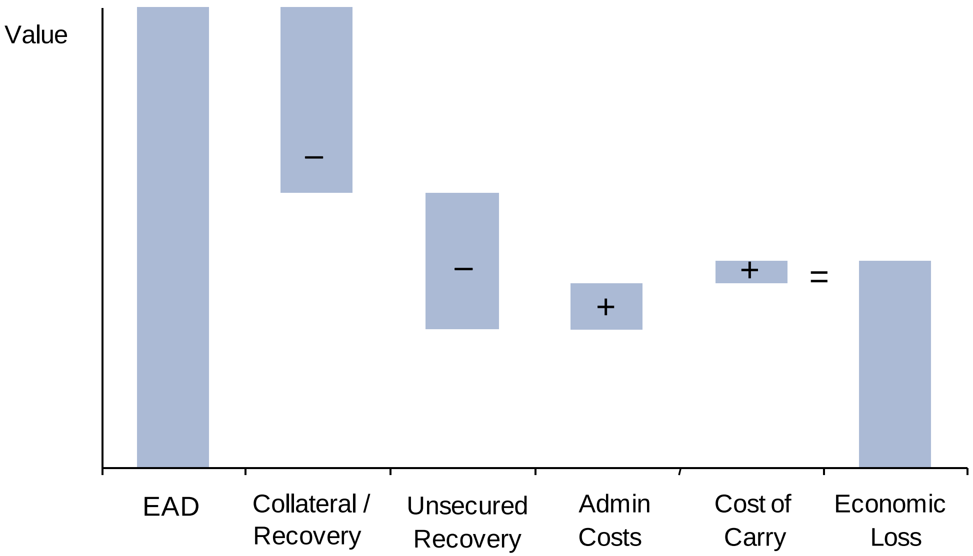


SARB's IRB master rating scale
(ie international scale, not a national / domestic scale)

PRESCRIBED PD BAND	DESCRIPTION	PRESCRIBED RATING SCALE Lower bound PD%	PRESCRIBED RATING SCALE Upper bound PD %	ILLUSTRATIVE CLIENT / SEGMENT
PERFORMING BOOK				
00	No risk (political grade)		0.000	
01	Investment Grade	0.000	0.012	
02	Investment Grade	0.012	0.017	← Large, international bank
03	Investment Grade	0.017	0.024	← South African Government
04	Investment Grade	0.024	0.034	
05	Investment Grade	0.034	0.048	← Large Corporate
06	Investment Grade	0.048	0.067	
07	Investment Grade	0.067	0.095	
08	Investment Grade	0.095	0.135	
09	Investment Grade	0.135	0.190	
10	Investment Grade	0.190	0.269	
11	Investment Grade	0.269	0.381	
12	Transition: Investment to Sub	0.381	0.538	
13	Subinvestment Grade	0.538	0.761	
14	Subinvestment Grade	0.761	1.076	← Average middle market client
15	Subinvestment Grade	1.067	1.522	
16	Subinvestment Grade	1.522	2.153	
17	Subinvestment Grade	2.153	3.044	← Average retail client
18	Subinvestment Grade	3.044	4.305	
19	Subinvestment Grade	4.305	6.089	
20	Subinvestment Grade	6.089	8.611	
21	Subinvestment Grade	8.611	12.177	
22	Subinvestment Grade	12.177	17.222	
23	Subinvestment Grade	17.222	24.355	
24	Subinvestment Grade	24.355	34.443	← Low quality microloan
25	Subinvestment Grade	34.443	99.999	
NON PERFORMING BOOK (DEFAULT)	Subinvestment Grade	34.443	99.999	

Loss Given Default (LGD) calculation

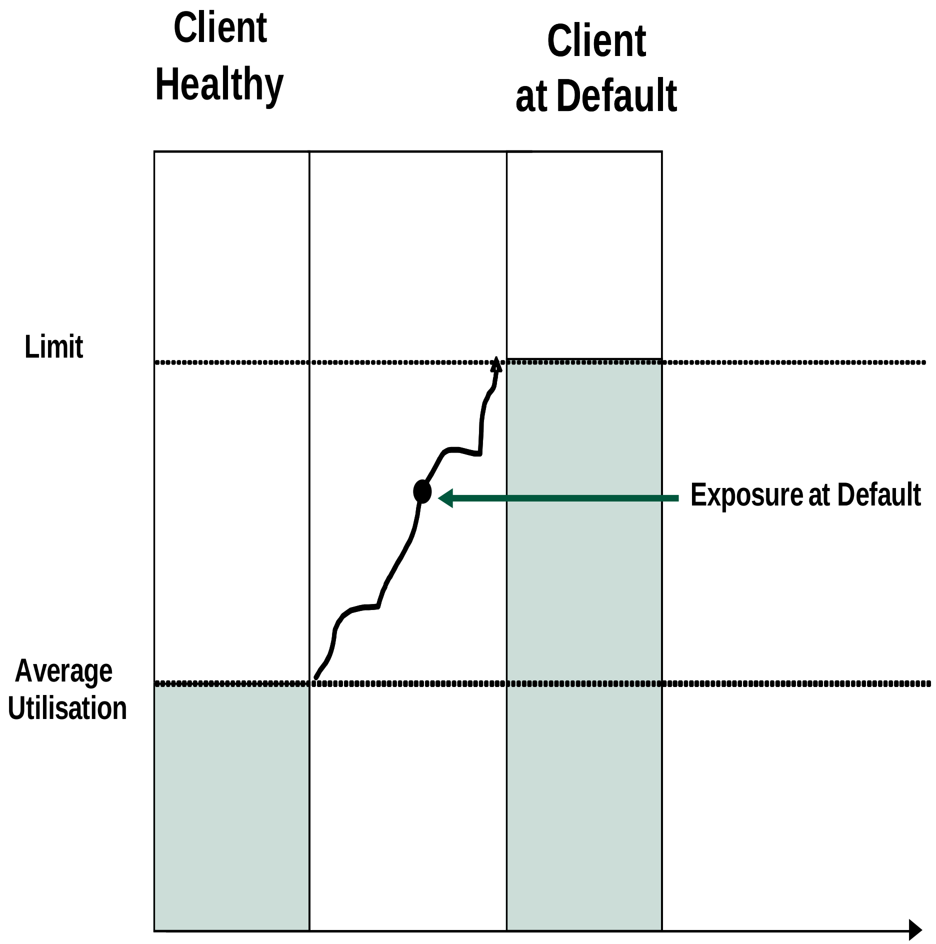
Overall LGD calculation steps



$$\text{LGD (\%)} = \frac{\textbf{Economic Loss}}{\textbf{Exposure at Default (EAD)}}$$

- LGD represents the exposure, net of recoveries, lost in a client default
- Actual economic loss is measured and not accounting loss
- This means that all cashflows are discounted to present values and hidden costs considered, such as those of administering problem loans
- LGD strongly depends on the seniority of exposure, type of collateral and borrower
- LGD is also a facility specific measure
- Based on:
  - Historical default experience
  - Internal records on recoveries
  - Both direct (legal, repossession) and indirect (collections dept) costs are included
  - Differentiation between different types of borrowers, structures, collateral, etc.
- Basel II requires downturn LGD (dLGD) to be used for regulatory capital calculations

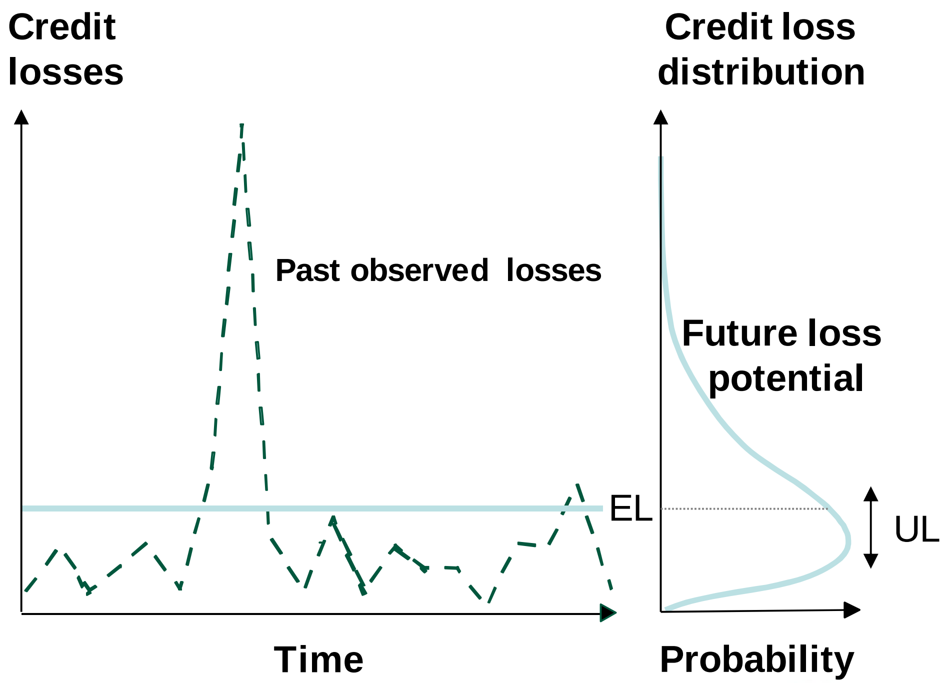
Exposure-at-Default (EAD) calculation



- EAD is a facility specific measure relevant where clients are granted credit limits which are not always fully utilised
- Methodology is that a client will tend to draw on available facilities in the period immediately prior to default
- Different ‘k-factors’ (or ‘credit conversion factors’) are applied
- EAD = Utilisation + K-factor * (Limit – Utilisation)
- K-factor = % of unutilised limit that is expected to be drawn in case of default
- For committed credit lines to clients
- K-factors are derived from historical experience unless under FIRB (0% / 75%)

Expected Loss (EL) and Unexpected Loss (UL)

Expected Loss (EL) and Unexpected Loss (UL) are defined as the average and standard deviation, respectively, of the distribution of potential losses inherent in the bank's credit portfolio



Expected loss (EL)

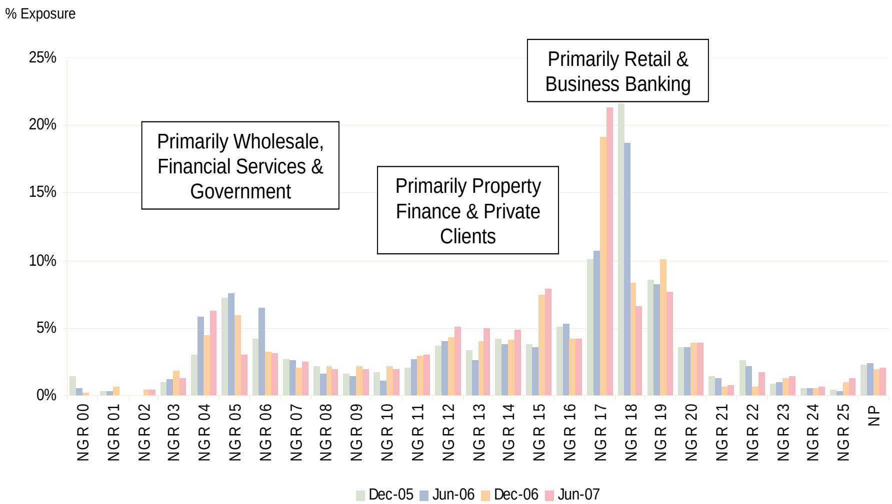
- Anticipated average annual loss rate
- Foreseeable 'cost' of doing business
- Not 'risk' as investors think of it, but rather a charge which affects anticipated yield
- Equal to the mean (average) of losses over an economic cycle
- Akin to provisioning (impairments), but markedly different (explained later)

Unexpected loss (UL)

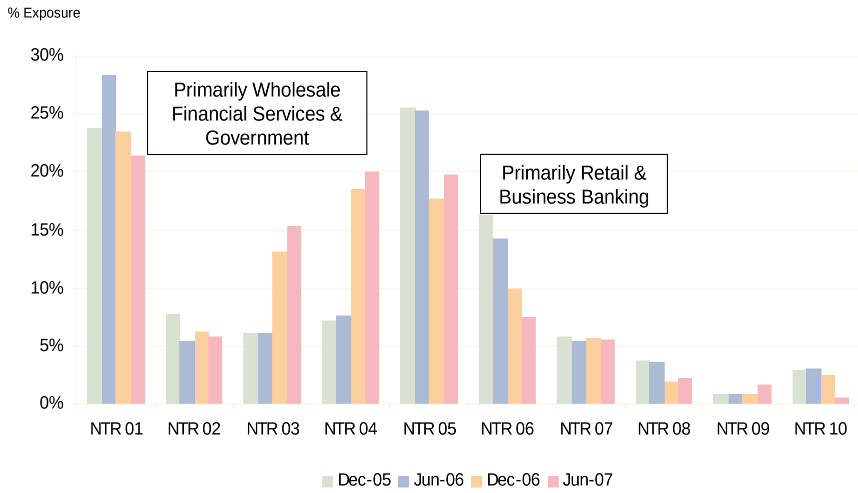
- Anticipated volatility of loss rate
- Results in volatility of returns over time
- Unanticipated but inevitable
- Therefore requires a balance sheet "cushion" in the form of capital (i.e. cushion adequate to absorb any unexpected losses that may occur)

Master rating scales are the common language of credit

Exposure per PD rating scale
(excludes CRM / collateral)



Exposure per EL rating scale
(includes CRM / collateral)



- The master rating scales are comprehensively used for:
  - Credit approval
  - Credit risk management and monitoring
  - Risk-based pricing and client value management
  - Management and board reporting on credit risk
  - Regulatory reporting and peer group comparison by SARB
  - External reporting (Pillar 3)

Core objectives of Basel II vs IFRS

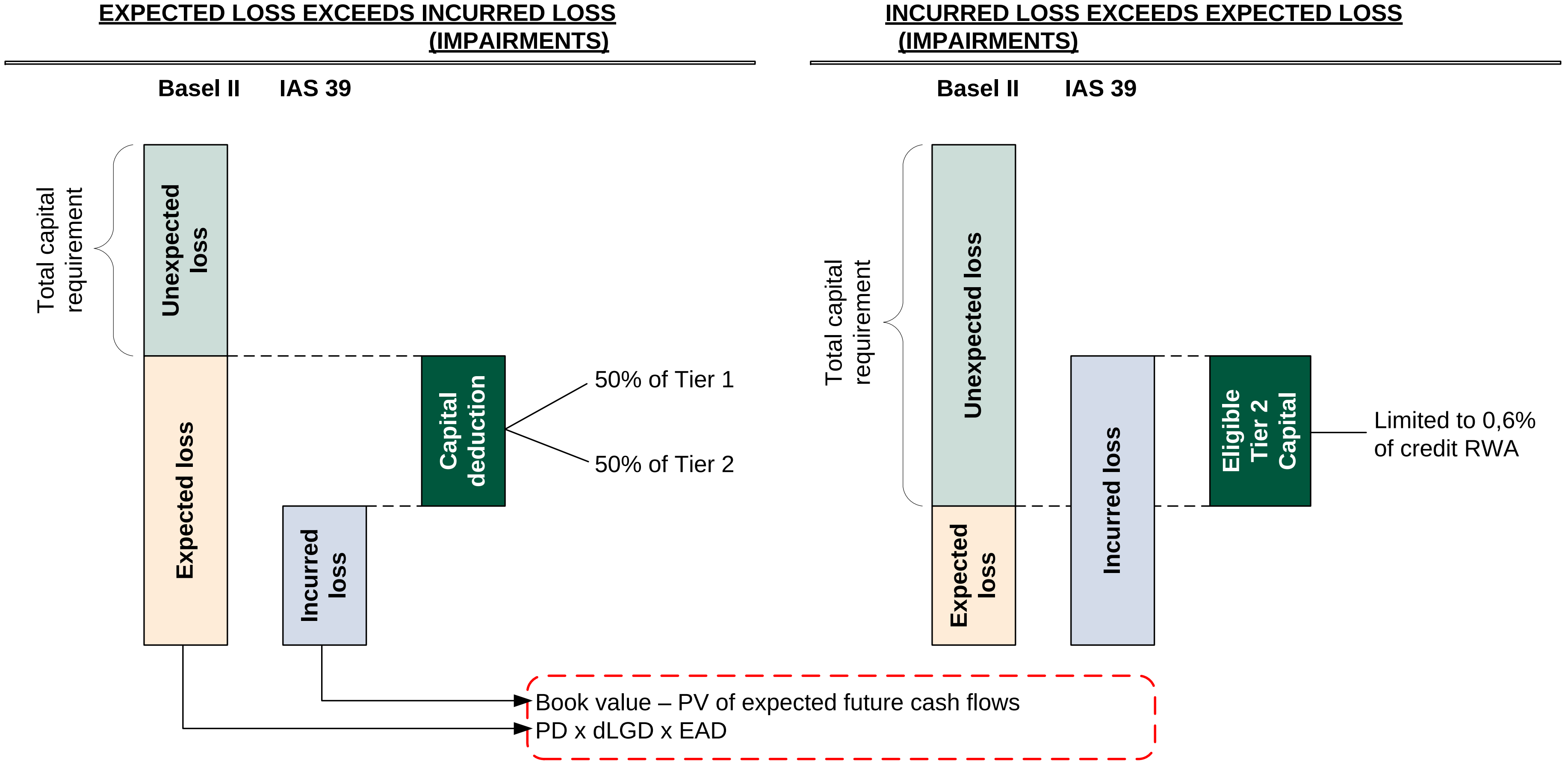
- BASEL II
  - To promote the **long-term sustainability of banks**
  - To further strengthen the safety and soundness of the banking industry
  - Forward looking

- IFRS
  - To report on the financial position at a **point-in-time** and the results for the year
  - Backward looking

Basel II (expected loss) vs IFRS (incurred loss)

	BASEL II (forward looking; economic loss)	IFRS (backward looking; accounting loss)
PDs		
Intention of estimate	• Conservative estimate of probability of default over next 12 months	• Best estimate of likelihood and timing of credit losses over life of loan
Period of measurement	• Long run historical average over full economic cycle – **"through-the-cycle"**	• Should reflect current economic conditions – **"point-in-time"**
LGDs		
Intention of estimate	• Conservative estimate is discounted value of post-default recoveries	• Conservative estimate of discounted value of post-default recoveries
Treatment of collection costs	• Recoveries net of direct and indirect collection costs	• Recoveries net of direct, cash collection costs only
Discount rate	• Recoveries discounted using entity's cost of capital	• Cash flows discounted using instrument's original effective interest rate
Period of measurement	• Reflects periods of high credit losses • "Downturn" LGDs required	• Should reflect current economic conditions – "point-in-time"
EXPOSURE		
Basis of exposure	• Based on Exposure-at-Default (EAD), which includes unutilised facilities	• Based on actual exposure

Basel II (expected loss) vs IFRS (incurred loss)



Concept of "minimum regulatory provisions" now obsolete for IRB banks. Replaced by Expected Loss (EL) methodology and a requirement that EL be compared with accounting impairments under IFRS. The difference impacts qualifying capital

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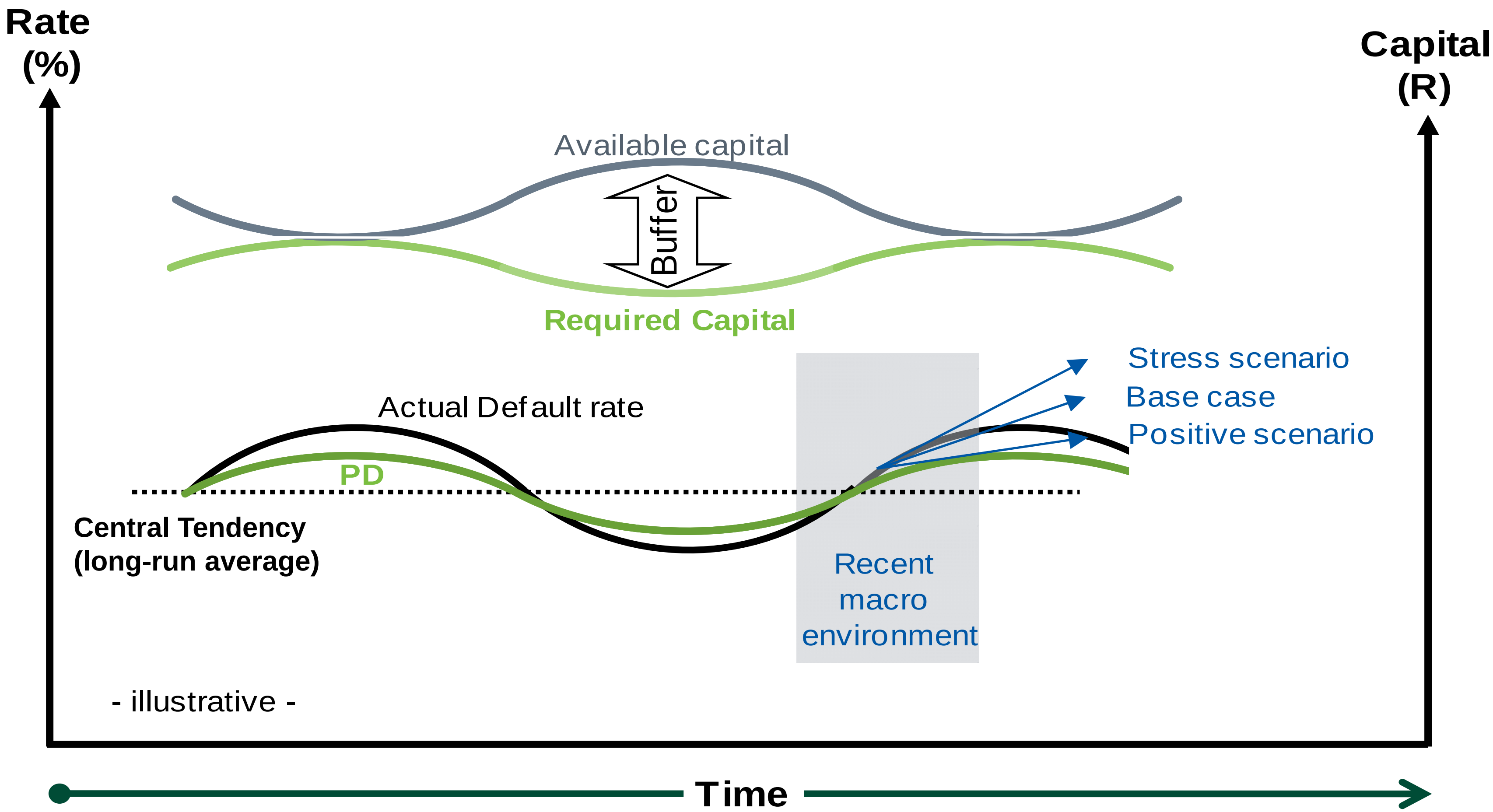
Pro-cyclicality of Basel II capital requirements

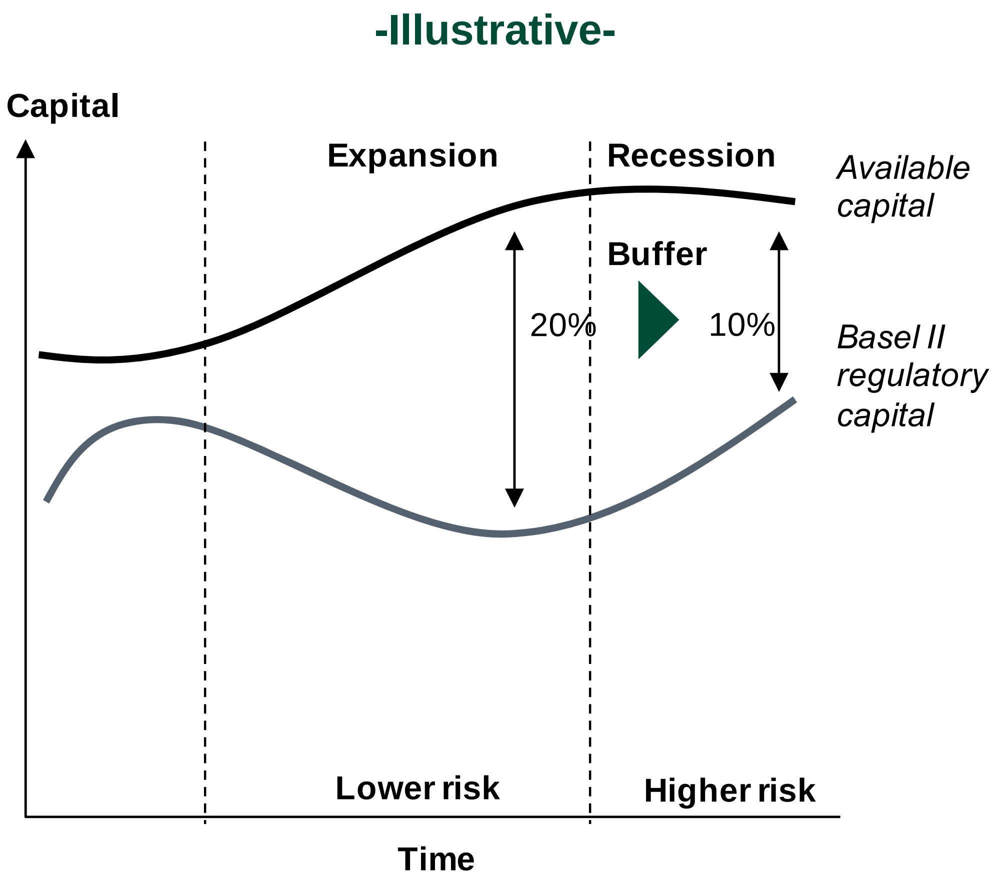
- **Definition**
  - Pro-cyclicality is the extent to which the buffer between available and required regulatory capital levels change as a direct result of changes in the economic cycle.

- **Background**
  - Credit rating models are required to be calibrated based on long-term historic average defaulted rates (“through-the-cycle”) of at least 5 years for retail and 7 years for wholesale but the actual level of PDs in any given year tend to represent a hybrid between a pure cycle-neutral average and a point-in-time default rate
  - Credit rating models calibrated to long-term average default rates are much less pro-cyclical than point-in-time rating models that are used for IFRS accounting purposes
  - However, due to the fact that Basel PDs are generally hybrids between cycle-neutral and point-in-time default rates, Basel II credit RWAs are pro-cyclical

Pro-cyclicality of Basel II capital requirements



Pro-cyclicality of Basel II capital requirements



- **Basel II ("risk sensitive") vs Basel I**
- **Basel II regulatory capital requirements (particularly for credit risk) fluctuate over an economic cycle**
  - Pro-cyclicality of default probabilities (PD)
  - Pro-cyclicality of collateral values and recovery rates (LGD) but use dLGD
  - Pro-cyclicality in limit utilisation (EAD)
- **Available capital resources** also fluctuate due to earnings volatility
  - Higher default rates leading to higher impairments
  - Lower earnings volume
  - Asset write downs (esp fair value MTM accounting)

Default rates and Basel II credit parameters will vary between banks

Driver	Explanation
Risk appetite	● Risk profiles and risk appetite vary bank on bank, and so should capital ratios and capital buffers
IRB model methodology	● Currently considerable latitude in the underlying methodology of the design / build of the credit models (and is a "level playing field" issue)
Customer segment / mix	● There are significant differences in average default rates. For example, typically corporate exposures have lower default rates than SME
Geography	● There are substantial differences between countries owing to differences in economic maturity, accounting rules, legal framework for repossession etc.
Policy	● Even for banks operating in the same segments / countries, there are differences between default rates due to differences in credit policy i.e. underwriting, monitoring, collections, etc.
Randomness	● This tends to cancel out in the customer segments with large numbers (e.g. retail) but it plays an important role in the Large Corporate space
Economy	● Default rates increase by orders of magnitude between economic expansion and contraction, depending on property values, interest rates and other macro-economic drivers

In practice most PD models are not "Through-the-Cycle" (by construction)

"Point-in-time" (PIT) "Hybrid" "Through-the-cycle" (TTC)

Merton based models | **External Agency Ratings**

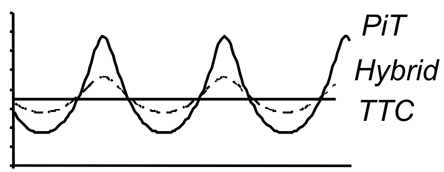
Wholesale / corporate models – cashflow based | **Wholesale / corporate models – scorecard based**

Retail behavioural models | **Retail application models**

- A pure PIT model would be 100% responsive to changes in credit environment, and should always predict PD equal to observed default rate
- Factors such as delinquency and limit utilisation vary strongly through the cycle, bringing cyclicality to the PD estimates

- PIT estimates correspond to actual default rates, which guide impairments

- Most PD models are somewhere between the two extremes, and exhibit dampened cyclicality vis-à-vis actual default / loss rates



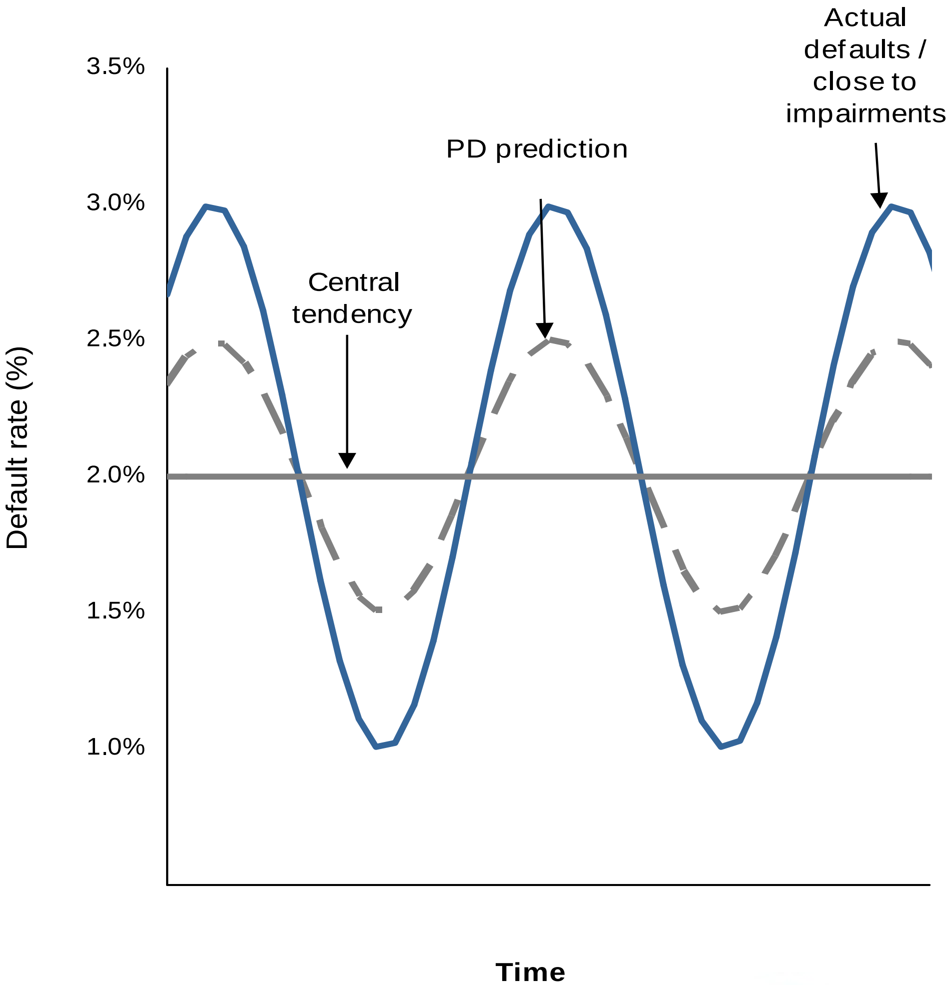
- Pillar 1 credit RWA is calculated based upon actual model output, and is thus partially pro-cyclical

- Pure TTC models would be completely invariant to cycle movements, with predicted default rate always equal to long-term cycle average
- Factors such as demographic factors tend to be stable through the cycle and contribute to dampening model cyclicality

- Pillar 1 RWA should theoretically be calculated from TTC PD's but it's impossible to build such models directly without a macro overlay as most credit risk factors / drivers tend be somewhat cyclical by nature

Variations in IRB credit methodologies

Illustrative default rates through time



Some key considerations

- **Central tendency (CT):** what is the long run average default rate for my portfolio of lending?
  - Use of internal and external time series
  - How long a time series to use?
- **Cyclicality:** how much of the cycle does my PD model pick up?
  - Answers will vary portfolio-by-portfolio and bank-by-bank based on the ratings methodology employed
- **Anchor point (AP):** what PD level is appropriate for calibrating the development sample, if the sample does not cover a full economic cycle?
  - The anchor point depends on the central tendency, the cyclicality of the model and the observed default rates for the time period corresponding to the development sample

Demystifying the pro-cyclicality of Basel II

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- Refresh of the key credit risk parameters and differences between Basel II vs IFRS
- Pro-cyclicality of Basel II capital requirements
- **Role of Basel II in the global financial crisis**
- Changes coming in respect of pro-cyclicality due to the global financial crisis

Role of Basel II in the Global Financial Crisis

- **Some shortcomings in Basel II**
  - Risk measurement / capture in **pillar 1** (ie in trading book, securitisations and counterparty credit risk)
  - Pro-cyclicality in Basel II
    - And no "general provision" allowed
  - Use of and reliance on external ratings
- **But there always existed to compensate**
  - Internal Capital Adequacy Assessment Process (ICAAP)
  - Supervisory Review and Evaluation Process (SREP) by Regulator

  Pillar 2

  - **Pillar 3** (too early for benefits)

ICAAP is Basel II "end-to-end"

ICAAP PRINCIPLE 1
Every bank should have an ICAAP

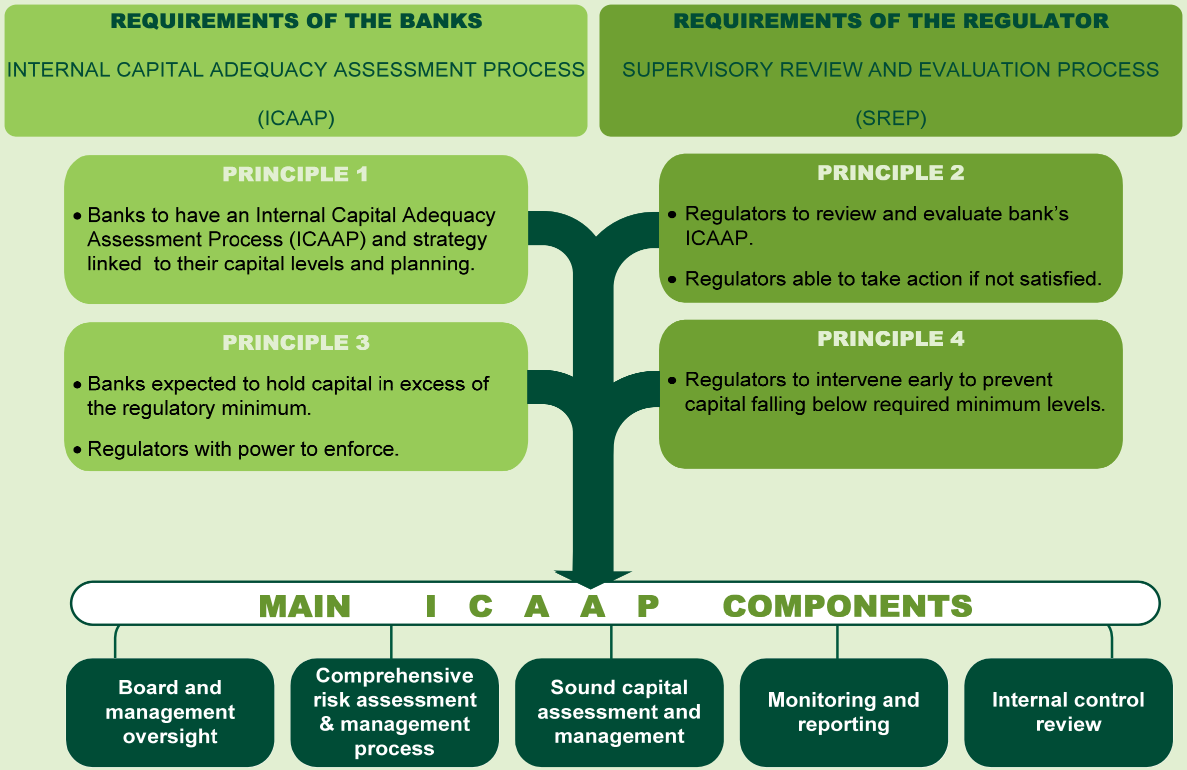
ICAAP PRINCIPLE 2
Ultimate responsibility for bank's ICAAP is the Board

ICAAP PRINCIPLE 3
Written record of ICAAP

ICAAP PRINCIPLE 4
ICAAP to be an integral part of management and decision-making culture of a bank

ICAAP PRINCIPLE 5
Proportionality to size and complexity of operations

ICAAP PRINCIPLE 6
Regular independent review of ICAAP



ICAAP PRINCIPLE 7
ICAAP to be forward-looking

ICAAP PRINCIPLE 8
ICAAP to be risk-based

ICAAP PRINCIPLE 9
Importance of stress testing and scenario analysis

ICAAP PRINCIPLE 10
Diversification and concentration risk to be well considered

ICAAP PRINCIPLE 11
Credit concentration risk to be well considered

ICAAP PRINCIPLE 12
Adequacy and integrity of ICAAP models

- ICAAP = best practice "enterprise-wide risk management" and is FORWARD LOOKING!
- Properly implemented and consistently applied, ICAAP will provide the management information to help control and optimise risk, and ensure financial sustainability
- Its effectiveness, however, is pervasively influenced by a bank's risk culture and governance, active and consistent CEO and Board support, and the operating business model

Timing and scope of Basel II

- In the USA, Basel II was delayed
- In Europe, UK and South Africa, only live from 2008

BUT MORE IMPORTANTLY

- Basel II mostly only applied to commercial banks (ie deposit-taking institutions)
- US investment banks were largely unregulated – ie Basel II would not have applied (they drove the excessive “originate and sell” mentality ~ using exotic derivatives to disguise toxic sub-prime assets)
- Credit derivatives market unregulated (a flaw admitted to by Alan Greenspan)
- Negative impacts of IFRS accounting rules (MTM / Fair value = “mark to fear”)
- No regulations to prevent:
    - irresponsible lending practices” (unlike NCA in South Africa)
    - excessive leverage ratios

Excessive pro-cyclicality in capital requirements is clearly undesirable

- Leads to pressure on banks capital ratios, incentivizing them to clamp down on lending during contractionary periods when default rates and PD's increase
  - "credit crunch", this typically leads to a worsening of the underlying economic situation
- Reverse is true during expansionary periods: default rates and PD's decrease, leading to a bigger capital buffer which may incentivise banks to lend excessively
  - Many financial crises (e.g. current situation) are the result of long expansionary periods, leading to excessive lending, risk taking and leverage

- Emerging view is to expect banks to hold and build up a substantial capital buffer in good times over the regulatory minimum
- Basel II is likely to now require that the PDs used in the calculation of RWAs are proper "through-the-cycle " PD's
  - Recent paper / recommendations reinforces this view
  - LGDs already clearly required to be "downturn"

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Changes coming in respect of pro-cyclicality due to the global financial crisis

Report of the Financial Stability Forum (Board) on addressing pro-cyclicality in the financial system

Overview of recommendations (April 2009)

Capital

"The objective of the measures below is to ensure that the Basel II capital framework promotes prudent capital buffers over the credit cycle and mitigates the risk that the regulatory capital framework amplifies the transmission of shocks between the financial and real sectors. An integrated package of measures covering the recommendations should be issued for consultation before the end of 2009".

- Strengthen capital framework so that the quality and level of capital in the banking system increase during strong economic conditions and can be drawn down during periods of economic and financial stress
- Revise the market risk framework of Basel II to reduce the reliance on cyclical VaR-based capital estimates
- Supplement the risk-based capital requirement with a simple, non-risk based measure to help contain the build-up of leverage
- Enhanced stress testing (Pillar 2) to validate the adequacy of banks' capital buffers
- **Make appropriate adjustments to dampen excessive cyclicality of the minimum capital requirements** – eg excessive impact of rating migrations on regulatory capital requirements

Changes coming in respect of pro-cyclicality due to the global financial crisis

- Regular assessments of the risk coverage of Basel II and banks' evolving risk profiles and make timely enhancements

Provisioning

"Earlier recognition of credit losses could have dampened cyclical moves in the current crisis. Under the current accounting requirements of an incurred loss model, a provision for credit losses is recognised only when a loss impairment event or events have taken place that are likely to result in non-payment of a loan in the future. Identification of the loss event is a difficult and subjective process that results in a range of practice and, potentially, a failure to fully recognise existing credit losses earlier in the credit cycle. Earlier identification of credit losses is consistent both with financial statement users' needs for transparency regarding changes in credit trends and with prudential objectives of safety and soundness".

- FASB and IASB should reiterate that existing standards require the use of judgement to determine an incurred loss for provisioning of credit losses
- FASB and IASB should reconsider the incurred loss model – dynamic provisioning? (ala Spain)
- Review of Basel II to assess the adequacy of disclosure of credit loss provisioning under Pillar 3

Changes coming in respect of pro-cyclicality due to the global financial crisis

Valuation and leverage

"A number of developments in financial systems – including increased direct and embedded leverage, leverage funded with short-term debt, more marketable assets, and extensive application of fair value accounting – have contributed to an increase in the pro-cyclicality of the system.

The procyclical effects arising from the interplay between leverage and valuation need to be assessed from a macro-prudential perspective. Regulators and supervisors should obtain a clear and comprehensive picture of aggregate leverage and liquidity and have the necessary tools to trigger enhanced surveillance if necessary".

- Use of constraints on leverage and liquidity margins as macro-prudential tools for supervisory purposes
- Measure funding and liquidity risk attached to maturity transformation, enabling the better pricing of liquidity risk in the financial system
- Examine the use of valuation reserves or adjustments for fair valued financial instruments when data or modelling needed to support their valuation is weak
- Examine possible changes to relevant standards to dampen adverse dynamics potentially associated with fair value accounting

Changes coming in respect of pro-cyclicality due to the global financial crisis

SEC study in the USA on MTM fair value accounting - recommendations

- SEC recommended against the suspension of fair value MTM rules
- Reconsider accounting for impairments (eg dynamic provisioning)
- Guidance for determining fair value in inactive markets
- Stress testing / scenario planning
- Better governance and valuation controls
- Risk management (eg skills and concentration risk)
- More transparency and disclosure

Changes coming in respect of pro-cyclicality due to the global financial crisis

Turner Report (FSA, March 2009)

- Capital required against trading book activities should be increased significantly (e.g. several times) and a fundamental review of the market risk capital regime (eg reliance on VAR measures for regulatory purposes) should be launched
- Regulators should take immediate action to **ensure that the implementation of the current Basel II capital regime does not create unnecessary pro-cyclicality; this can be achieved by using "through the cycle" rather than "point in time" measures of probabilities of default**
- **A counter-cyclical capital adequacy regime should be introduced, with capital buffers which increase in economic upswings and decrease in recessions**
- Published accounts should also include buffers which anticipate potential future losses, through, for instance, the creation of an "Economic Cycle Reserve"

Changes coming in respect of pro-cyclicality due to the global financial crisis

- A maximum gross leverage ratio should be introduced as a backstop discipline against excessive growth
- Liquidity regulation and supervision should be recognised as of equal importance to capital regulation
- Credit rating agencies
  - Should be subject to registration and supervision
  - Fundamental review of the use of structured finance ratings in the Basel II framework
- Credit Default Swap (CDS) market infrastructure
  - Clearing and central counterparty systems should be developed

Thank you

QUESTIONS