

Session VI

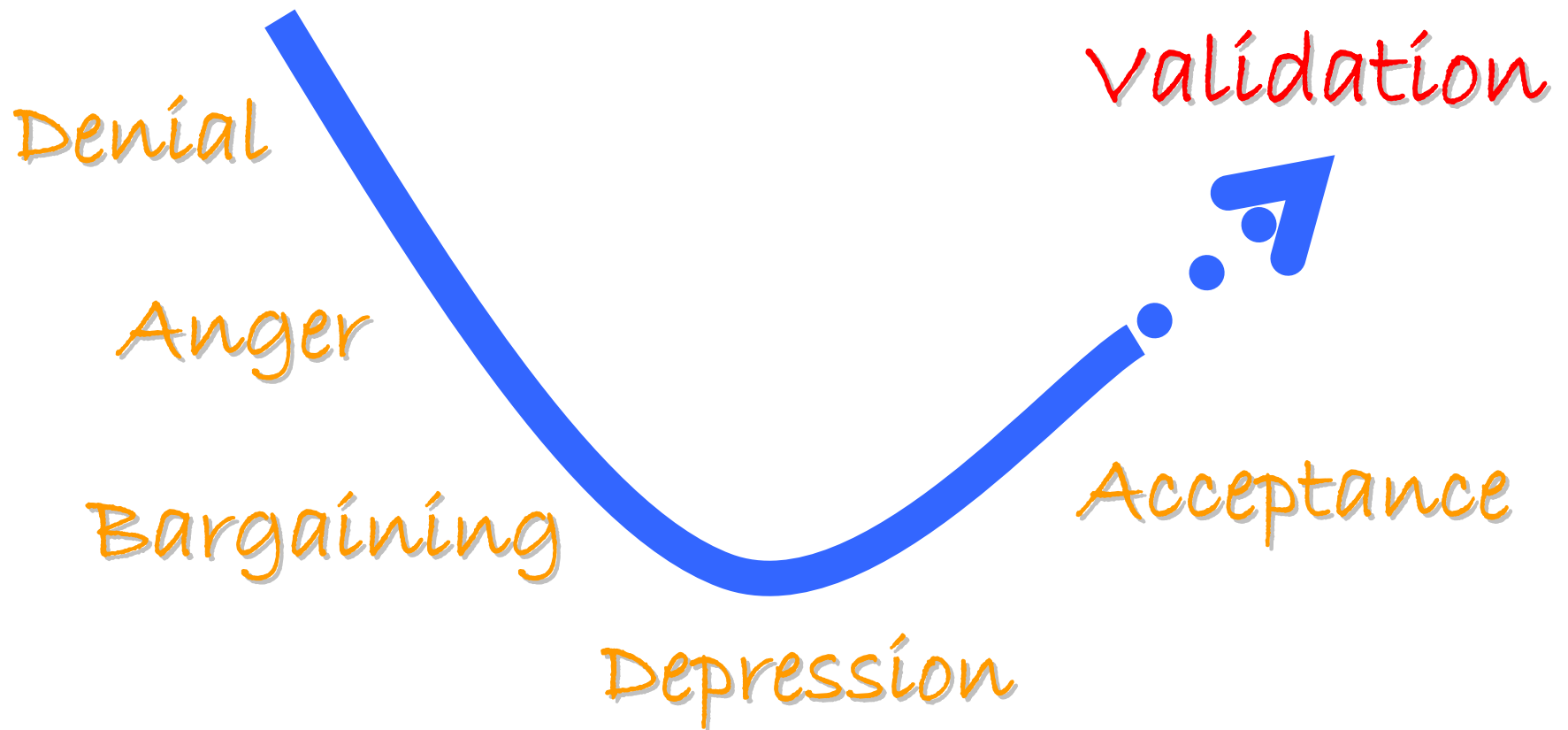
**Validation as a Control
Function Under Basel II**

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Basel

The Stages of ~~Grief~~



Outline

- Basel II emphasizes validation
- Credit risk under Basel's IRB approach
- Validation and other control processes for IRB
- A validation example: LGD for Basel II
- New challenges likely require new tools

The Basel Connection

- Basel II has enhanced interest in validation
- Basel Committee's Accord Implementation Group (AIG) has established a validation subgroup, which has published validation principles
(Basel Committee Newsletter No. 4, January 2005)
- Basel II brings a new focus
Aspects previously regarded as arcane quantitative issues may become central concerns for both bank management and bank supervisors

Basel II on Validation for Credit Risk

- Basel framework includes specific language requiring validation:

500. Banks must have a robust system in place to validate the accuracy and consistency of rating systems, processes, and the estimation of all relevant risk components. A bank must demonstrate to its supervisor that the internal validation process enables it to assess the performance of internal rating and risk estimation systems consistently and meaningfully.

(Source: Basel Committee, November 2005, page 105)

Credit Risk Under Basel II

- Broad outlines of credit risk under Basel II likely are familiar by now
- Under the Internal Ratings-Based (IRB) approach, banks must:
 - Differentiate obligors and exposures according to credit risk
 - Quantify credit risk for obligors and exposures within a particular modeling framework

Risk Differentiation for IRB

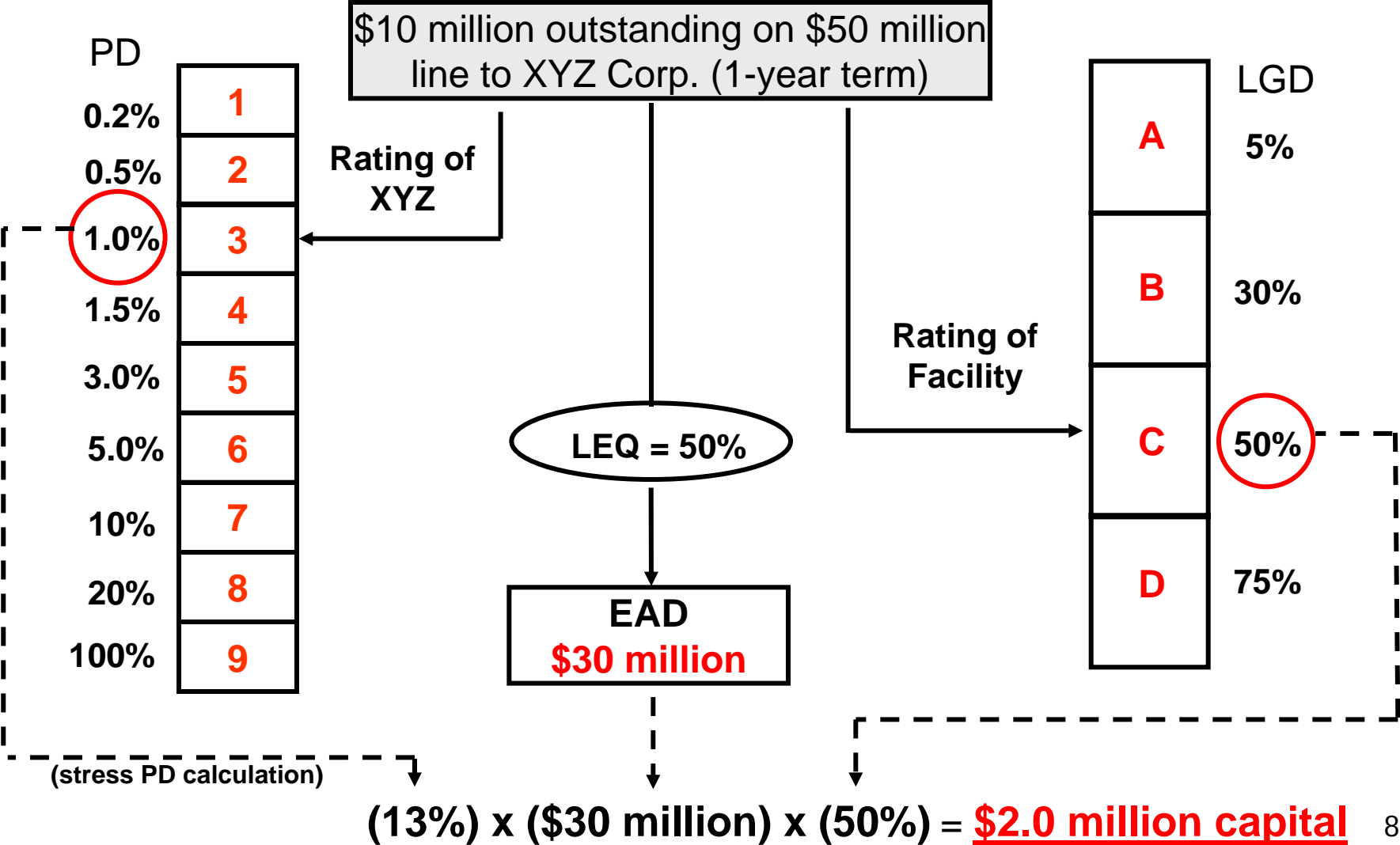
- Banks are required to assign exposures to groupings with roughly homogeneous risk
 - Obligor ratings linked to default frequency
 - Severity grades linked to default losses
 - Segmentation for retail exposures

- Traditional credit rating and scoring methods may be used, or “models” may be less explicit (for example, ratings assigned using expert judgment)

Risk Quantification for IRB

- Banks estimate certain parameters of the credit risk model Basel II uses for capital calculations
 - PD: probability of default
 - LGD: loss given default
 - EAD: exposure at default
 - M: effective maturity (for wholesale exposures)
- Parameter estimates are assigned to grades, segments, or exposures as relevant

IRB for Wholesale Credit



Example: Exposures for Large Bank

		LGD							
	PD	10%	15%	20%	23%	30%	33%	34%	38%
1	0.03%	3,048	865	1,258	0	0	0	0	8
2	0.05%	31	207	2	0	12	40	69	247
3	0.29%	43	179	0	0	115	4	0	913
4	0.32%	70	578	0	0	51	224	0	1,144
5	0.77%	59	539	48	75	60	1,002	0	2,187
6	7.77%	17	81	0	6	10	1,500	0	511
7	19.74%	2	83	0	16	2	370	0	166
8	27.17%	1	42	0	0	4	436	0	271

Corporate-Bank-Sovereign exposure (in \$ millions)

Control Processes for IRB

- Integrity of internal risk estimates must be ensured through adequate governance around processes
 - Formalized, approved policies and procedures
 - Independent review
 - Effective internal audit
 - Incentives inherent in the system
 - Documentation and transparency

- Validation is another element of the control environment
 - Quantitative nature of IRB may make validation a particularly important control

- The control environment, including validation, should be viewed as a whole

Validation in the Basel Context

- Recall key elements of validation from earlier talks
 - Developmental evidence
 - Ongoing monitoring, process verification, and benchmarking
 - Analysis of outcomes

- For Basel II, the specifics of validation may change, but concepts or principles remain the same

- Where is validation needed?
 - Explicit models may be used to differentiate and quantify risk
 - But there are also “models” in a broad sense: transforming information as input into output for making a decision
 - These “models” may not be captured in computer code

Validating Risk Groupings

- Assignment of obligors and exposures to internal rating grades or segments must be validated
 - Methods span a spectrum from explicit, statistically based quantitative scores to judgmental approaches
 - Homogeneous risk within groupings is crucial
 - Models used may be designed to rank-order, but this might not be the most important feature for IRB rating assignments
- Validation elements in this context include:
 - Developmental evidence for the risk grading system
 - Benchmarking in the form of comparison to alternatives
 - Process verification through transaction testing
 - Ex-post analysis of credit outcomes

The Relevance of Rating Philosophy

- Different rating systems aim to reflect cyclical or systematic effects in different ways
 - Primarily an issue in corporate credit
 - Commonly discussed in terms of “point-in-time” and “through-the-cycle” (whatever those mean...)
- Differences in “philosophy” have implications for validation of IRB systems
 - Philosophy or approach affects interpretation of outcomes analysis for risk-grading systems
 - Estimation and mapping must take into account possible differences between a bank’s current approach and the philosophy embedded in reference data

Risk Quantification: The Big Picture

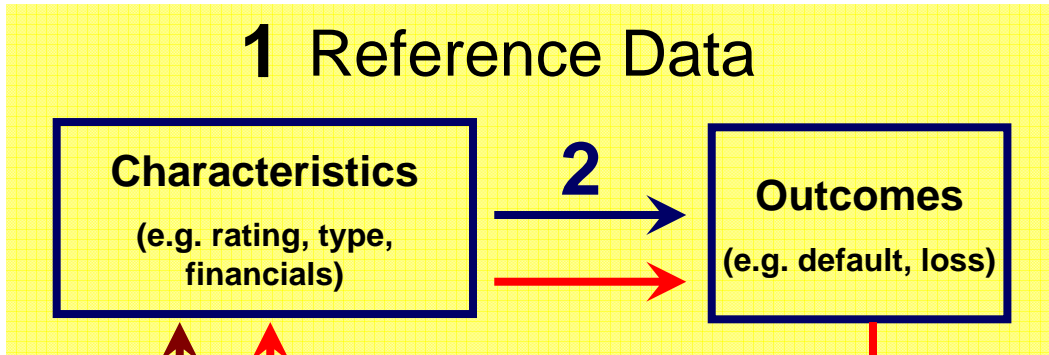
- After homogeneous risk groups are identified, risk must be quantified, and quantification also must be validated
- Details of quantification vary between retail and wholesale, and across parameters (PD, LGD, EAD)
- However, all practical approaches to quantification include identifiable conceptual steps or stages
- Each stage can and should be subject to validation

Risk Quantification: Four Stages

- **Reference Data:** a dataset with known outcomes, and information on characteristics related to risk
 - In some settings this is called a “developmental sample”
- **Estimation:** methods that relate observed outcomes to the characteristic variables in the reference data
- **Mapping:** a process to link observable features of obligors or exposures in the existing portfolio to similar variables used in the estimation
- **Application:** use the established mapping to apply the estimates to the existing portfolio

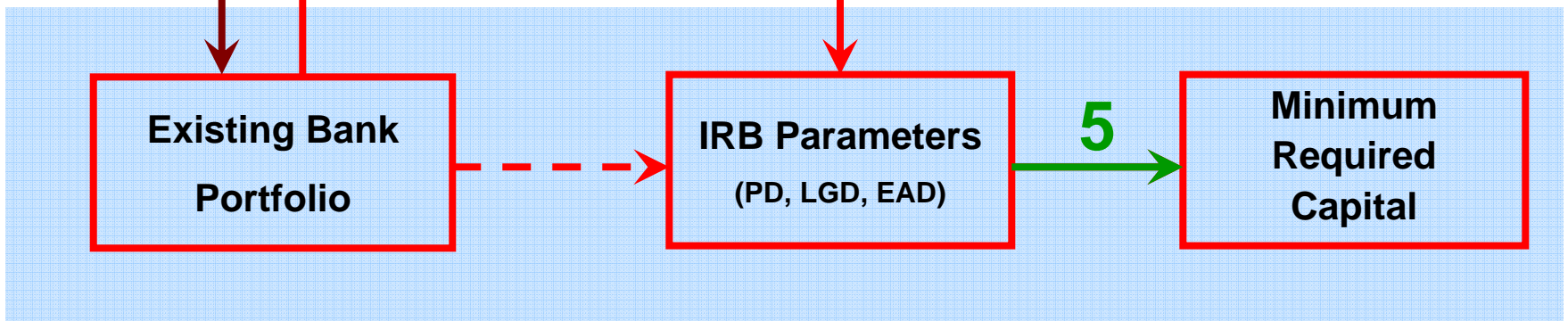
1 Reference dataset contains both characteristics and outcomes

2 Estimation method creates a relationship between the two



3 Mapping describes the portfolio in terms of the same characteristics

4 Estimated relationship is applied to the portfolio, using the mapping, to produce IRB parameters



5 Capital for portfolio is computed using resulting parameters

Validation for IRB Quantification

	Developmental Evidence	Process Verification and Benchmarking	Outcomes Analysis
Reference Data	X	X	
Estimation	X	X	?
Mapping	X	X	?
Application	X	X	X

Example: LGD Quantification

- Bank has internal data on all defaulted loans, with timing and amounts of recoveries, back to 1996 (net of workout costs)
- For each loan, data include collateral type (e.g. real estate, inventories, cash), and collateral coverage as “high, medium, low”
- Apply discount rate to value recoveries, then estimate LGD from average recovery rate, for each of 12 combinations

LGD (percentage of EAD lost in default)			
	Low coverage	Medium coverage	High coverage
Collateral Type 1	25	12	5
Collateral Type 2	5	3	1
Collateral Type 3	16	16	14
Collateral Type 4	90	40	25

Example (continued)

- Bank has more detailed information on collateral types and coverage for the exposures in its existing portfolio, but divides the portfolio into 12 categories to match the available reference data
- Any exposure with multiple types of collateral receives an average of the LGD values for those collateral types
- All LGD estimates adjusted upward by 10% to account for “benign environment” represented in reference data

Dissecting the Example

- Internal risk-rating system for loss severity, based on established criteria related to loss rates
- Reference data set of internal defaults, with some observable risk-related characteristics (collateral)
- Estimation is simple averaging within categories
- Mapping requires determination of relationship between collateral information for existing portfolio and less-detailed information in reference data
- Application stage involves some adjustments for special cases (multiple collateral types) and conservatism

Example: Illustrative Validation Questions

	Developmental Evidence	Process Verification and Benchmarking	Outcomes Analysis
Reference Data	Was there available information that was excluded from the reference data set?	How does the discount rate compare to what others use?	
Estimation	Did the bank consider other factors that might affect losses?	How do these LGDs compare to other available estimates?	How do realized loss rates compare to LGD estimates?
Mapping	How did the bank establish the relationship for the collateral variable?	Does the approach resemble current sound practice?	
Application	How did the bank determine that 10% was an appropriate adjustment?	How does the 10% adjustment compare to other banks' practices?	Is there evidence that the adjustment accomplished its objectives?

Basel Validation: New Tools Needed

- From the LGD example:
 - Outcomes analysis when distribution is multimodal
 - Benchmarking when workout practices differ across banks
- Challenges for assessing PD
 - Small samples, small probabilities
 - Statistical tests can be difficult if default rates vary over time
- Requirement to validate *all* parts of the process
 - For risk quantification, validation can be organized around the four “stages” discussed above
- Likely need for better data – data have not necessarily been collected in the form now needed

Prominent Basel Validation Issues

- Dialogue among regulators and with industry representatives highlights a number of issues
 - Expectations for validation of vendor models used for IRB
 - Expectations for independence in validation or other aspects of IRB
 - Expectations for “conservatism” in various areas and the impact on validation
 - Validation for “low-default” portfolios

- These and many other issues are the subject of continuing work and development
 - Validation for so-called “low-default” portfolios is discussed in a recent Basel Committee newsletter (No. 6, September 2005)

Conclusions

- Validation is a process, not an event
 - Process must specify who, what, when – and include responses linked to established “tolerances”
- Now is the time to consider the validation strategy
 - Models used for IRB should be validated according to the principles of OCC 2000-16
 - Validation should be built into the development process
- Validation should be designed and evaluated in the context of other controls around the IRB system
- Creative thinking and new tools and data are needed

References

- Basel Committee on Banking Supervision, "Update on work of the Accord Implementation Group related to validation under the Basel II Framework," *Basel Committee Newsletter No. 4*, January 2005.
- Basel Committee on Banking Supervision, "Validation of low-default portfolios in the Basel II Framework," *Basel Committee Newsletter No. 6*, September 2005.
- Basel Committee on Banking Supervision, *International Convergence of Capital Measurement and Capital Standards: A Revised Framework*, updated November 2005.