RISK-BASED CAPITAL
(from Basel 1 to Basel 2)

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Bankers Institute of the Philippines, Inc.
"Intricacies of the New Basel Capital Accord"
14 January 2005

Differentiate...

- Minimum capital
  - Minimum level of capital a bank should have to open for business
  - Serves as a floor
- Risk-based capital
  - Minimum level of capital a bank should hold based on the measured volume of its risk exposures
  - Should not go below minimum capital

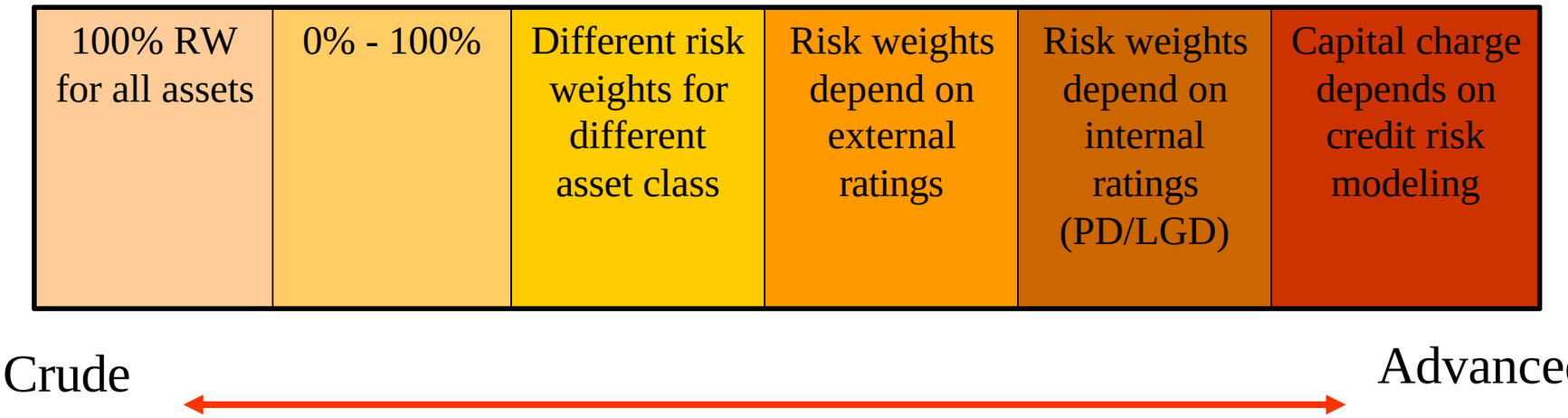
What is the role of capital?

- Capital serves as financial buffer to enable a bank to ride out earnings volatility
- The greater the potential for earnings volatility (i.e., riskier), the more capital a bank should hold
- But since capital is more costly than other sources of funds, banks have more incentive to choose a level of capital that may not be appropriate to the risks they take
- This is the underlying concern addressed by risk-based capital regulations

Risk-based capital ratio

$$= \frac{\text{Capital}}{\text{Risk Weighted Assets}}$$

Evolution of risk-based capital framework



Evolution of risk-based capital framework

100% RW for all assets	0% - GS, cash 100% - others	Different risk weights for different asset class	Risk weights depend on external ratings	Risk weights depend on internal ratings (PD/LGD)	Capital charge depend on credit risk modeling

Net worth/Risk Assets
(Prior to Circular No. 280)

What is Basel 1?

- Aimed to standardized the computation of risk-based capital across banks and across countries.
- Issued in 1988 by the Basel Committee on Banking Supervision, a group of banking supervisors which secretariat is based at the Bank for International Settlements in Basel, Switzerland.

What is Basel 1?

100% RW for all assets	0% - GS 100% - others	Different risk weights for different asset class	Risk weights depend on external ratings	Risk weights depend on internal ratings (PD/LGD)	Capital charge depend on credit risk modeling

1. OECD – nonOECD countries
2. OECD – nonOECD incorporated banks
3. Residential mortgage
4. Others

What is Basel 1?

- Market risk was incorporated into Basel 1 in 1996
  - Allows both a standardized and an internal model approach

Basel 1 implementation by BSP

- Circular No. 280 issued in 29 March 2001
- Circular No. 360, which incorporated market risk, was issued in 3 December 2002

Basel 1 implementation by BSP

100% RW for all assets	0% - GS 100% - others	Different risk weights for different asset class	Risk weights depend on external ratings	Risk weights depend on internal ratings (PD/LGD)	Capital charge depend on credit risk modeling

1. Highly rated – nonhighly rated countries
2. Highly rated – nonhighly rated banks
3. Residential mortgage
4. SMEs
5. Others

Why the need for Basel 2?

- Assignment of credit risk weights under Basel 1 is crude – Basel 2 aims to make capital requirements more risk sensitive
- Basel 1 only accounts for credit risk and market risk – Basel 2 includes operational risk and other risks

The making of Basel 2

1999 – First Consultative Package (CP1) was issued

2000 – First Quantitative Impact Study (QIS1)

2001 – CP2 was issued

2001 – QIS2 and QIS 2.5

2002 – QIS3 (with 6 Philippine banks)

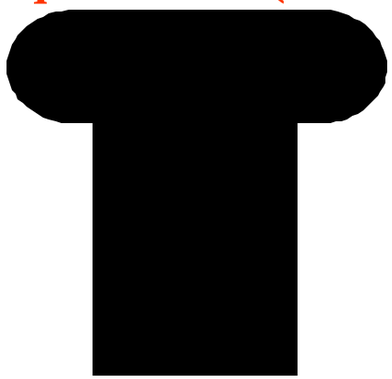
2003 – CP3

2004 – Final Document

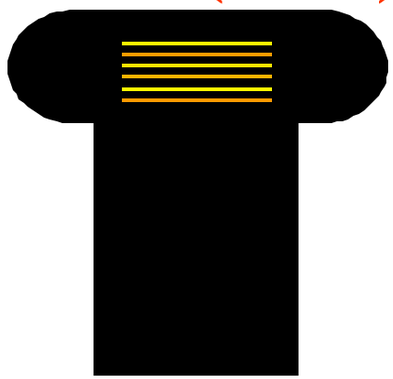
Basel 2 framework

Basel 2 is a three-pronged approach relying on so-called “3 Pillars”:

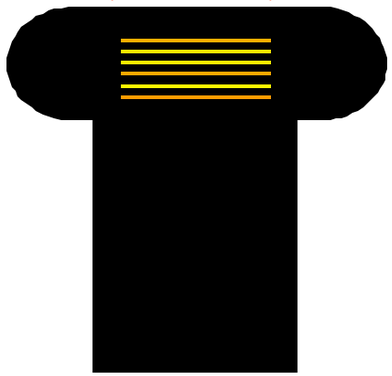
Minimum Capital Requirements (Pillar 1)



Supervisory Review Process (Pillar 2)



Market Discipline (Pillar 3)



Basel 2 underlying principles

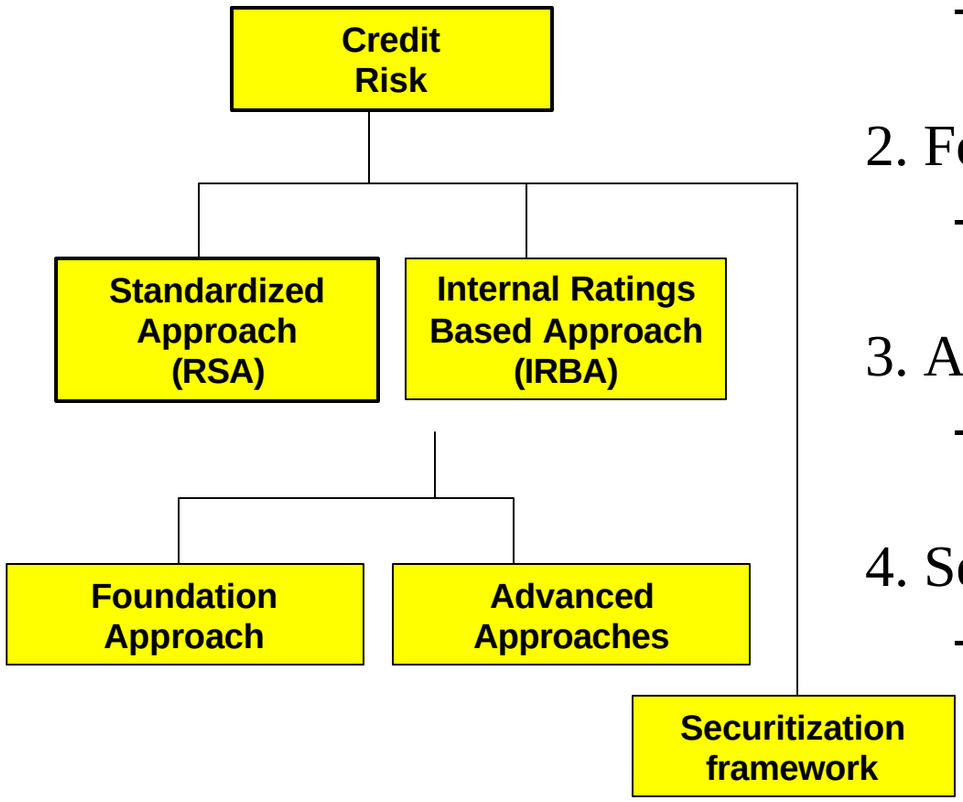
1. Banks should have capital appropriate for their risk-taking activities (Pillar 1)
2. Banks should be able to properly assess the risk they are taking, and supervisors should be able to evaluate the soundness of these assessments (Pillar 2)
3. Banks should be disclosing pertinent information necessary to enable market mechanism to complement the supervisory oversight function (Pillar 3)

Pillar 1
(Minimum capital requirements)

Prescribes capital charges for:

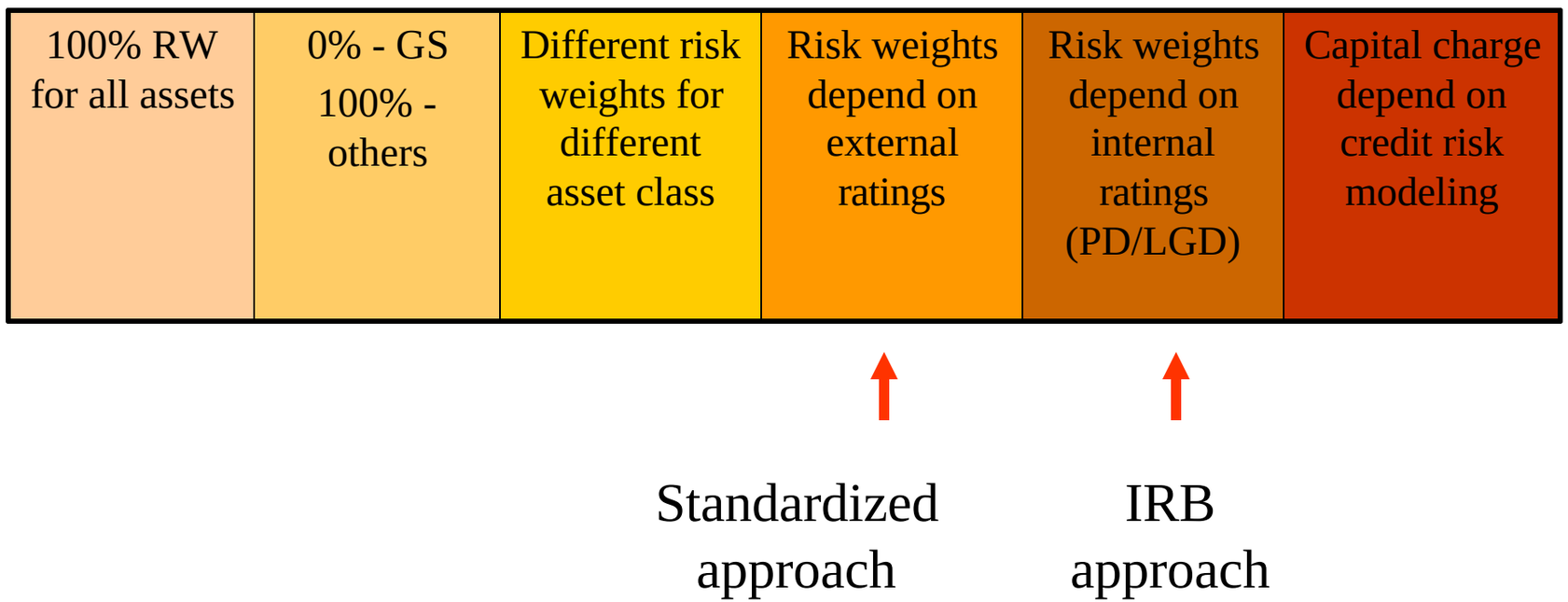
1. Credit risk (major revision)
2. Operational risk (new provision)
3. Market risk (minor change)

Credit Risk



1. Standardized approach
   - risk weights depend on external credit ratings
2. Foundation IRB
   - banks to use internal credit ratings and supply PD
3. Advanced IRB
   - banks to use internal credit ratings and supply PD, LGD, EAD, M
4. Securitization framework
   - sets out various approaches in computing capital charges for securitization exposures

Basel 2 framework



Credit Risk- Standardized Approach

Credit assessment	**AAA to AA-**	**A+ to A-**	**BBB+ to BBB-**	**BB+ to B-**	**Below B-**	**Unrated**
Sovereign RW	0%	20%	50%	100%	150%	100%
Bank RW						
Option 1	20%	50%	100%	100%	150%	100%
Option 2	20%	50%	50%	100%	150%	100%
Credit assessment	**AAA to AA-**	**A+ to A-**	**BBB+ to BB-**	**Below BB-**	**Unrated**	
Corporate RW	20%	50%	100%	150%	100%	
Retail portfolio	75%					
REM	35%					
Past due REM	100%					
Past due others	150%					

Credit risk mitigation

Important operational requirements for recognition of collateral and guarantees:

- Legal certainty
- Value of collateral/guarantee and credit quality of counterparty must not have a material positive correlation

Credit risk mitigation[2]

Collateral recognition:

- simple approach (RW substitution)
- comprehensive approach (use of haircuts)

Guarantee recognition:

- RW substitution

Credit risk mitigation[3]

List of <u>likely</u> eligible collateral:

- Cash on deposit with the bank which is incurring the counterparty exposure
- Securities issued by the Philippine national government and BSP, and central governments, central banks and non-central government public sector entities of foreign countries rated at least AA- or equivalent
- Other securities rated at least AA- or equivalent

Credit risk mitigation[4]

List of likely eligible guarantors:

- Philippine national government and BSP
- Central governments, central banks, and non-central government public sector entities of foreign countries rated at least AA- or equivalent
- Financial institutions rated at least AA- or equivalent

BSP framework

- Current elements of Basel 2 credit risk standardized approach already incorporated in the BSP framework
  - 0% risk weight for sovereigns with external ratings of AA- and up
  - 20% risk weight for banks with external ratings of AA- and up
  - 75% risk weight for qualified SME portfolio

Likely deviation by BSP framework

- Risk weights for REM and other retail might stay at 50% and 100%, respectively
- There might be an explicit adjustment for concentration risk in the computation of CAR
- Limited number of eligible collateral and guarantors

Credit Risk: The Internal Ratings - Based Approach

Internal Rating Based Approach is based on Measures of Expected and Unexpected Losses

1. Expected Loss

2. Unexpected Loss

Risk Components

PD - **P**robability of **D**efault

M - Effective **M**aturity of exposure

LGD - **L**oss **G**iven **D**efault

EAD - **E**xposure **A**t **D**efault

Basic Statistical Components

Expected Value - mean

Volatility - standard deviation

Correlation - relation of one variable to another

Parametric Distribution – pdf & cdf

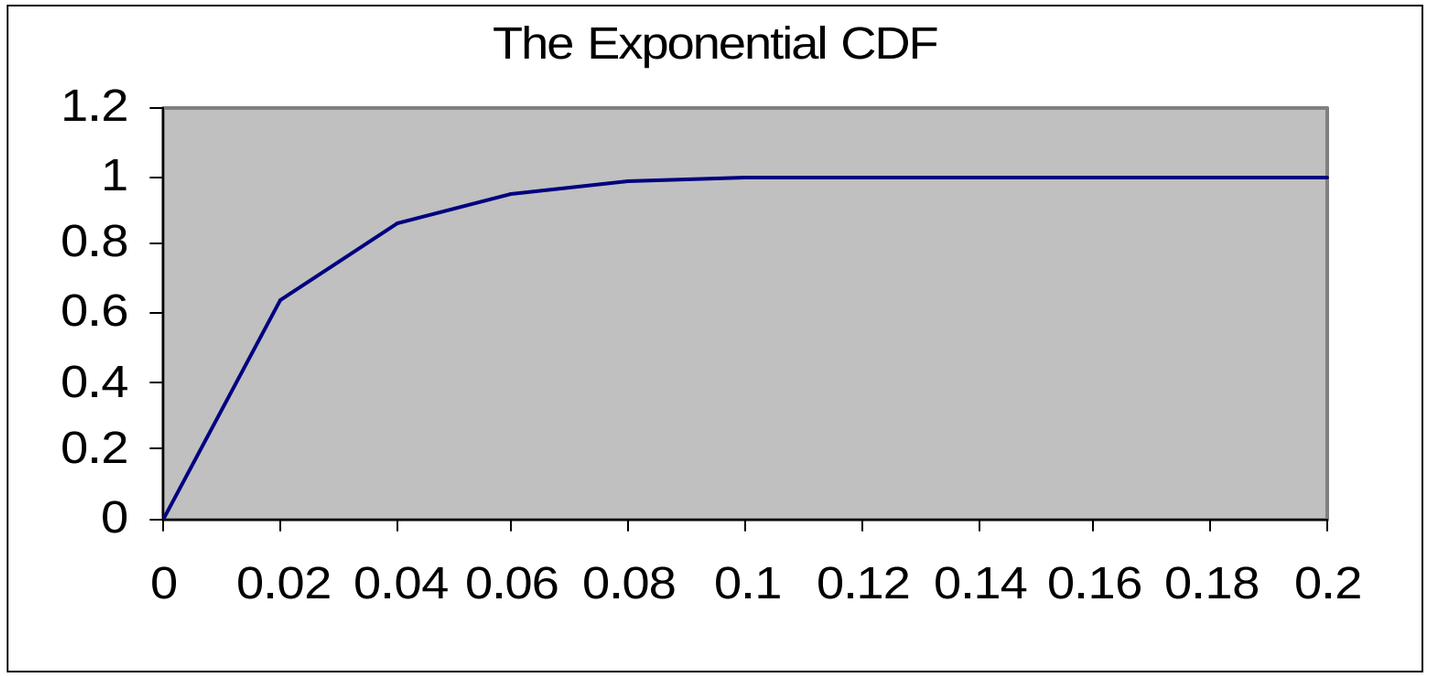
a. Exponential Distribution

b. Standard Normal Distribution

c. Logarithmic Distribution

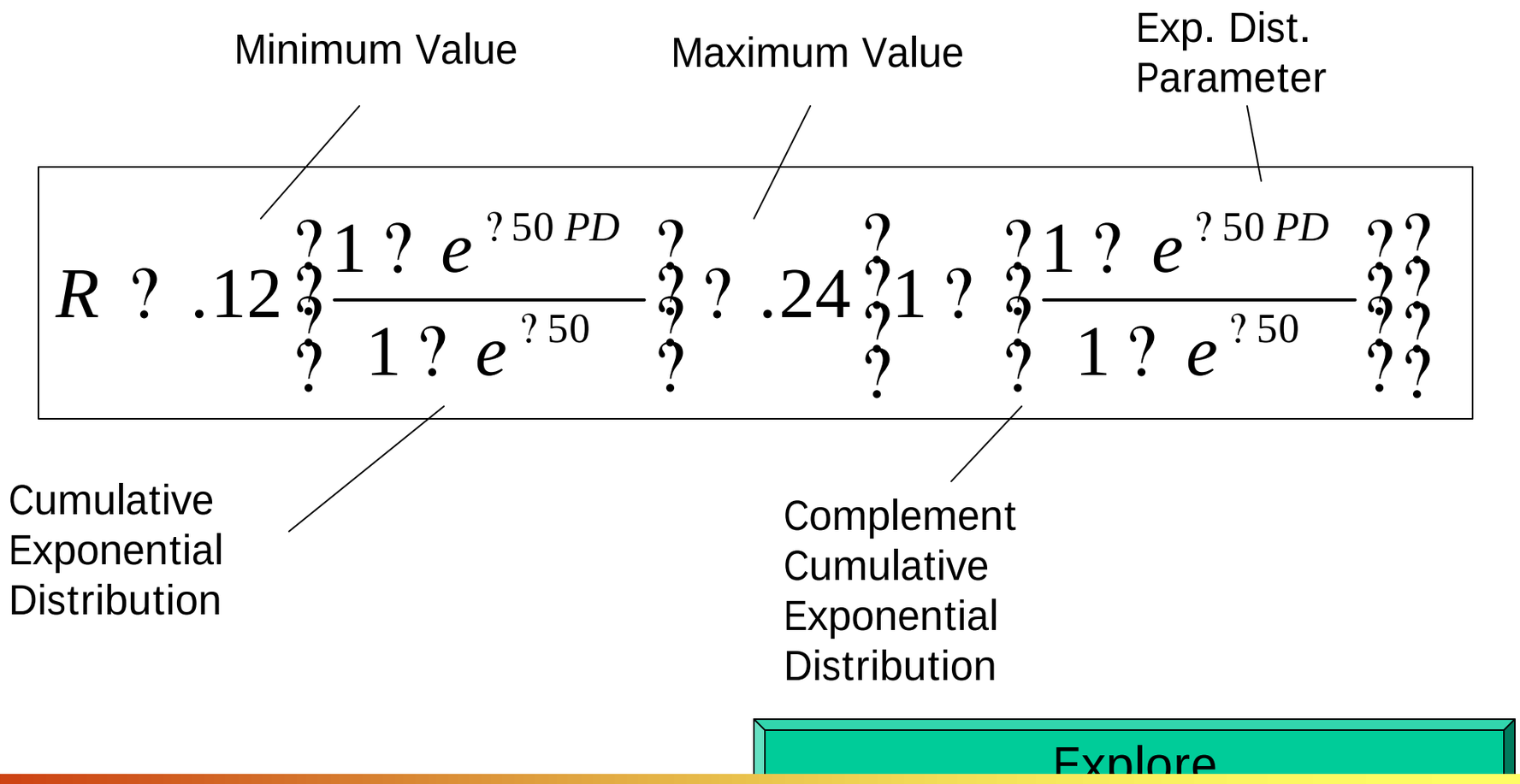
Cumulative Exponential Distribution

$$F(x;?) ? 1 ? e^{? ?x}$$



Excel Sample

Correlation (R)



Correlation (R)

What then is the effect of such formula???
Think... Think... Think

The formula implies that the correlation values should be within the range 0.12 to 0.24. The parameter 50 is used to define how fast y values moves for every change in x, in such case we observe that the values abruptly fall down from PDs of 0.00% to 0.08% because of such parameter.

Maturity Adjustment (b)

$$b = (0.11852 - 0.05487 * (\ln PD))^2$$

Parameter Constants

Logarithmic Function

This maturity adjustment caters the effect of PD to the exposures' maturity, please note that the constants are derived from the global data and could be subject to change in Philippine setting.

Capital Requirement (K)

$$K = LGD \cdot N\left[\left(\frac{1}{1-R}\right)^{\frac{1}{2}} \cdot G(PD) + \left(\frac{R}{1-R}\right)^{\frac{1}{2}} \cdot G(0.999)\right] - (PD * LGD) \cdot \frac{1 + (M - 2.5) \cdot b(PD)}{1 - 1.5 \cdot b(PD)}$$

$$N\left[\left(\frac{1}{1-R}\right)^{\frac{1}{2}} \cdot G(PD) + \left(\frac{R}{1-R}\right)^{\frac{1}{2}} \cdot G(0.999)\right] - (PD * LGD)$$

Standard Normal Distribution

Inverse Standard Normal Distribution

Expected Loss

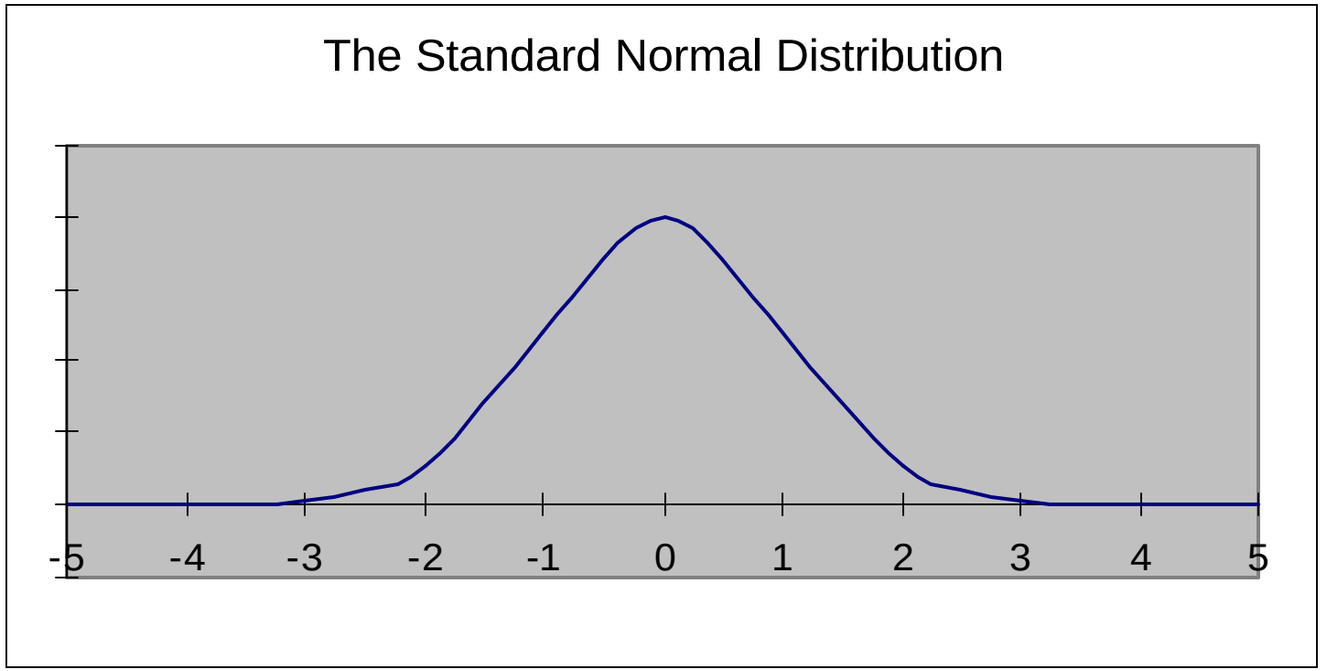
Capital Requirement (K)

$$N\left[\left(\frac{1}{1-R}\right)^{\frac{1}{2}} \cdot G(PD) + \left(\frac{R}{1-R}\right)^{\frac{1}{2}} \cdot G(0.999)\right] - (PD * LGD)$$

Note that the Inverse Standard Normal Distribution G(x) is used to capture the Expected Loss position G(.999) and capturing the effect of PD thru G(PD) incorporating it with weights on the precomputed correlation. Since we are concerned with the Unexpected Loss we remove the Expected Loss which is PD*LGD.

Capital Requirement (K)

$$f(z;0,1) = \frac{1}{\sqrt{2\pi}} e^{-\frac{z^2}{2}}$$



Explore

Capital Requirement (K)

$$\frac{1 \;?\; ?M \;?\; 2.5 ?? \; b \; ?PD \;?}{1 \;?\; 1.5 \;?\; b \; ?PD \;?}$$

Maturity Adjustment in effect is attached to the capital requirement to capture longterm and short term adjustments. To simplify our discussion we **assume M to be equal 1**.

Capital Requirement (K)

$$K = LGD \cdot N\left[\left(\frac{1}{1-R}\right)^{\frac{1}{2}} \cdot G(PD) + \left(\frac{R}{1-R}\right)^{\frac{1}{2}} \cdot G(0.999)\right] - (PD * LGD) \cdot \frac{1 + (M - 2.5) \cdot b(PD)}{1 - 1.5 \cdot b(PD)}$$

$$K = LGD \cdot N\left[\left(\frac{1}{1-R}\right)^{\frac{1}{2}} \cdot G(PD) + \left(\frac{R}{1-R}\right)^{\frac{1}{2}} \cdot G(0.999)\right] - (PD * LGD)$$

Explore

Risk Weighted Asset (RWA)

$$RWA \; ? \; K \; ? \; 12.5 \; ? \; EAD$$

Multiplicative Inverse of Capital Requirement

$$\frac{capital}{RWA} \; ? \; 8\%$$

Capital Required

Explore

The Internal Ratings - Based Approach

Lets explore then how we can use the IRB Approach in our systems. Note in using the this system a bank should estimate the PD for each exposure. The formula is highly dependent on the estimated PD so we should be strict enough in the way we compute or estimate this risk component.

Explore

Preparing for IRB compliance

- Data, data, data
  - Compliance with Circular No. 439 as an initial step
  - Strong IT system to support data collection
  - Personnel with technical background and knows how to use data for risk management analysis

Implementation of Circular No. 439 (Banks' IRS)

- Documentation of the credit risk rating system
- IT infrastructure that would maintain the database of the credit risk rating system

IRS - Documentation

- Organization structure, definitions, reporting lines, and other operational aspects of the credit risk rating system
- For banks not using the BAP model – rationale for choice of rating criteria
  - Are the factors used for rating statistically significant determinants of borrower default?
  - If expert based, future plans to revise the model once enough data is available
- For banks using the BAP model – future plans to revise the model
  - Methodology to be used in determining which factors are significant predictors of borrower default

IRS - Data to maintain

- Information that would track the predictive power of each rating criterion
- Ratings per account
  - Dates the ratings were assigned
  - Methodology and data used to derive the ratings
  - Analyst who gave the ratings
- Accounts that default
  - Borrower and facility
  - Timing and circumstances of defaults
  - Rating
  - Actual loss
- Ratings migration

What BSP expects from banks in terms of IRS

- BSP expects banks to eventually use only rating factors that are good determinants of borrower default
- This involves doing statistical tests on the empirical relationships of the various factors currently used and actual default.
- Data is of paramount importance.

What BSP expects from banks in terms of IRS²

- Information is power!
- Banks should not wait for a regulatory push before putting in place a system to accumulate pertinent portfolio information
- Banking business becomes more and more portfolio information driven
- This is not a compliance issue but a business decision

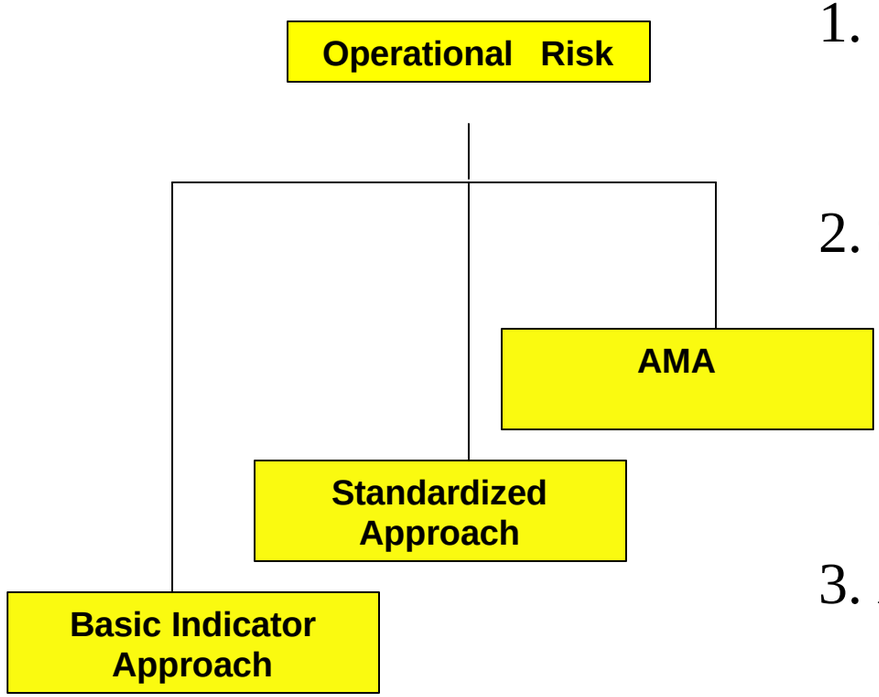
Things BSP examiners would look out for – Use test of IRS

- Evaluation of loan applications and other prospective exposures
  - Internal rating's effect on pricing
- Review of existing exposures
  - Actions taken in case of downgrade/upgrade

Importance of use test

- Banks should trust their credit risk rating systems enough for the ratings output to figure into banks' credit business decisions.
- If this is not the case, BSP would deem the bank to be not in compliance with Circular No. 439.

Operational Risk



1. Basic indicator approach
   - capital charge is a fraction of gross income
2. Standardized approach
   - capital charge computed by business lines
   - total operational risk capital charge is the sum for all business lines
3. Advanced Measurement Approach
   - use of statistics-based measurement models

Operational Risk – Basic Indicator Approach

- Operational risk capital charge is 15% of the average gross income over the previous 3 years.

Operational Risk – Standardized Approach

- Operational risk capital charge is computed for each business line – a fraction of the average gross income attributed to a business line over the previous 3 years
- Total operational risk charge is the sum of the operational risk charges for all business lines

Operational Risk – Standardized Approach[2]

Business lines	Beta factors
Corporate finance	18%
Trading and sales	18%
Retail banking	12%
Commercial banking	15%
Payment and settlement	18%
Agency services	15%
Asset management	12%
Retail brokerage	12%

Operational Risk – Advanced Measurement Approaches

- Operational risk capital charge is computed based on statistical methods

Market Risk

- Capital treatment remains generally unchanged except for some minor changes in the standardized computation of specific risk charges
- To be consistent with the credit risk standardized approach, specific risk weights now depend purely on the external ratings of the issue

Market Risk – Likely changes in specific risk weights

External credit assessment – for sovereigns	External credit assessment – for other entities	Specific risk capita charge
AAA to AA-		0%
A+ to BBB-	**AAA to BBB-**	0.25% (residual term to final maturity 6 months or less) 1.00% (residual term to final maturity greater than 6 and up to and including 24 months) 1.60% (residual term to final maturity exceeding 24 months)
All others	**All others**	8.00%

Pillar 2
(Supervisory review)

- Emphasizes the 4 key principles of supervisory review:
  1. Banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels;
  2. Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the result of this process;

Pillar 2
(Supervisory review)[2]

3. Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum;
4. Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

Pillar 3
(Market discipline)

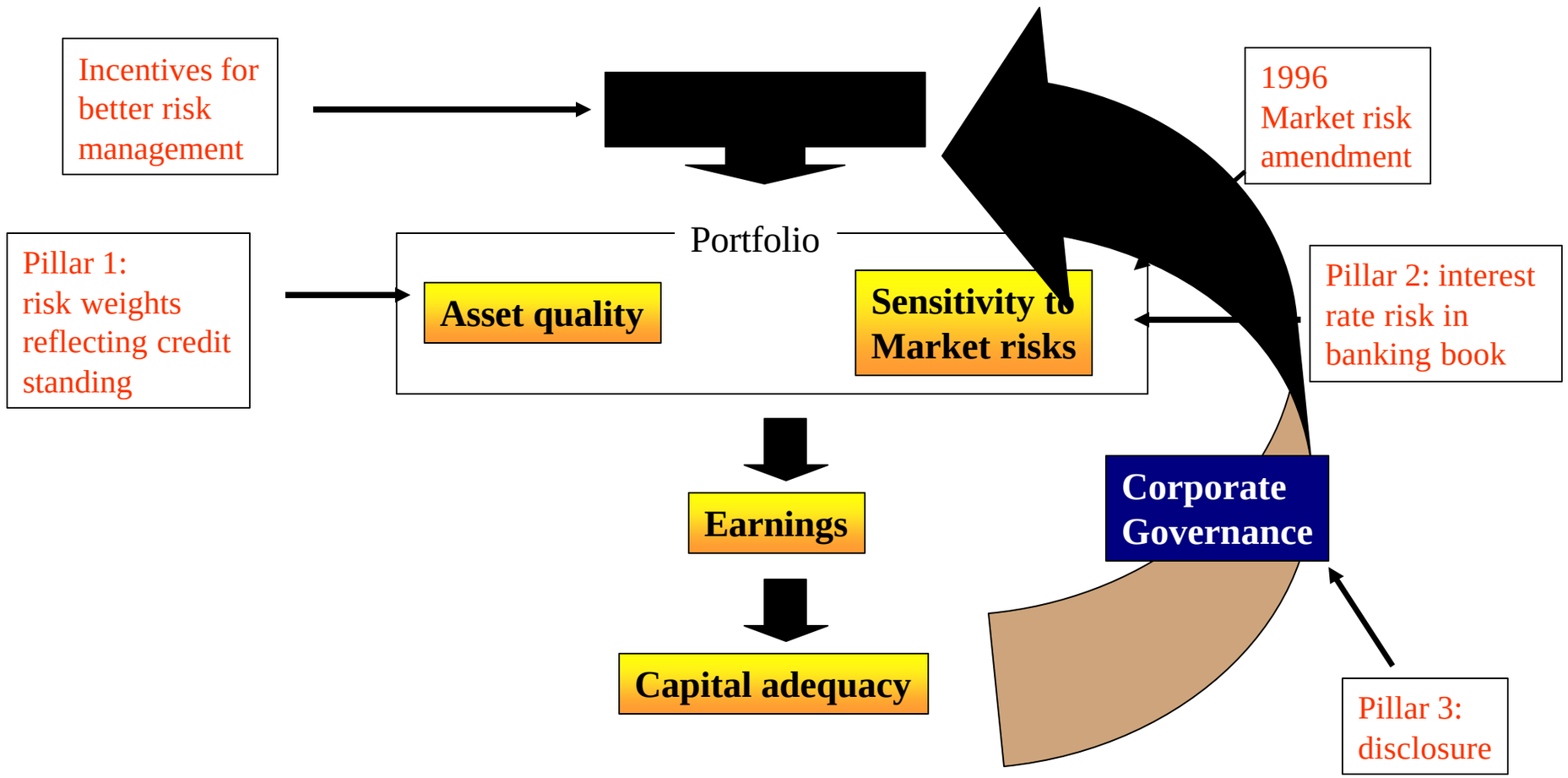
- Proposes an extensive list of bank disclosure requirements
- Recognizes that markets contain disciplinary mechanisms that reward banks that manage risk effectively and penalize those whose risk management is inept or imprudent

Pillar 3
(Market discipline)^2

Broad classification of required disclosures:

1. Scope of application
2. Capital structure
3. Capital adequacy
4. Credit risk exposure and assessment
5. Credit risk mitigation
6. Market risk exposure and assessment
7. Operational risk exposure and assessment
8. Equity exposure and assessment
9. Securitization exposure and assessment
10. Exposures to interest rate risk in the banking book

Basel 2 is fully consistent with the CAMELS framework



QIS results

Impact on banks' CAR

- RWA will increase, on average, by 25%
- Given UBs/KBs latest CAR of 18.30%, CAR will decrease by 366 basis points to 14.64%

Impact on banks' CAR[2]

- But this should be taken cautiously since individual bank results showed great variability
- Increase in RWA ranges from 5% to 48%!
- Change in CAR ultimately depends on a bank's portfolio

Impact on banks' CAR[3]

Likely drivers of increase in RWA

- Additional capital charge for operational risk
- Higher risk weight for past due accounts
- Higher risk weight for OTC counterparty exposures
- Deduction of "significant minority investments" from capital

Impact on banks' CAR[4]

- 17% out of the 25% increase in RWA is contributed by operational risk
- Generally, banks that engage in traditional banking businesses will have lower operational risk charge
- Those that engage more in less traditional banking businesses like *trading and sales*, *corporate finance*, and *payment and settlement* will likely experience a significant increase in RWA.

Implementation plans in Non G-10 Countries

Implementation in Non G-10 Countries

BASEL II SURVEY CONDUCTED BY FSI IN EARLY 2004		
Region	**Number of respondents (Banking supervisors)**	**Respondents intending to adopt Basel 2**
Africa	22	16
Asia	**18**	**15**
Caribbean	7	5
Latin America	15	11
Middle East	8	7
Non-BCBS Europe	37	34
TOTAL	**107**	**88**

Implementation plans in Asia

Overall survey results

- In the period 2007-09, banks controlling around 70% of total banking assets in the sample of Asian jurisdictions are expected to move to Basel 2.
- 20% belongs to banks which are foreign-controlled or foreign-incorporated

Groups of countries

FSI divided sample of Asian countries into homogenous groups:

1. Group 1 – plans to offer all options contained in Basel 2 as from end-2006
2. Group 2 – will implement the framework more gradually between 2007 and 2009 (the Philippines belongs here)
3. Group 3 – still undecided about the date and scope of implementation

Group 2 banking assets expected to be subject to Basel 2 credit risk approaches

End-2006: 5% in standardized approach

2007-2009: almost 50% in foundation IRB

more than 20% in standardized

2010-2015: 5% will move from standardized to foundation IRB

Group 2 banking assets expected to be subject to Basel 2 operational risk approaches

- Majority of assets will be subject to the basic indicator approach after January 2007. A very small amount of assets will then move to the AMAs.

Implementation timetable for BSP

2005	2006	2007	2008	2009	2010
Gradual phasing in of certain Basel 2 provisions (securitization SA, past dues, highest credit quality corporates)		<u>Credit risk</u> -standardized approach <u>Operational risk</u> -basic indicator or standardized approach			<u>Credit risk</u> -FIRB and AIRB allowed <u>Operational risk</u> - AMA allowed

Pillar 2 (Supervisory Review) – a continuing process

Pillar 3 (Market discipline) – gradual implementation starting 2007

Proposed Consultation Phase

- Draft guidelines on
  - Pillar 1 (computation of minimum capital charges)
  - Pillar 3 (enhanced disclosures)
- Draft guidelines to be released by 1st quarter of 2005
- For comments until end-June 2005

Proposed Issuance of Final Guidelines

- Final guidelines will be issued by end-2005
- Effectivity will be on 1 January 2007

For "Stand-alone" Thrift and Rural Banks

- Stay with the existing framework but with certain Basel 2 elements incorporated to make it more risk-sensitive

RISK-BASED CAPITAL
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