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Better Faster Decisions

Ratings and CECL in Times of Stress

Incorporating market conditions into commercial loan risk ratings and the allowance process

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Introductions

Jan Larsen

Sr. Director- Advisory Services

- Jan has worked at Moody's since 2011, and currently leads the Risk and Finance Solutions Advisory Practice for the Americas.
- Jan's team advises financial institutions and corporates throughout the Americas on a wide range of credit-relevant topics. His team has delivered risk rating solutions to dozens of banks throughout North America.
- Prior to Moody's, Jan was at NERA Economic Consulting, an Oliver Wyman company, for over seven years.
- Jan has an MS in Physics, is a CFA Charter holder, and holds the PRM designation.

Emil Lopez

Sr. Director- Sr. Strategist

- Emil spent over 8 years leading implementation of impairment accounting solutions (IFRS 9/CECL) and risk modeling advisory engagements for financial institutions.
- Prior to this, Mr. Lopez oversaw operations for Moody's Analytics Credit Research Database, one of the world's largest private firm credit risk data repositories. He has extensive experience in credit impairment accounting, credit risk modeling and reporting, data sourcing, and quality control.
- Mr. Lopez has an MBA from New York University and a BS in finance and business administration from the University of Vermont.

Agenda

1. Internal Risk Rating: Best Practices
2. Leveraging Risk Ratings in CECL Process
3. Am I Double Counting?

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Internal Risk Ratings: Best Practices

Typical evolution of risk rating systems

Banks tend to move towards more granular pass ratings, as well as separation of borrower and facility risk, over time

Basic Single Risk Ratings

4-5 pass grades, 8-10 total

- Grades largely judgment-based
- Typically large concentrations in 1-2 grades (e.g., '4' and '5')
- Most common among banks <$7bn in assets
- Grades typically reflect both borrower and collateral characteristics

Granular Risk Ratings

8-10 pass grades, 12-15 total

- Grades partly based on models
- Rating scale designed to avoid concentrations
- Common first step for banks moving towards dual risk ratings
- Grades typically are based on borrower factors, collateral is addressed through haircut tables

Dual Risk Ratings

Separate borrower/facility ratings

- Grades partly based on models
- Borrower scale designed to avoid concentrations
- Nearly universal among banks >$25bn, increasingly common $7bn - $25bn
- Delivers most granular picture of risk

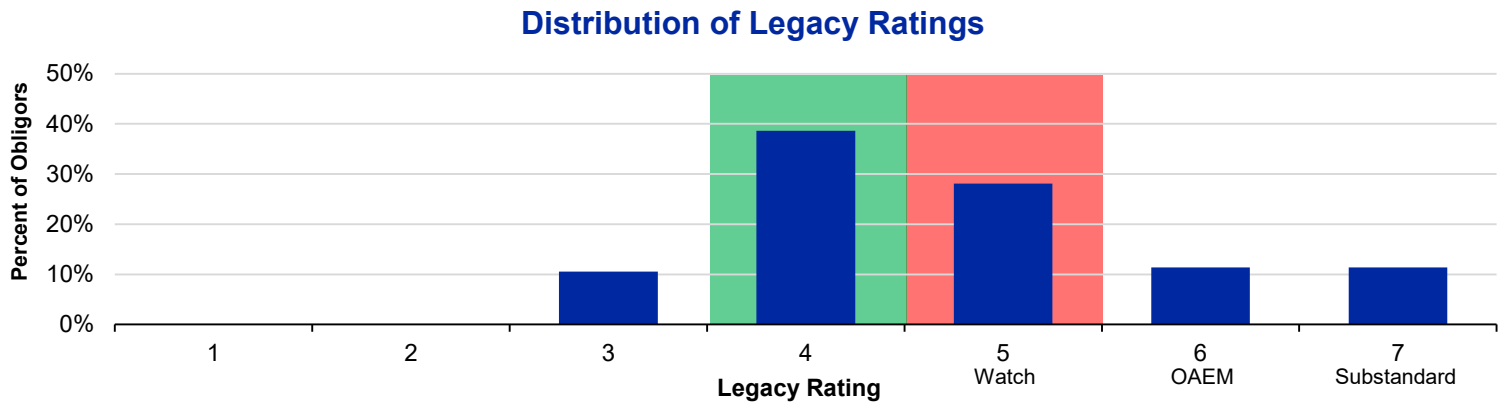
Enhanced granularity of pass grades delivers business value

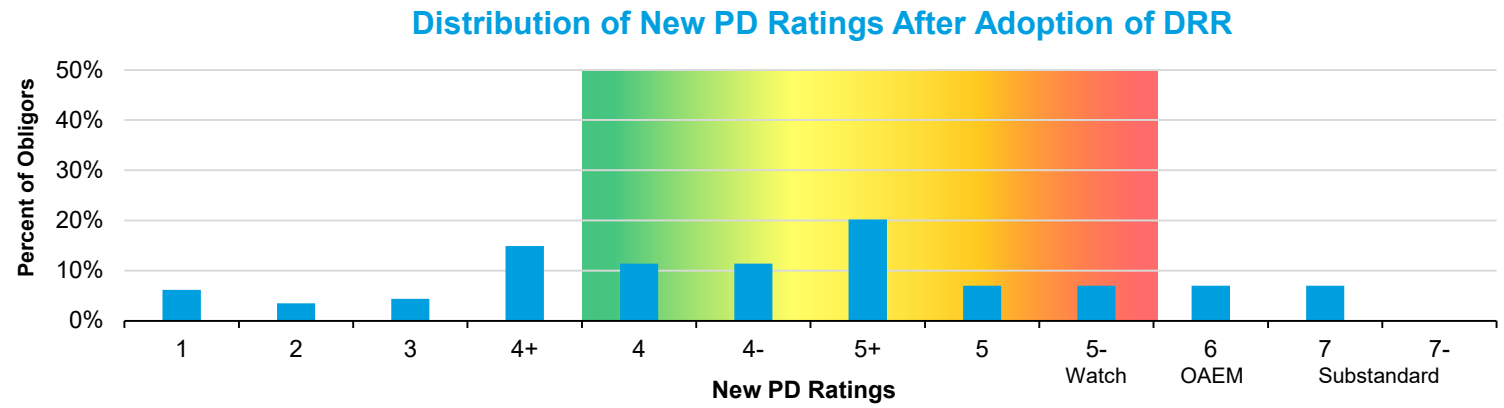
- Increased granularity of pass grades allows the bank to:
  - Focus on originating loans with the strongest pass credits
  - Price in the risk of the weakest pass credits
  - Detect credit deterioration to prior to loans hitting Watch or Non-Pass
- Provides enhanced flexibility to underwrite loans with
  - Weak obligors but strong collateral (e.g., ABL)
  - Strong obligors but weak collateral
- Enables executive leadership to understand the performance of different business lines
  - Is a 5% yield on the CRE portfolio really better than 4.5% on the C&I portfolio after accounting for risk?

Enhanced risk ratings also have regulatory and accounting value

- DRR is:
  - Nearly universal among commercial banks >$25 billion in assets
  - Increasingly becoming an industry standard/regulatory expectation among banks approaching or above $10 billion in assets
- For banks with ambitious growth aspirations, moving towards DRR today can remove regulatory roadblocks to acquisitions in the near-to-medium term future
- More granular risk ratings lend enhanced accuracy to the inputs to the CECL allowance process, leading to a more rigorous reserve estimate that can often benefit from lower buffers to account for uncertainty

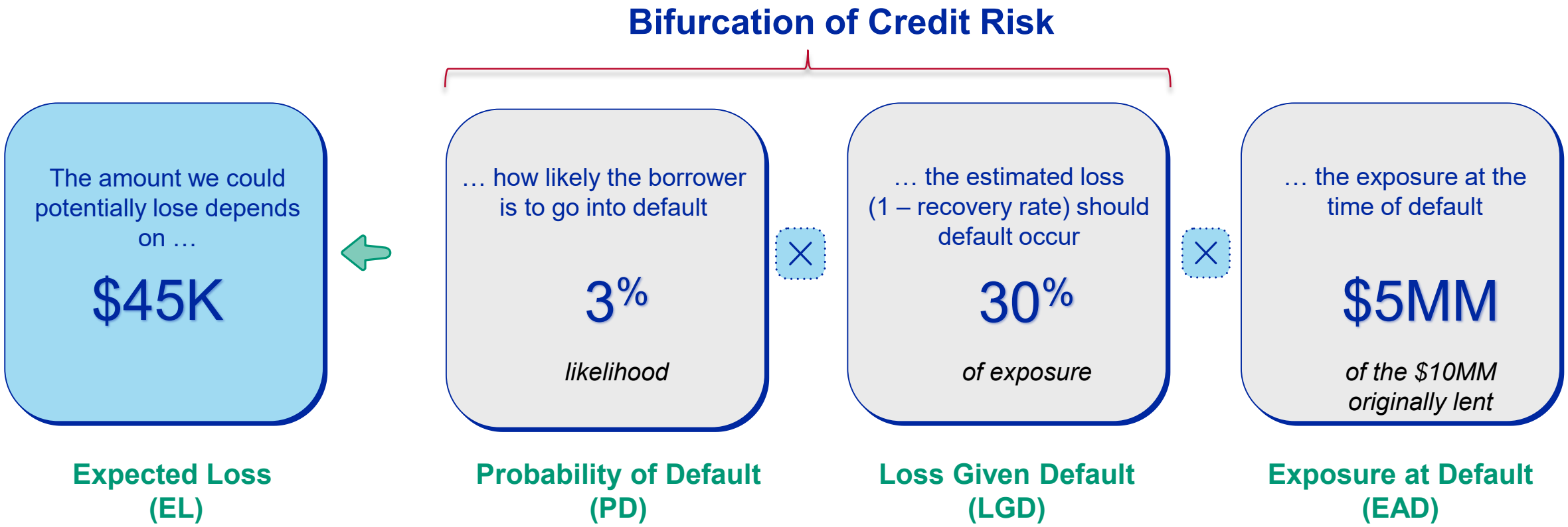
Well-designed rating scales provide granularity and differentiation





Dual Risk Rating: Bifurcation of Credit Risk

Industry Leading Practice



PD and LGD capture different risk dynamics

PD Ratings

- Drivers include:
  - Financial statement items
  - Qualitative factors (management quality, industry conditions, etc.)
- PD is a more dynamic credit risk measurement
  - High PDs can be over 100x low PDs (typically ranges from ~10 bps – ~10%)

LGD Ratings

- Drivers include:
  - Amount & quality of collateral
  - Type of collateral (value volatility)
  - Obligation seniority
  - Jurisdiction
- Typically ranges from ~20% – ~80%
  - Weak loans can have 4x as much LGD as strong loans

Single Risk Rating Drawbacks

- Single risk ratings can penalize safer borrowers with riskier facilities
  - Allow a high LGD to overwhelm a lower PD, resulting in inconsistent pricing for clients
  - Risk drivers are entangled, allow less transparency into credit risk and allowance drivers

DRR leads to a highly granular, two-dimensional rating scale

Risk Rating		PD Mapping		
		Fitted PD	Min PD	Max PD
1	Pass	0.06%	0.00%	0.08%
2	Pass	0.11%	0.08%	0.14%
3	Pass	0.18%	0.14%	0.22%
4	Pass	0.28%	0.22%	0.34%
5	Pass			
6	Pass			
7	Pass			
8	Pass			
9	Pass			
10	Pass			
11	Spec Mtn			
12	SubStd Acr			
13	SubStd Non			
14	Doubtful			
15	Loss			

Rating	MDPT	LB	UP
A	2.5%	0.0%	5.0%
B	7.5%	5.0%	10.0%
C	12.5%	10.0%	15.0%
D	17.5%	15.0%	20.0%
E	22.5%	20.0%	25.0%
			30.0%
			40.0%
			50.0%
			100.0%

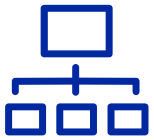
PD				LGD								
				A	B	C	D	E	F	G	H	I
				2.5%	7.5%	12.5%	17.5%	22.5%	27.5%	35.0%	45.0%	75.0%
	1	Pass	0.06%	0.002%	0.005%	0.008%	0.011%	0.014%	0.017%	0.022%	0.028%	0.046%
	2	Pass	0.11%	0.003%	0.008%	0.014%	0.020%	0.025%	0.031%	0.039%	0.051%	0.084%
	3	Pass	0.18%	0.004%	0.013%	0.022%	0.031%	0.040%	0.048%	0.062%	0.079%	0.132%
	4	Pass	0.28%	0.007%	0.021%	0.034%	0.048%	0.062%	0.076%	0.096%	0.124%	0.206%
	5	Pass	0.43%	0.011%	0.032%	0.054%	0.075%	0.097%	0.118%	0.151%	0.194%	0.323%
	6	Pass	0.67%	0.017%	0.051%	0.084%	0.118%	0.152%	0.185%	0.236%	0.303%	0.505%
	7	Pass	1.05%	0.026%	0.079%	0.132%	0.184%	0.237%	0.290%	0.369%	0.474%	0.790%
	8	Pass	1.65%	0.041%	0.124%	0.206%	0.289%	0.371%	0.454%	0.577%	0.742%	1.237%
	9	Pass	2.58%	0.065%	0.194%	0.323%	0.452%	0.581%	0.710%	0.903%	1.161%	1.936%
	10	Watch	4.04%	0.101%	0.303%	0.505%	0.707%	0.909%	1.111%	1.413%	1.817%	3.029%
	11	Special Mention	6.32%	0.158%	0.474%	0.790%	1.106%	1.422%	1.738%	2.212%	2.844%	4.739%
	12	Substandard (Accru)	13.83%	0.346%	1.037%	1.729%	2.420%	3.111%	3.803%	4.840%	6.223%	10.371%
	13	Substandard (Non-Accru)	27.09%	0.677%	2.032%	3.386%	4.741%	6.095%	7.450%	9.482%	12.191%	20.318%
	14	Doubtful	50.00%	1.250%	3.750%	6.250%	8.750%	11.250%	13.750%	17.500%	22.500%	37.500%
	15	Loss	100.00%	2.500%	7.500%	12.500%	17.500%	22.500%	27.500%	35.000%	45.000%	75.000%

What are the benefits of DRR?

Accurate, granular, transparent approach that supports business needs and satisfies regulatory expectations

- More **accurate**
  - More confidence around credit risk ratings, reducing capital buffers and reserves due to uncertainty
  - Supports more consistent and competitive pricing

- More **granular**
  - Improve differentiation among borrowers and loans via more rating grades
  - Separate PD and LGD ratings create a rating grade matrix (PD x LGD)



- **Untangle** risk drivers—what drives default does not explain recovery
  - Identify whether the bank targeted weaker borrowers and/or poorly structured loans during periods of elevated provisions
  - Informs most efficient/appropriate credit protections in future deal structuring

- Meet **regulatory expectations**
  - Regulators increasingly expect DRR for >$10bn banks

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Leveraging Risk Ratings in CECL Process

In essence, CECL looks to improving measurement and reporting of expected credit losses

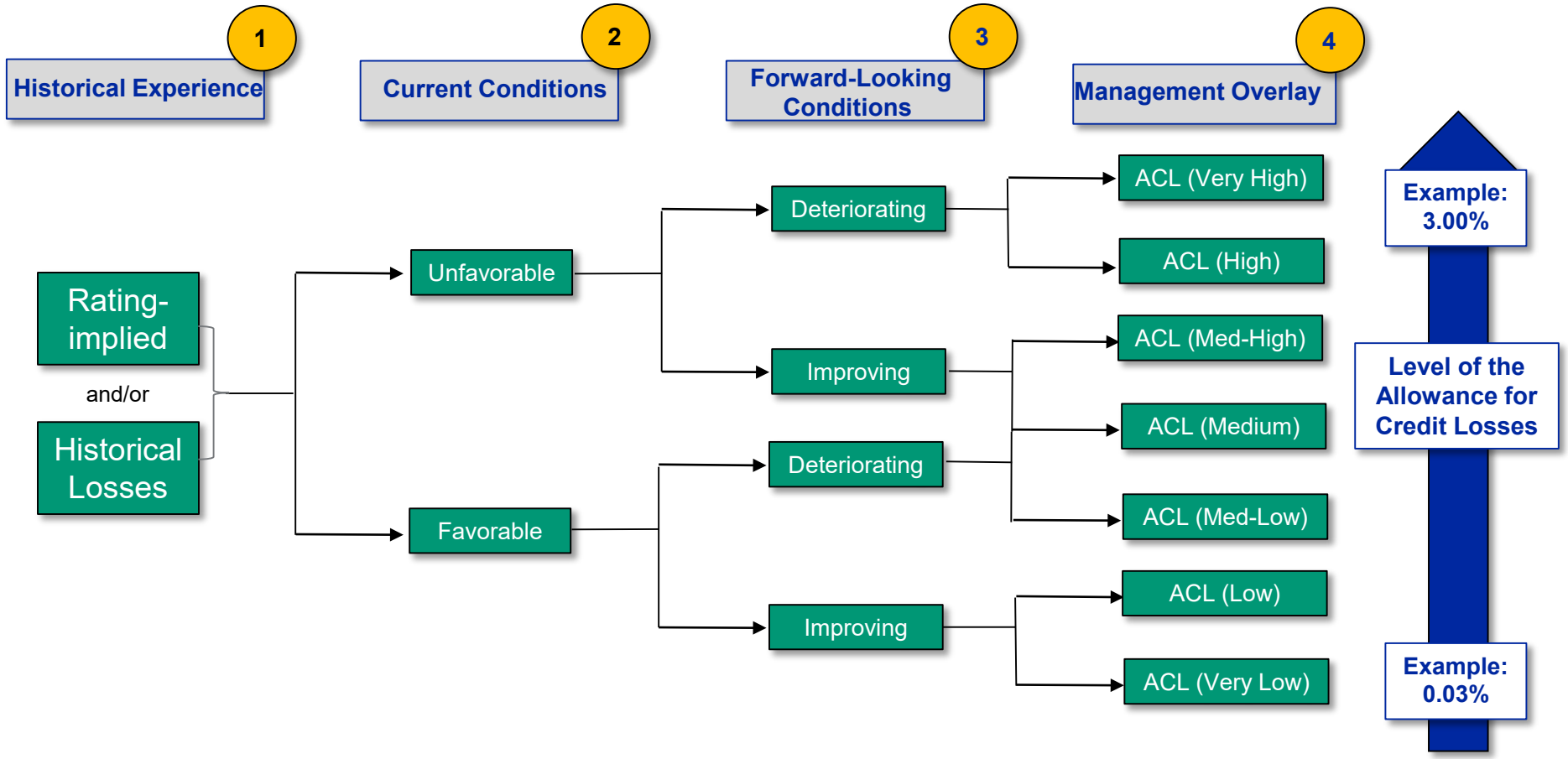
Institutions need to measure and record immediately expected credit losses (ECL) over the life of their financial assets reported on an amortized cost basis, on a collective basis, reflecting:

1) Past events, including historical experience
2) Current conditions
3) Reasonable and supportable forecasts

If it effects the collectability of the reported amount, it should be considered!

- Although "reasonable and supportable forecasts" are required, an entity will not need to create an economic forecast over the entire contractual life of long-dated financial assets
- Institutions will have significant discretion over how they measure expected credit losses
- ECL recorded at origination and updated at subsequent reporting dates

Illustration of the CECL quantification process



Most common ECL estimation methodologies for commercial portfolios

Loss Rate

- Apply a historic loss rate percentage, by segment (e.g. rating, industry, etc.)
- Can be applied as a cumulative rate or as a term structure
- Includes: Average charge-off method, static pool analysis, vintage analysis, WARM method

Rating Migration

- Compute percentages of assets that will "migrate" to a more severe risk rating or delinquency status
- Migration-rate percentages are applied to the balance in each category to estimate amount that will migrate to the next category
- Aggregate total migration for each category to determine the allowance

PD/LGD (DCF or Non-DCF)

- Separates default and recovery risk, providing greater insight into the ECL estimate
- Can support other business processes such as loan pricing, limit setting, and risk monitoring
- Includes Basel models, granular stress testing models, and internal Dual Risk Ratings

Statistical and/or qualitative analysis can be applied to:

1. Reflect current conditions
2. Incorporate reasonable and supportable forecasts
3. Account for life-time loss

Incorporating forward-looking information

Scenario-Conditioning Approach	Key Characteristics	Leveraging Internal Ratings
Direct Forecast of PD/LGD/LR	» Macro data embedded directly as a variable in the scenario-conditioning model » Requires sufficient default/recovery/loss data	» As a model input or, » To calibrate model output
Change in PD/LGD/LR	» Models the shock to PD/LGD/Loss Rate » Requires reliable starting-point risk measures » Often based on the observed relationship between macro variables and a risk estimate rather than observed defaults/recoveries	» As the starting point to shock
Change in PD/LGD/LR Risk Drivers	» Models the impact of macro variables on factors underlying the PD/LGD/Loss (profitability, LTV, systematic factors, etc.) » Requires access to sufficient data on the underlying risk drivers	» To calibrate model output

Relevant risk measures for internal ratings include Probability of Default (PD), Loss Given Default (LGD), and Loss Rate (LR)

Direct Forecast of PD/LGD/Loss Rate

Example: Moody's Analytics C&I Loss Rate Model

» Models lifetime loss rate as a function of loan/pool characteristics as well as macroeconomic scenarios

$R_{\text{Lifetime Loss Rate}} = F_1(\text{Age Percentage}) + F_2(\text{Credit Spread at Origination}) + F_3(\text{Original Loan Size}) + F_4(\text{Regulatory Rating Dummy}) + F_5(\text{Loan Type Dummy Variables}) + F_6(\text{Sector dummy Variables}) + F_7(\text{Transformed Macro Variables})$

- **Age Percentage**: Defined as: (As of Date- Origination Date)/(Maturity Date-Origination Date)
- **Credit Spread at Origination**: Origination coupon rate – USD 3Yr Swap rate
- **Original Loan Size**: log10(Original balance (Term Loan)/Commitment (Line, Revolver))
- **Regulatory Rating**: "Pass", "Watch", "OLEM", "Substandard". "Pass" is the baseline
- **Loan Type**: "Line", "Revolver", "Term Loan". "Term Loan" is the baseline
- **Industry Sectors**: 13 Sectors, 'Unassigned' is the baseline
- **Macroeconomic Variables** (Transformed):
  1. Unemployment rate YoY change next 8 quarter moving average
  2. Baa Spread next 6 quarter moving average

Embedded internal ratings

Embedded macro variables

Change in PD/LGD/Loss Rate

Example: Moody's Analytics GCorr Macro

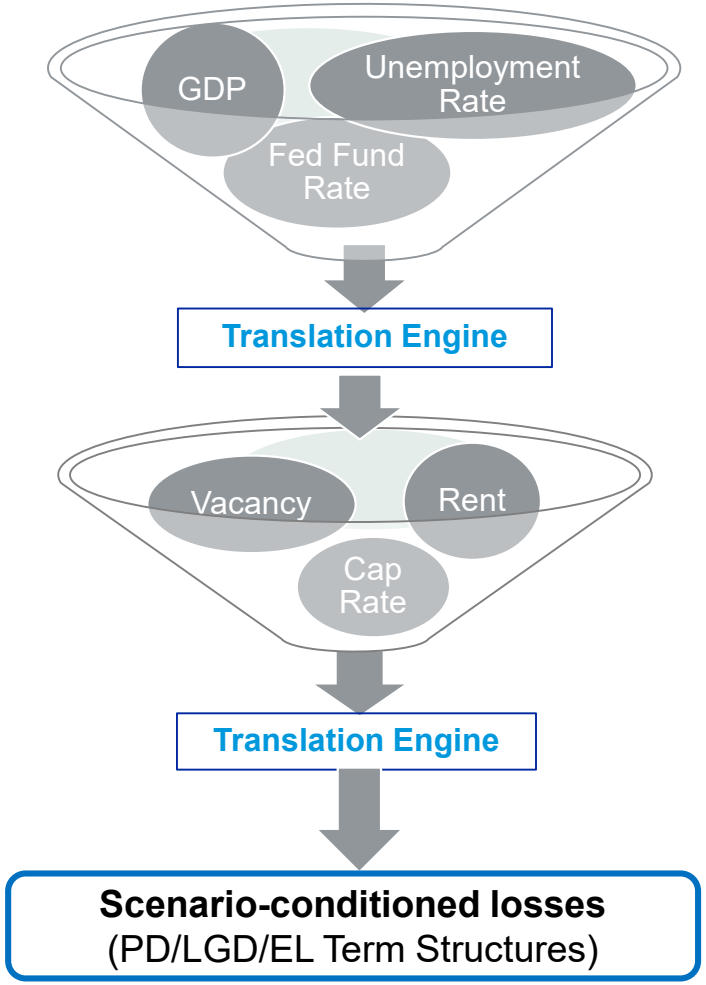
- Leverages covariance matrix between systematics factors and macroeconomic variables
- **PD**: "Starting" (Unconditional) probability of default } Internal ratings can be used to derive starting point*
- **RSQ**: Sensitivity of a firm's asset return to it's country and industry systematic factor
  - Similar to the beta in the CAPM model
- $\boldsymbol{\beta_{MV}}$: Sensitivity of the country and industry systematic factor to the macrovariables
  - Similar to the coefficients from regressing the systematic factors onto the macro variables
- $\boldsymbol{p^2}$: Explanatory power of the macroeconomic variables
  - Similar to the R2 of regressing the systematics factors on the macrovariables
- $\boldsymbol{f(MV)}$**:** Macrovariable scenario, transformed into standard shocks

* May require conversion from through-the-cycle (TTC) to Point-in-Time (PIT)

Change in PD/LGD/Loss Rate Risk Drivers

Example: Moody's Analytics Commercial Mortgage Metrics (CMM)

- CMM links macro variables to real estate variables that impact the ultimate risk drivers: LTV and DSCR
- The baseline relationship between the model implied and the internal rating-implied risk can be used to "calibrate" all other scenario results



Macroeconomic Scenario

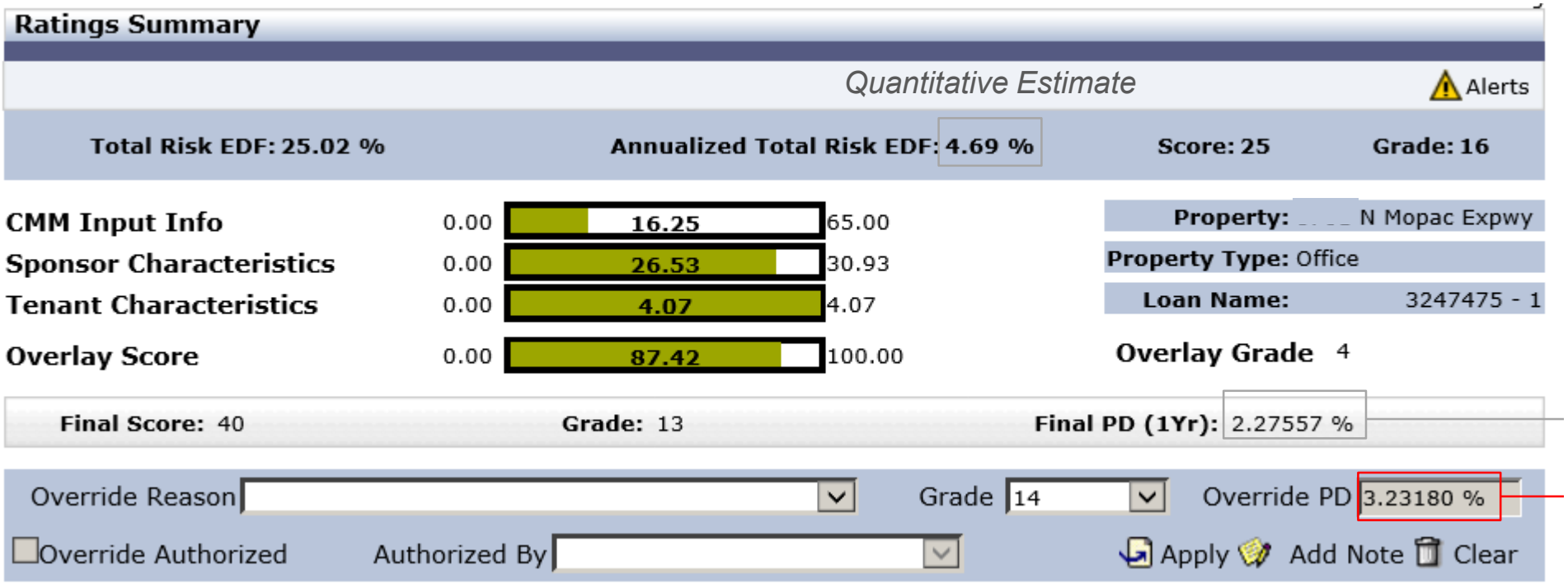
National and Local Real-Estate Market Factors

To forecast NOI & Property Value, a Monte Carlo simulation is run utilizing:

- Loan level CRE forecast,
- Loan and Property Details
- Forward Looking Volatility

Change in Risk Measure's Drivers (Cont.)

Example: Moody's Analytics Commercial Mortgage Metrics (CMM)



Scorecard Estimate

Rating-implied PD

CMM Annualized PD	4.69%
Rating Implied Annual PD	3.23%
Scaling Ratio	**0.6897**

Used as a linear scalar for the entire term structure

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Am I Double Counting?

Am I Double Counting?

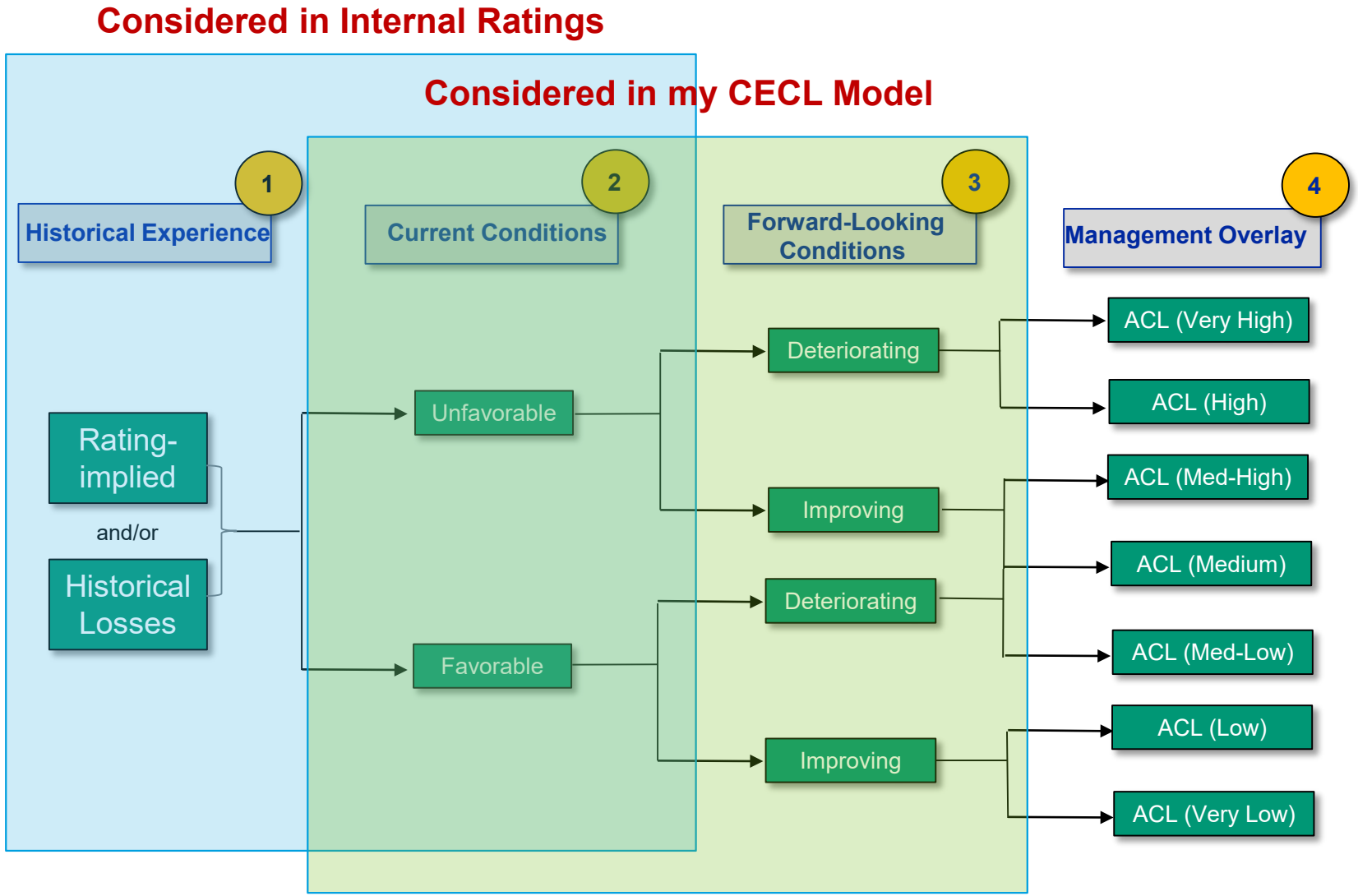
It Depends!

- How up to date are internal ratings?
- What current conditions are being captured in the ratings process?

Ratings are better for capturing idiosyncratic, borrower-specific information

CECL models are better for capturing systematic effects by segments (e.g. industry)

Management overlays should capture other effects omitted in ratings and CECL models



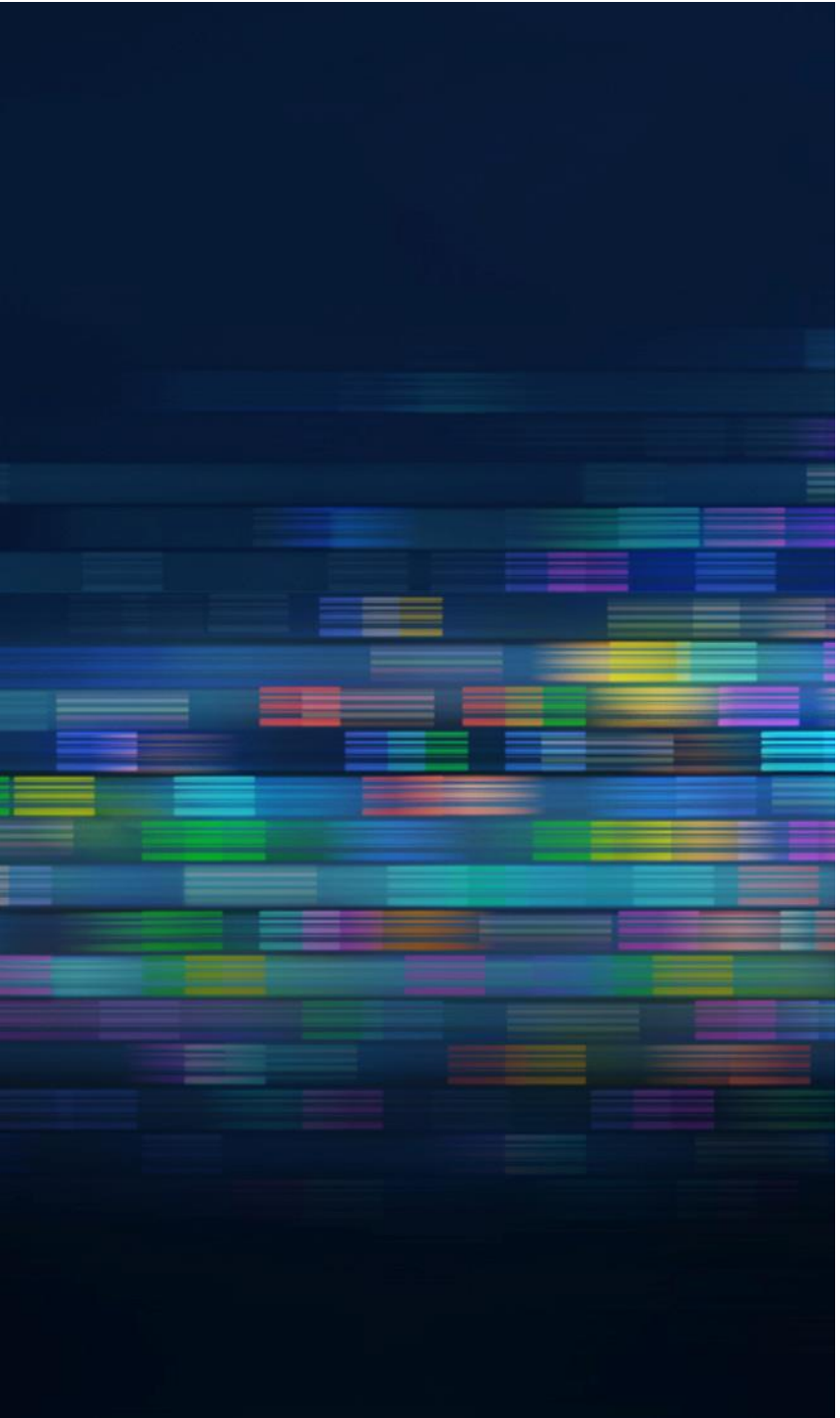
Key Takeaways

Dual Risk Ratings advance internal rating practices by providing more granularity, consistency, and separation of default and recovery risk.

CECL looks to improve measurement and reporting of expected credit losses, by incorporating historical, current, and forward-looking information, through life of loan.

CECL models can leverage internal ratings as an input variable, as the variable to shock, or for output calibration.

Ratings are better for capturing idiosyncratic, borrower-specific information. **CECL models** are better for capturing systematic effects by segments. **Management overlays** can capture other effects omitted in ratings and CECL models.



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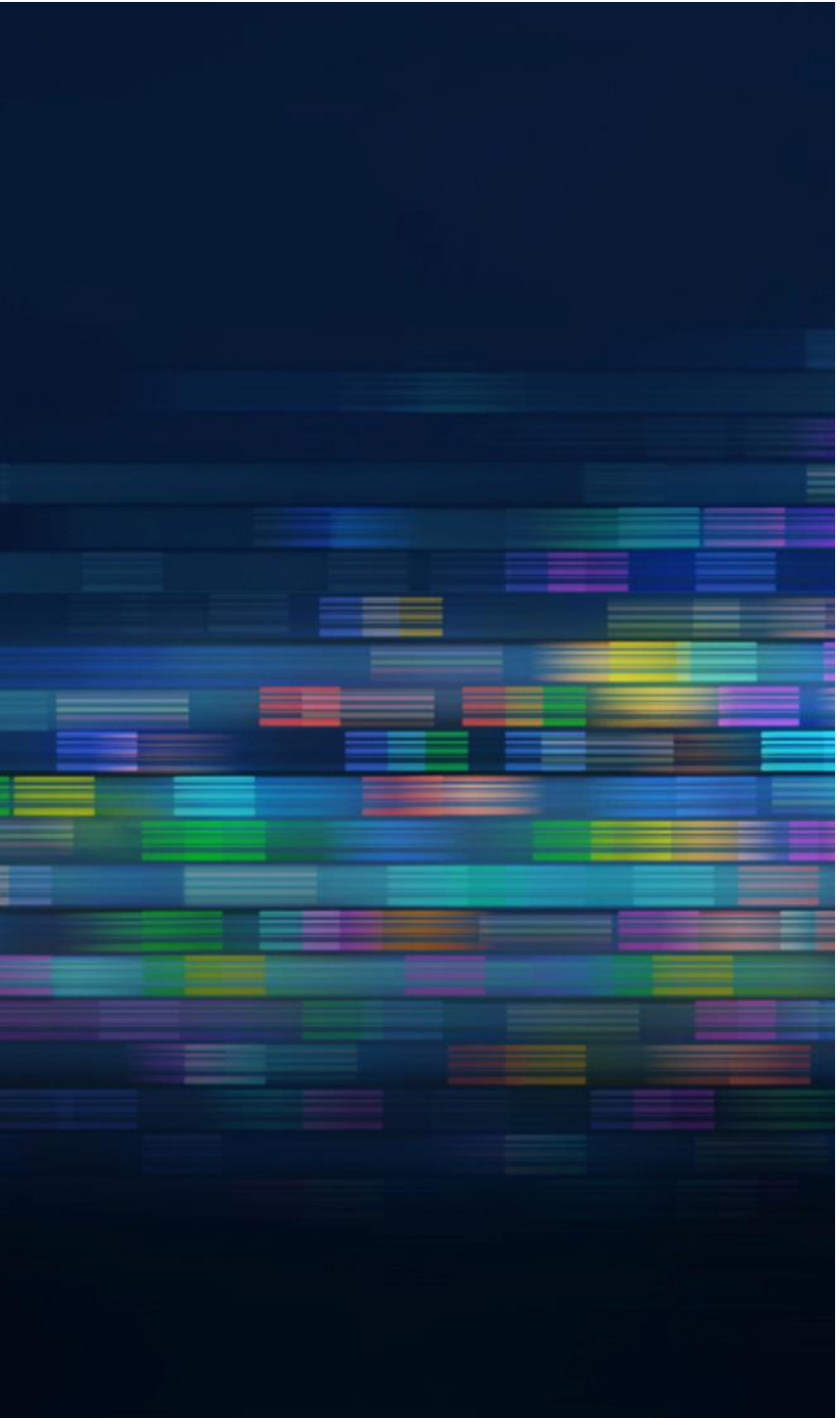
Q&A

RATINGS AND CECL IN TIMES OF STRESS



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