



Commercial Real Estate (CRE) Credit Risk Solutions & Best Practices

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Agenda

- 1. Credit Risk Management Challenges
- 2. Best Practices
- 3. Stress Testing Model and Approach
- 4. CRE Risk Tools
- 5. Questions





Speakers



Sumit Grover is an associate director of product management with Moody's Analytics in San Francisco. He manages Commercial Mortgage Metrics and also supports other commercial real estate offerings including spreading, scoring and stress testing solutions. Sumit holds an undergraduate degree in Information Systems and a MBA from Indiana University Bloomington.



Chris Henkel is a Director in the Enterprise Risk Solutions group with Moody's Analytics where he leads the risk measurement delivery team throughout the Americas. He has vast experience offering advisory services and custom quantitative risk solutions to clients. Chris has served as a credit risk instructor and is a frequent lecturer in industry conferences and organizations. He received his master's and undergraduate degree from the University of Texas and graduated Valedictorian form the Southwestern Graduate School of Banking at Southern Methodist University.







Challenges in CRE Risk Management

Updated Property Information Foresight into Market Fundamentals Default history and modeling expertise Intuition vs quantitative validation

Assessing the impact of macro economy



Valued - \$95M in 2007 Now?

- Data captured at origination may not be complete for data analysis.
- Data management is important for historical and forward looking analysis



• Sound forecast that differentiates between property types and submarkets is important is not available



 Default history over multiple credit cycles and from multiple sources is important for sound modeling and CRE data history is not captured



• Several qualitative factors can impact the analysis and risk measures and integrating quantitative models with intuition can be a challenge



 Different cities and neighborhoods react differently to an economic recession or expansion





Understanding why CRE credit events occur



Insufficient income (NOI) to make the mortgage payment

- Rising vacancy and loss of rental income during recessions
- Deterioration of certain neighborhoods or properties even during boom years



Perceived inability to sell the property for the loan amount

 LTV comes into play when the borrower is having cash-flow problem or during the time to refinance

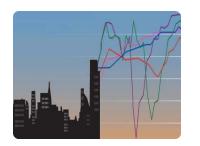


Lack of reserves and additional outside resources available to cover cash flow shortfalls

- Both ability and willingness to pay shortfalls decrease during recessions
- Size of shortfall likely to matter: \$1 million >> \$1000

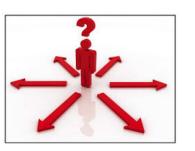


Employing a modeling framework that reflects business practices



Starting with collateral

- Forecasting cash flow under various scenarios
- Property value influences default decision mostly during cash flow stress
- Macro and local market condition matters





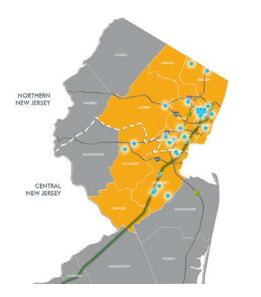
Empirical Evidence

- Inability to reach consensus triggers credit events
- Borrowers are more likely to default in a recession than in an economic expansion

Modeling default behavior

- Option A: Continue payment out of pocket, expecting market recovery
- Option B: Default
 on loan

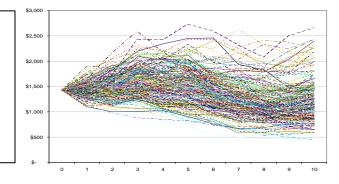
A granular market forecast can improve model accuracy



A forecast should:

- Differentiate between different *cities* and *neighborhoods* to identify high risk concentration
- Provide visibility into how market behavior might change under various economic conditions

Using a multi-pass forecasting to identify the volatility in individual property value and income can help improve confidence in the model





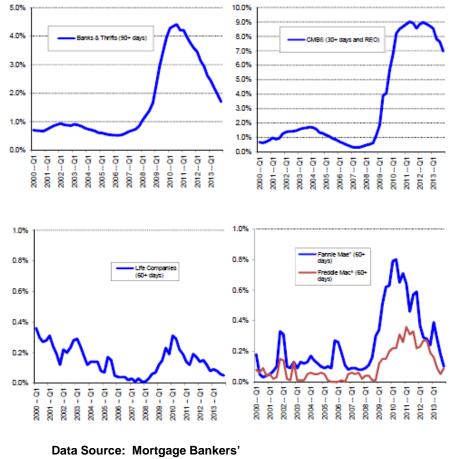
Default history should span across the industry and economic cycles

- Different segments/origination groups have experienced each economic cycle uniquely
- Insurance segment saw high losses in the early 90's and have since been able to maintain high quality portfolios
- Commercial banks experienced moderate losses in the recent financial crises

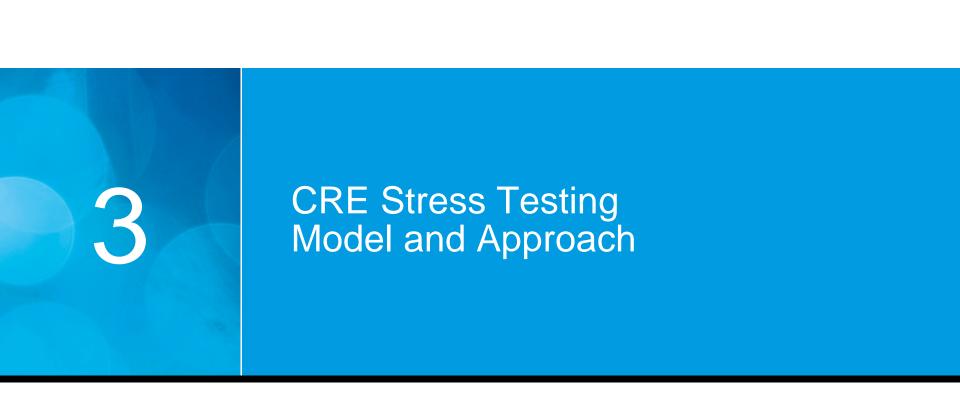
- CMBS portfolios experienced highest losses in the recent crisis

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ANALYTICS

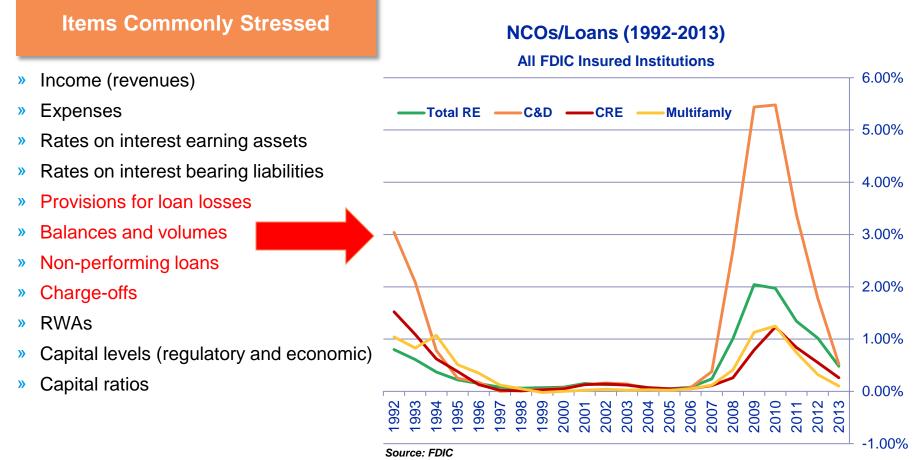


Association





Our focus for today is on the loss forecasting components of stress testing



Stress testing loan losses is not a new concept - but it has our attention now more than ever

Common Approach to Stress Testing (pre-DFAST)

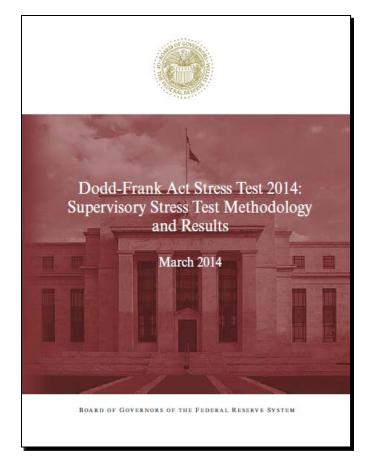
- » Historically based on stressed loss-rate analysis based on call report categories
- » "Top-down" approach with a focus on material credit concentrations
- » Loss rates applied to specific segments
- » Included scenario and sensitivity analysis:
 - "What if" questions

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ANALYTICS

- Impact on earnings and capital
- Integrated with overall risk management, ALCO, and capital planning
- » Still relevant for smaller institutions
- » Loose link between macroeconomic conditions to stressed losses

Enhanced Approach and Requirements



If unemployment rate rises above 10%, what would be the impact to the credit quality in my CRE portfolio?

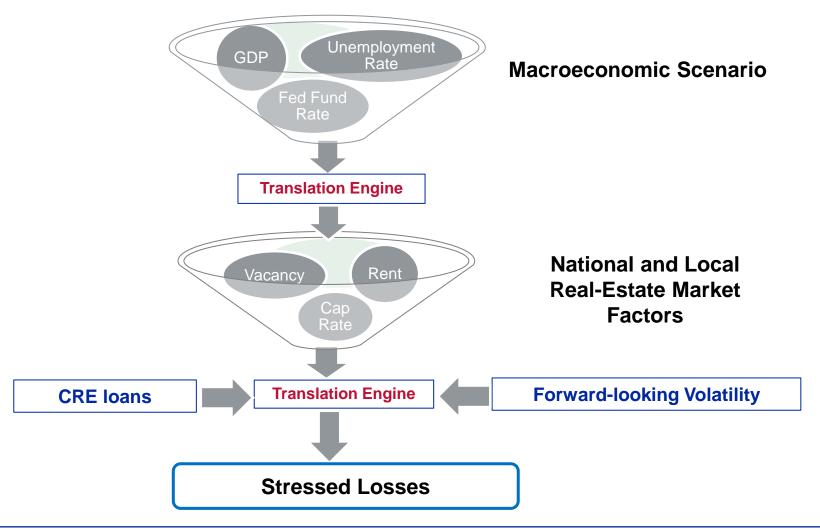
US Unemployment Rate



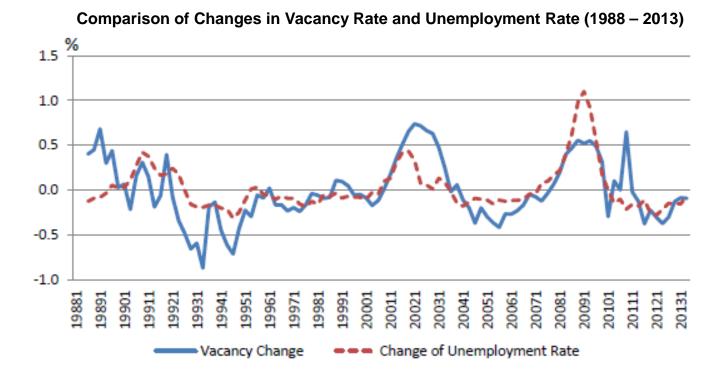
Source: Federal Reserve



It is important to first translate the forecast of macrovariables into a forecast of RE variables



Changes in unemployment certainly influence changes in real estate factors, but differently through time



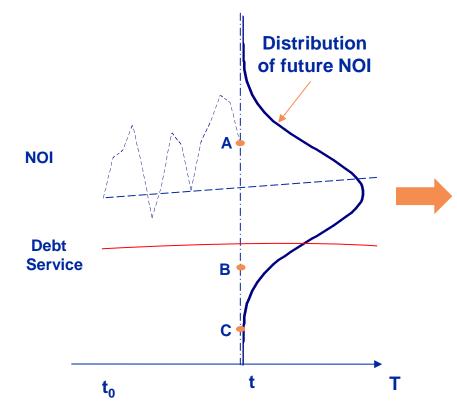
Recession	Trough to Peak Unemployment Rate Change	Trough to Peak Vacancy Rate Change	$\frac{\Delta Vacancy}{\Delta Unemployment}$
2001-2002	2.2%	5.6%	2.5
2008-2010	5.4%	4.5%	0.8



With a stressed RE forecast, we can estimate factors such as DSCR and LTV – and, in turn, PDs and LGDs

Future values of NOI relative to debt service...

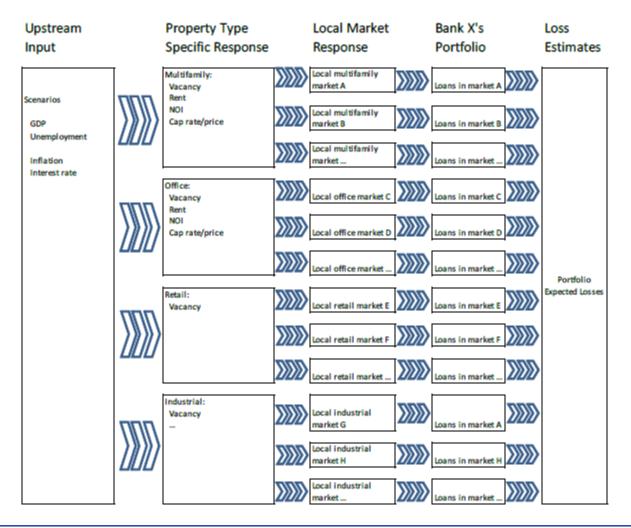
...calibrated to the historical experience



Realized NOI Point	DSCR	Empirical Default Rate	Empirical Loss Given Default
А	1.20	0.50%	5.0%
В	0.95	5.00%	25.0%
С	0.30	15.00%	40.0%

Note: Values do not necessarily reflect actual model coefficients; they are presented to illustrate the concept.

In the end, the impact of a given scenario can be translated into a loan-level estimate of expected loss









What is CMM[®] (Commercial Mortgage Metrics)

- » CMM is the leading analytical model and risk management tool for assessing credit risk in commercial real estate loans
- » CMM offers:
 - » State-of-the-art model
 - » Built on extensive, proprietary dataset and calibrated to recent financial crisis
 - » Flexible framework that allows clients to customize the models
 - » Robust scenario analysis/stress testing capabilities that support regulatory compliance
 Property Type Distribution (By Loan Balance)
 - » Enterprise-class software





CMM Inputs, Outputs & Uses

CMM Inputs

- » Loan Details
 - » Loan Amount, Term/Amort *
 - » Rate: Fixed, Floating, Other *
 - » Structure *
- » Property details
 - » Property type, Location, Property Value, NOI *
 - » Rent, Vacancy, Cap Rate, Lease rolls, Expenses
- » Asset Volatility
 - » Systematic and Idiosyncratic volatility
- * Required input

CMM Outputs

- » Estimated Property Value
- » Estimated NOI
- Expected Default Frequency (EDF)
- » Loss Given Default (LGD)
- » Expected Loss (EL)
- » Yield Degradation (YD)
- » Stressed Risk Measures
 - » Stressed PD, LGD
 - » Unexpected Loss
- » Implied Moody's Rating
- Customer Rating (Based on customer rating scale)

CMM Uses

- » Stress Testing
- » Identify sources and causes of risk
- » Price new loans
- » Monitor loan expected performance as markets change
- » Early Warning System
- » Identify loans for potential sale
- » Identify periods of maximum risk
- » Respond to management and regulators
- » Efficiently size capital allocations vis-à-vis competing asset classes

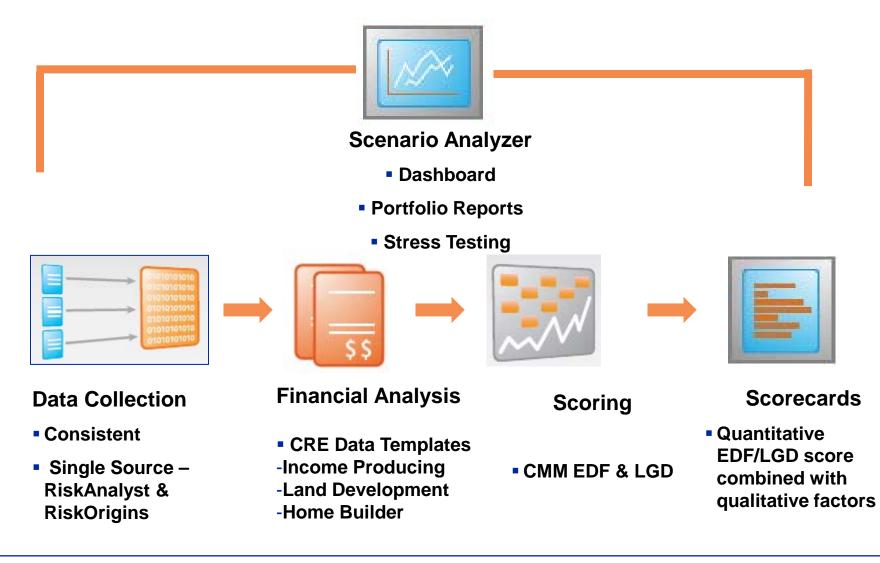


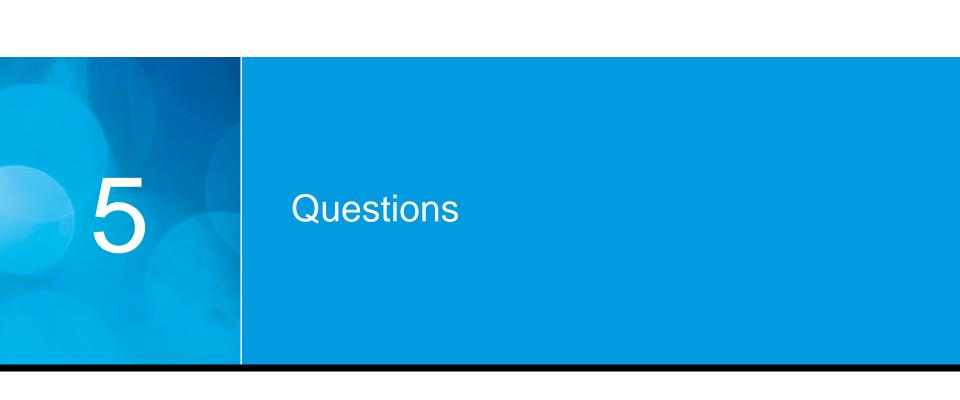
CMM capabilities at a glance

- » Report risk measures at *portfolio and loan level;* also integrated with our spreading, loan origination and stress testing solutions
- » Supports back-testing by allowing historical analysis on a portfolio
- » Supports *regulatory stress testing*, by enabling you to generate risk measures under ECCA, supervisory scenarios and user-defined (organization specific) macroeconomic scenarios into CRE specific forecast and determine related losses on your portfolio
- » Provides flexible framework that is *adjustable* to your default experience

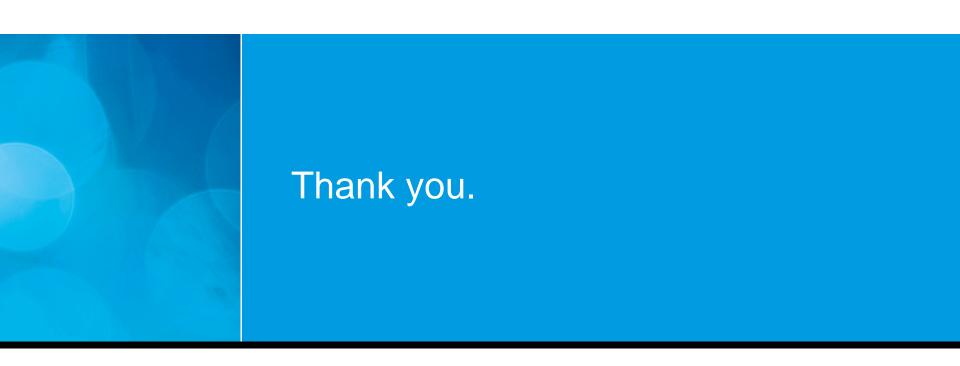


Spread, Score, Store, Workflow & Reporting Solutions











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