MOODY'S
ANALYTICS

Effective Risk Management in CRE Lending

CHRISTIAN HENKEL, SENIOR DIRECTOR, MOODY'S ANALYTICS

SUMIT GROVER, ASSOCIATE DIRECTOR, MOODY'S ANALYTICS

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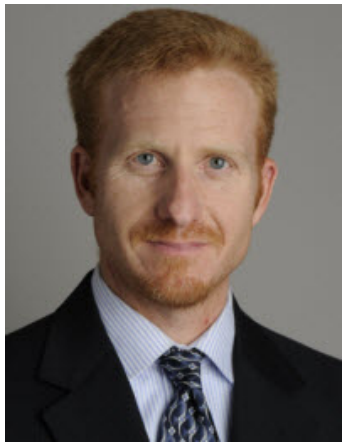
Speakers

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 Senior 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 from the Southwestern Graduate School of Banking at Southern Methodist University.

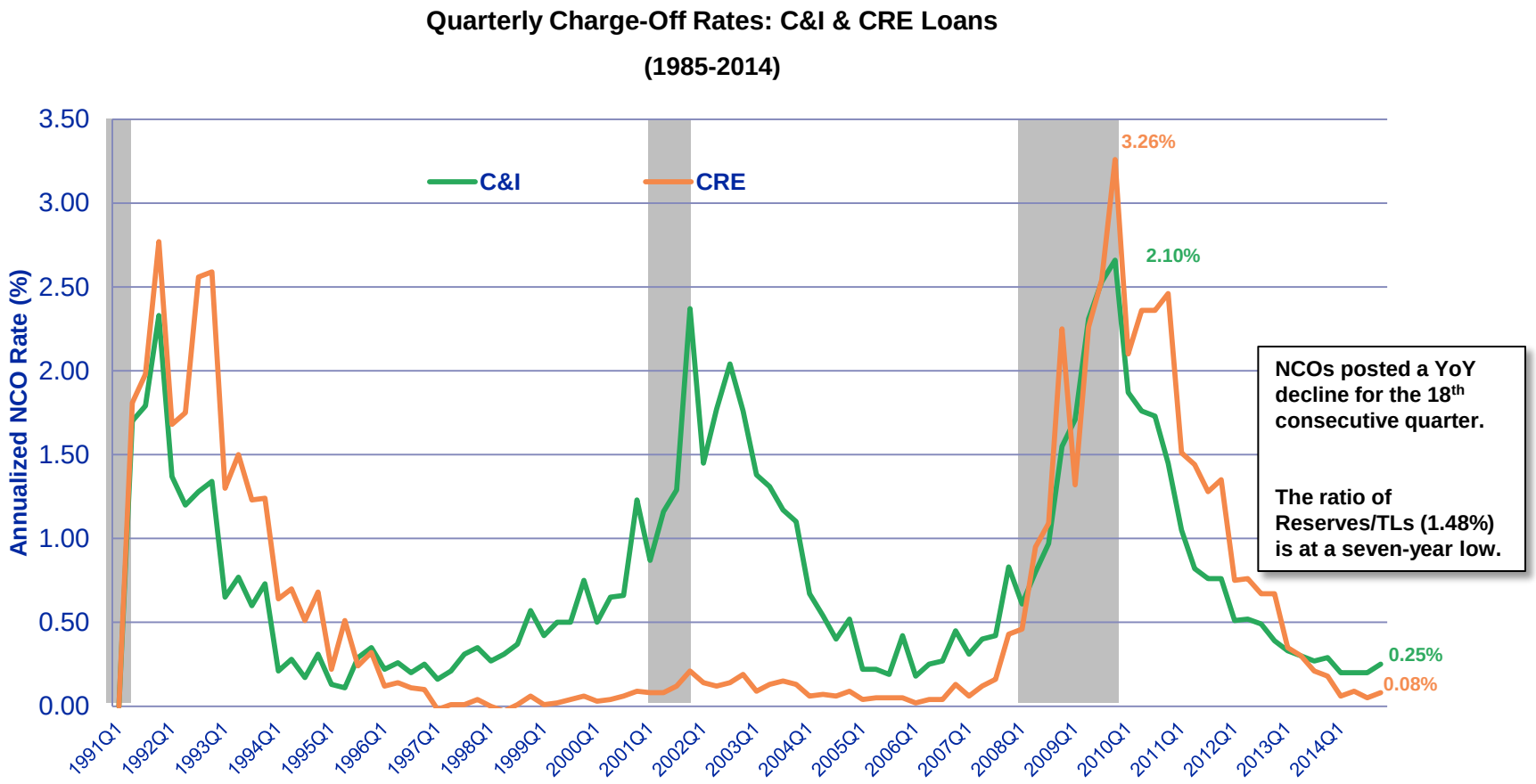
Agenda

1. Market Overview
2. Improving the Measurement of CRE Credit Risk
3. Tethering Improved Risk Measurement to Business Activities
4. Commercial Mortgage Metrics (CMM) Product Overview
5. Sample uses for CMM
6. Questions

1

Market Overview

The credit quality of CRE portfolios is largely influenced by the health of the economy

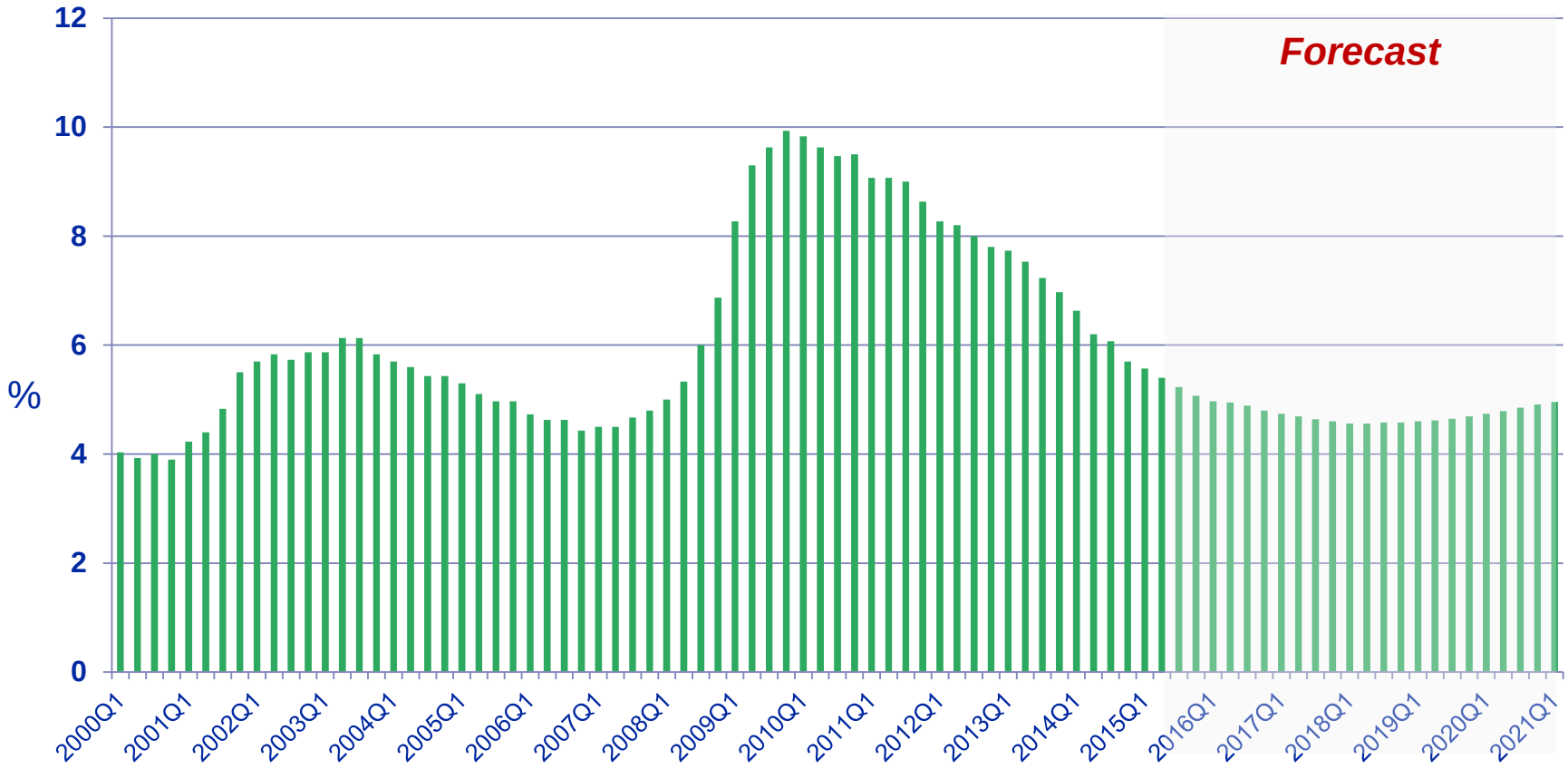


Source: Federal Reserve, All Banks, NSA; NBER

Quarterly GDP Growth (Annualized, SA)

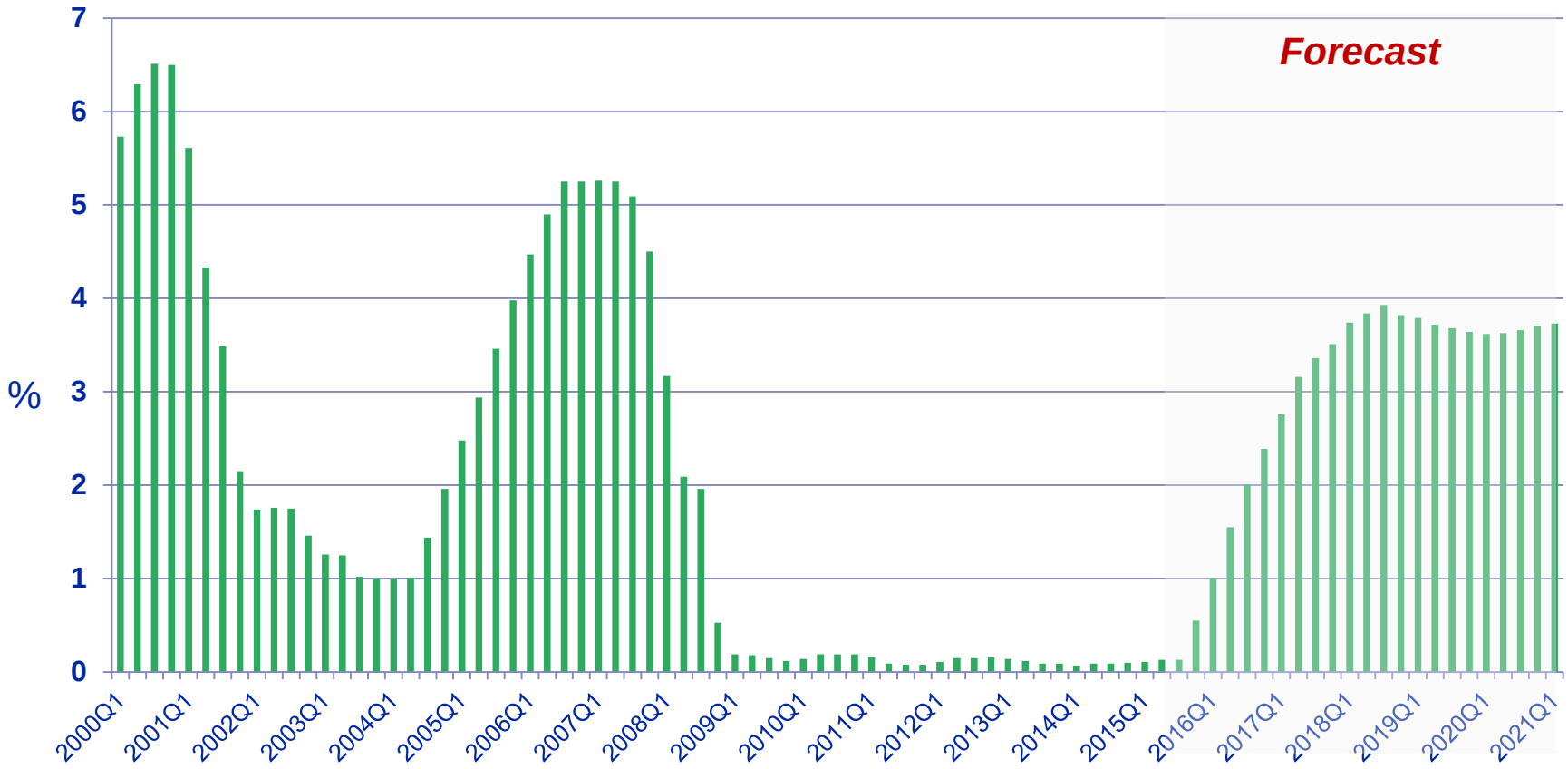
Source: U.S. Bureau of Economic Analysis (BEA); Moody's Analytics (ECCA) Forecast

Unemployment



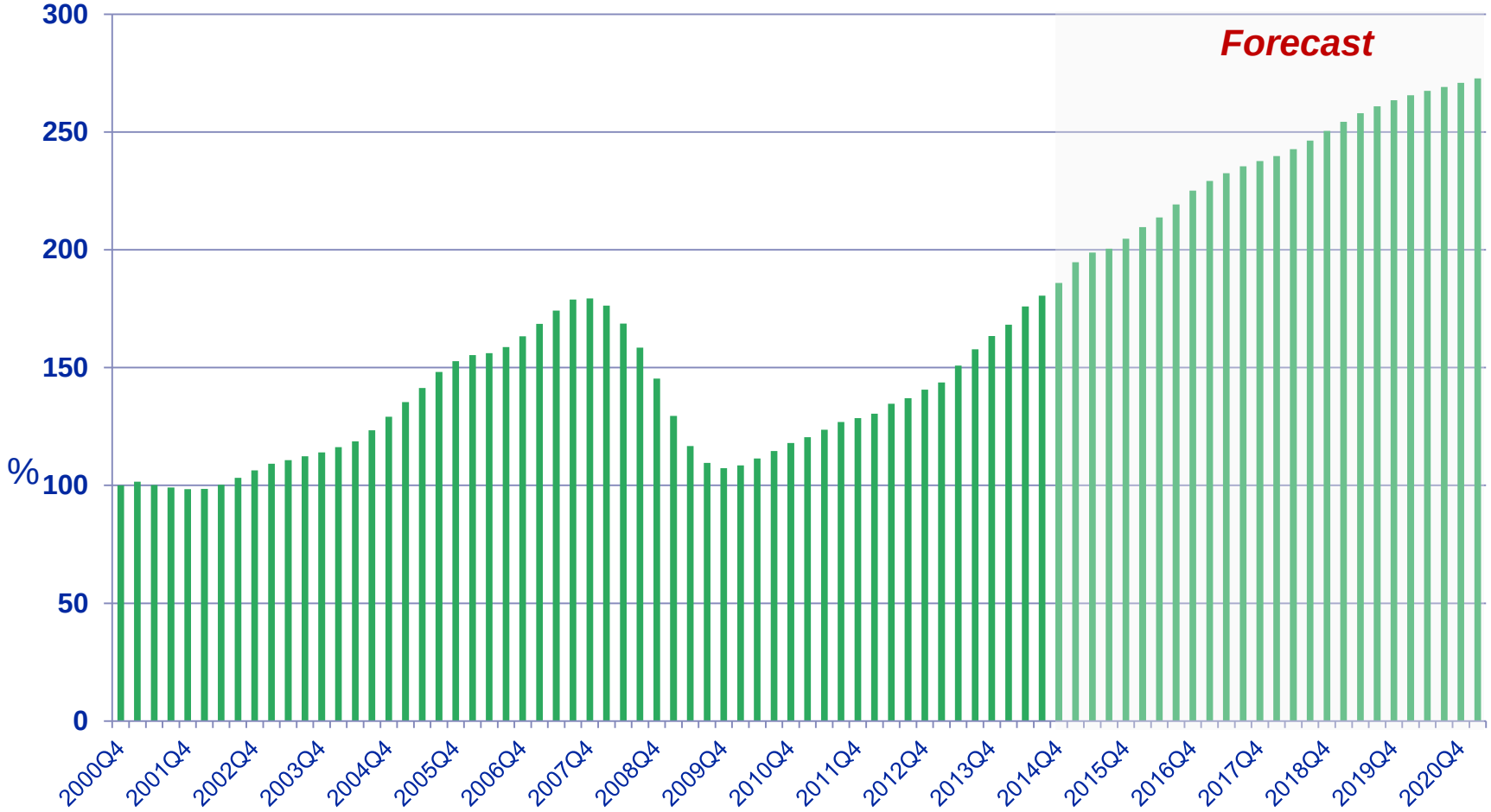
Source: U.S. Bureau of Labor Statistics (BLS); Moody's Analytics (ECCA) Forecast

Fed Funds Rate



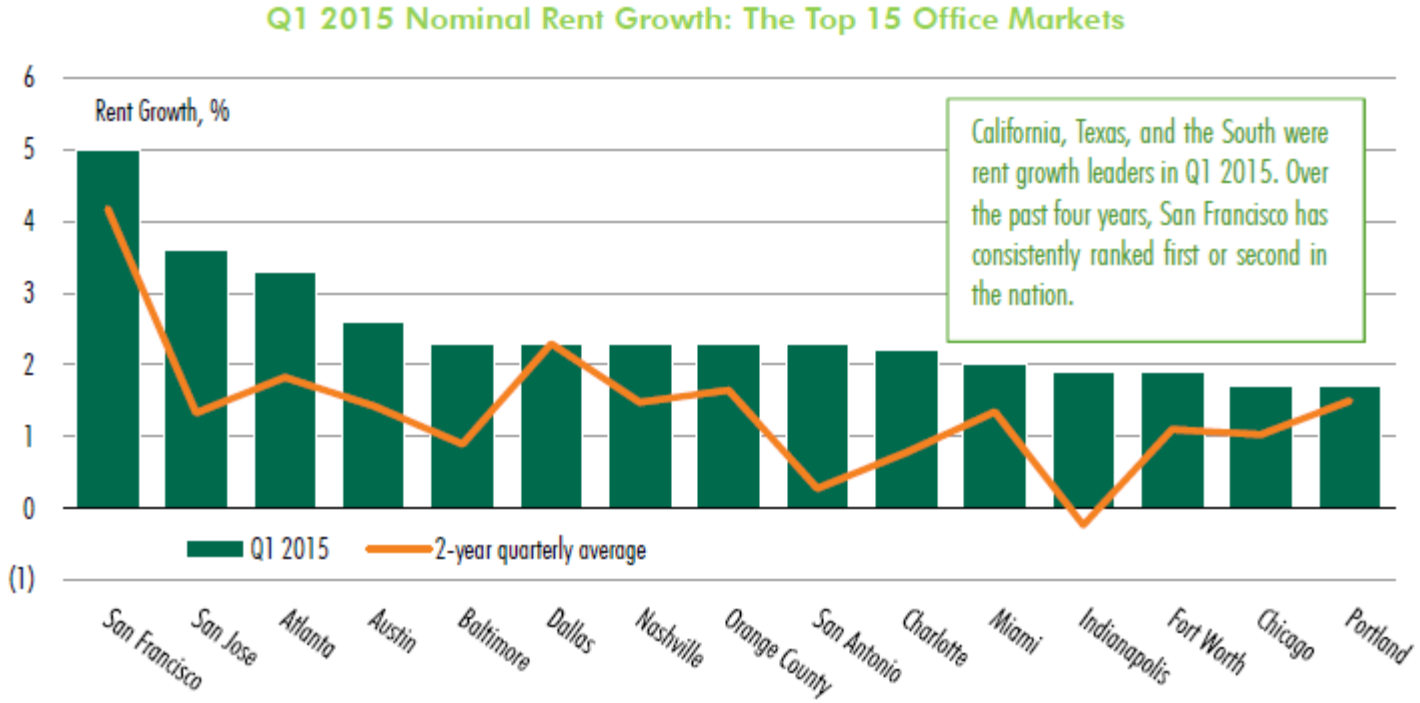
Source: U.S. Board of Governors of the Federal Reserve System (FRB); Moody's Analytics (ECCA) Forecast

Commercial RE Prices



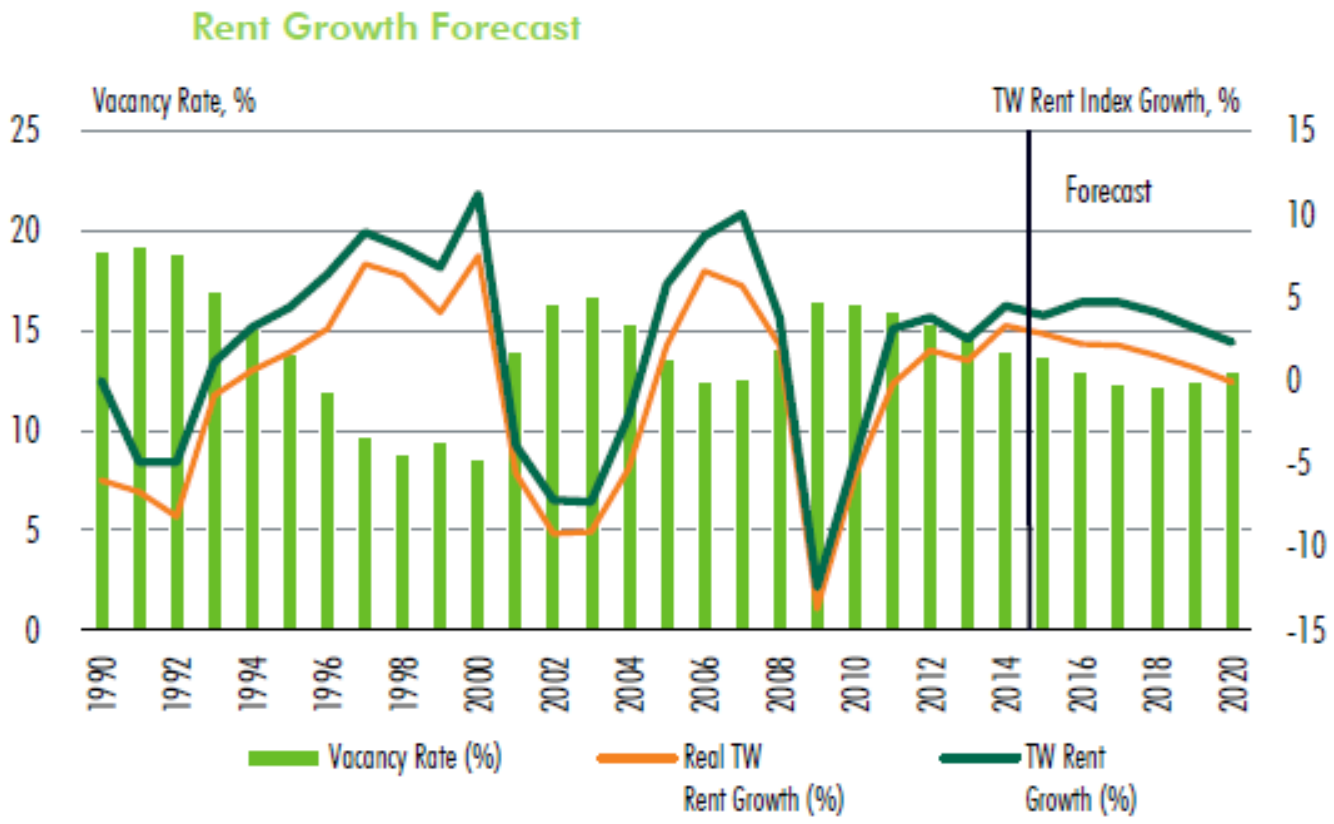
Source: Moody's Investors Service (MIS); Moody's Analytics (ECCA) Forecast ; All Property Types

Rents and Rent Growth



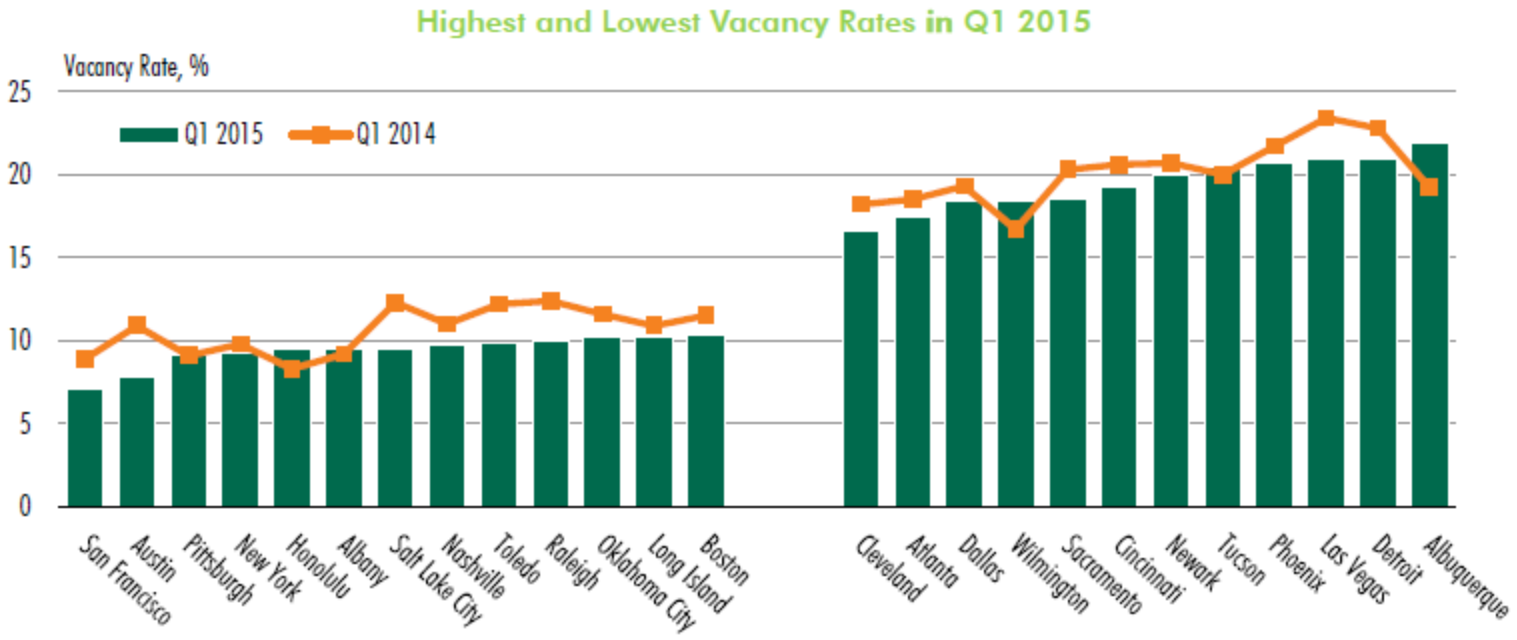
Source: CBRE Econometric Advisors; 1Q15 Office

Rent Growth Forecast



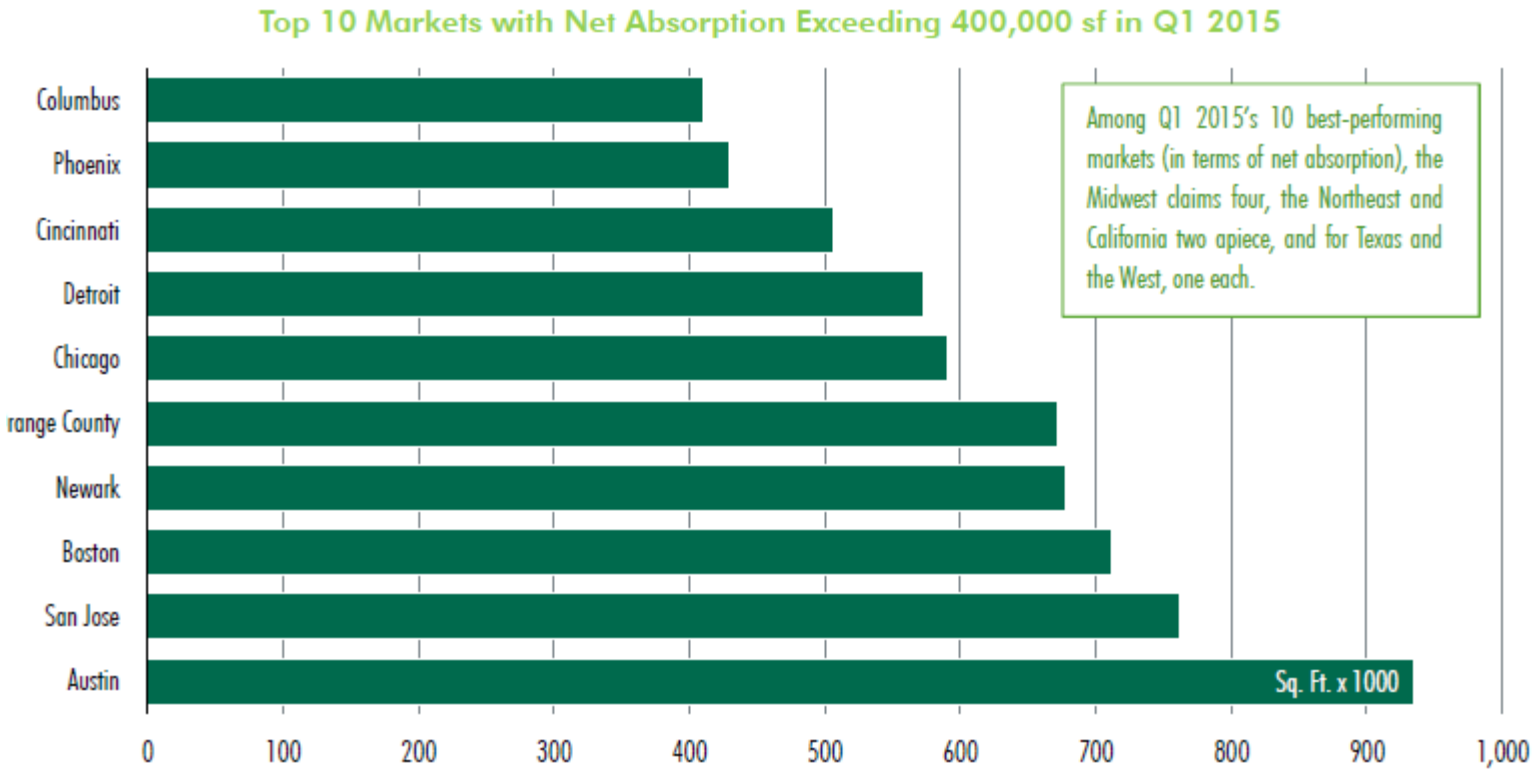
Source: CBRE Econometric Advisors; 1Q15 Office

Vacancy Rates



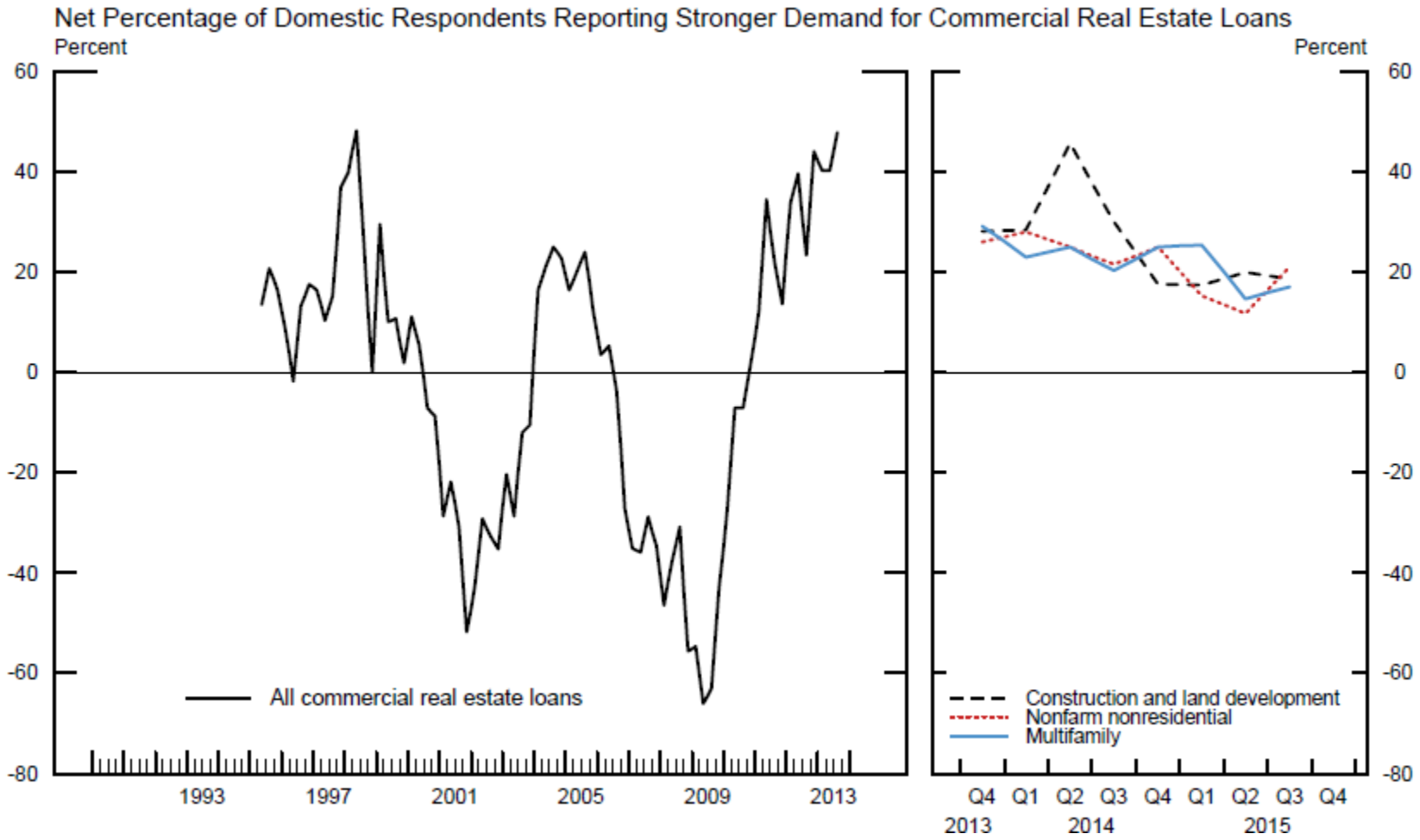
Source: CBRE Econometric Advisors; 1Q15 Office

Net Absorption



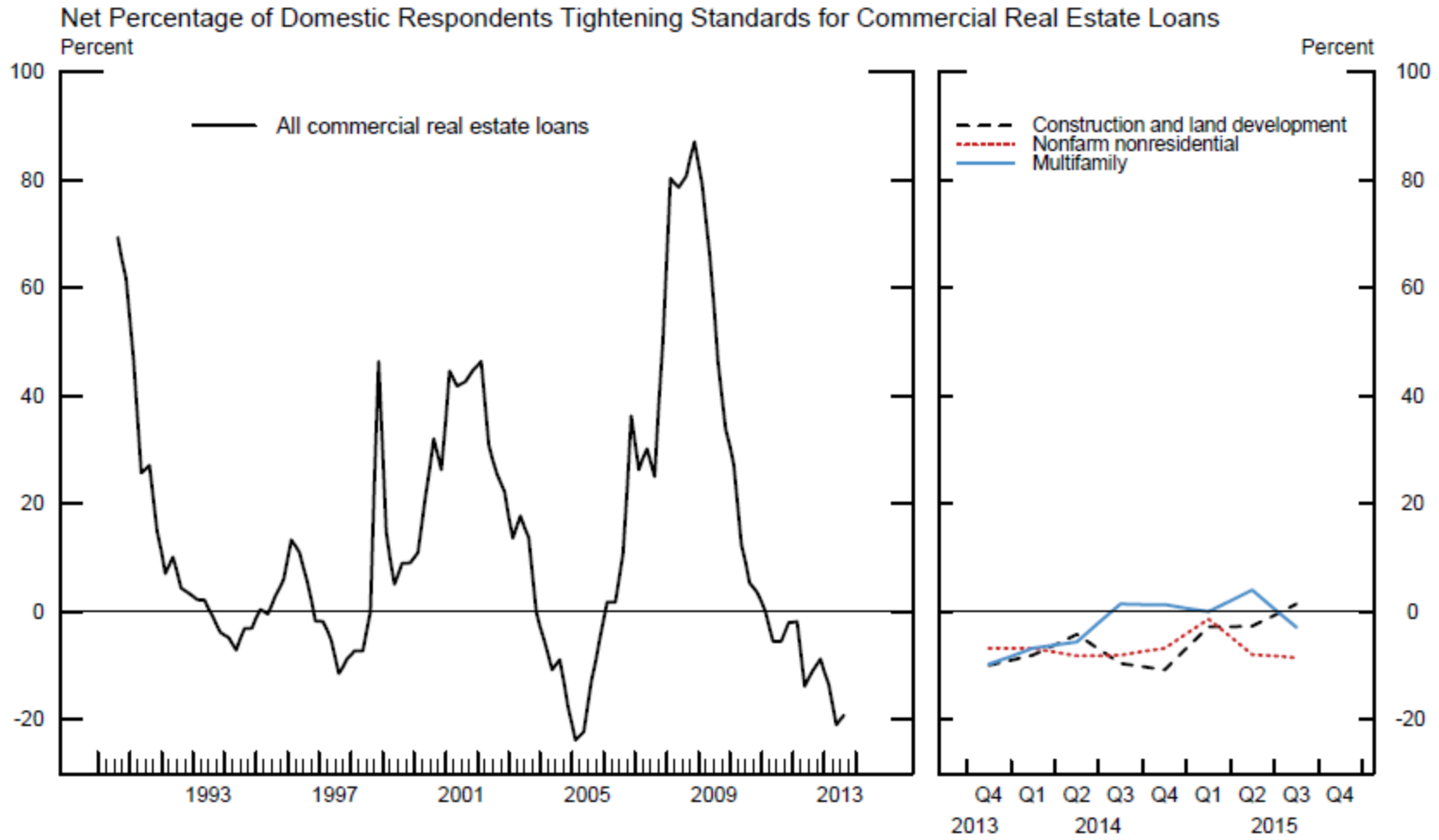
Source: CBRE Econometric Advisors; 1Q15 Office

Demand for CRE Loans



Source: Federal Reserve

Underwriting Standards for CRE Loans



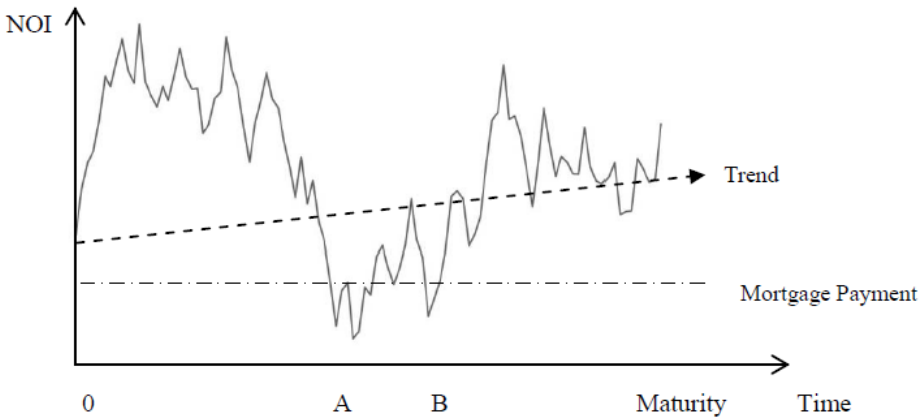
Source: Federal Reserve

2

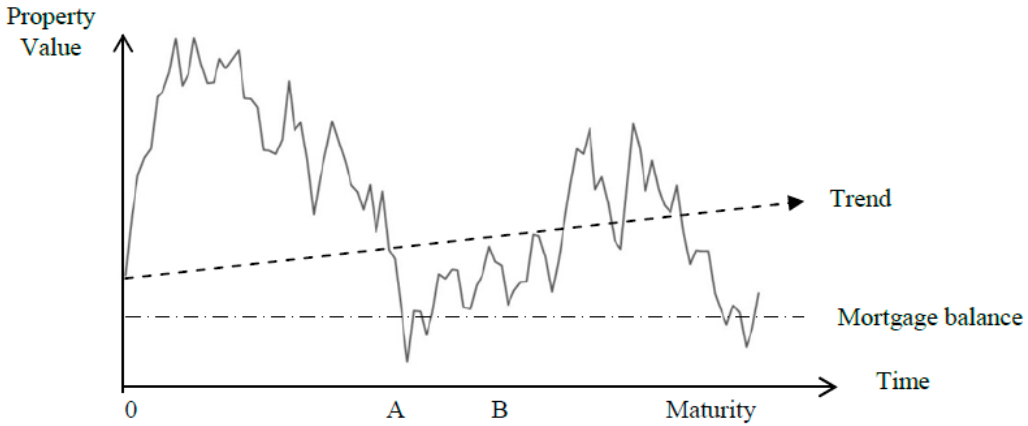
Improving the Measurement of CRE Credit Risk

First and foremost, why would a CRE borrower default on their debt obligations?

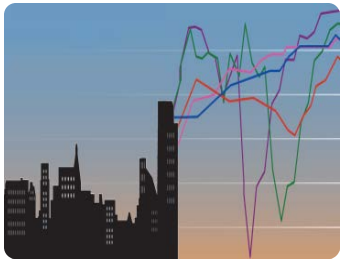
1. Cash flow from the property is inadequate to cover the scheduled debt service payment.
2. The underlying commercial properties, which serve as the secured collateral, are worth less than the amount of the loan.



If underwritten appropriately, in theory, CRE loans carry very little credit risk at origination. What drives the credit risk is the inherent future uncertainty – which potentially can be quantified.



Modeling default behavior should incorporate both CRE fundamentals and CRE market information



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

Modeling default behavior

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

Empirical Evidence

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

Data limitations and inconsistencies make quantifying CRE risk a challenge for many institutions

Updated Property Information

Valued - $15M in 2008. Now?

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

Foresight into Market Fundamentals

- Sound forecast that differentiates between property types and submarkets is important but unavailable

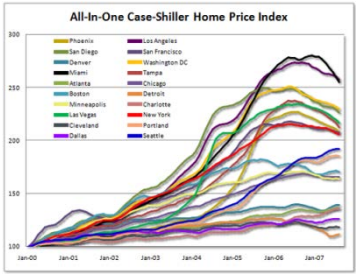
Default history and modeling expertise

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

Intuition vs quantitative validation

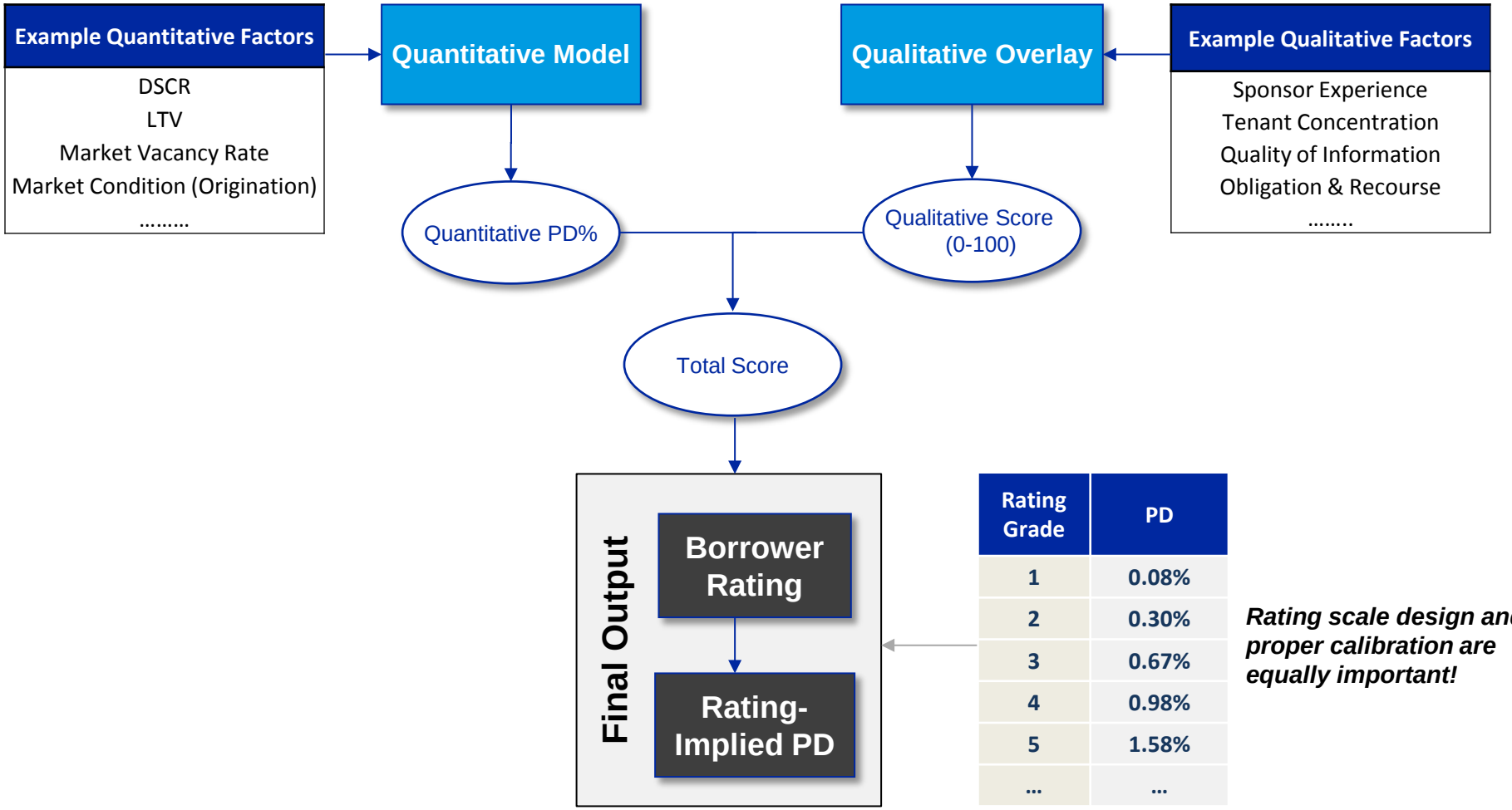
- Several qualitative factors can impact the analysis and risk measures and integrating quantitative models with intuition can be a challenge
- More than just data

Assessing the impact of the economy



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

A common approach is to blends empirically-derived risk measures with expert judgment



Rating Grade	PD
1	0.08%
2	0.30%
3	0.67%
4	0.98%
5	1.58%
…	…

Rating scale design and proper calibration are equally important!

It is important to be as objective as possible when assigning scorecard factors

Characteristics of Good Candidate Risk Factors

- ☐ **Able to distinguish defaulters from non-defaulters (i.e., "action" in the underlying data sample)**
- ☐ **Clear, objective, and uniformly understood**
- ☐ **Capable of being assessed in a reasonable timeframe using accessible, consistently available data**
- ☐ **Possessing unique information value (i.e., non-duplicative, non-correlated)**
- ☐ **Supported by intuition and general business sense**
- ☐ **Measurable and verifiable (using historical data at some point in future)**

3

Tethering Improved Risk Measurement to Business Activities

Dual risk ratings have become increasingly popular as a tool for measuring CRE risk

$$EL = PD \times LGD \times EAD$$

Expected Loss — Probability of Default — Loss Given Default — Exposure at Default

"Dual risk rating (DRR)"

Example:

When you make a loan, the amount of money the bank could potentially lose depends on these three things…

$9K (Expected Loss)

=

… how likely the borrower is to go into default

3% *likelihood* (Probability of Default)

x

… how much the bank is likely to lose once the borrower go into default

30¢ *on the dollar* (Loss Given Default)

x

… and the loan amount at the time of default

$1MM (Exposure at Default)

The concept of dual risk ratings is simple, but there are challenges institutions often face with implementation

Data Quality & Availability

What is the data quality?

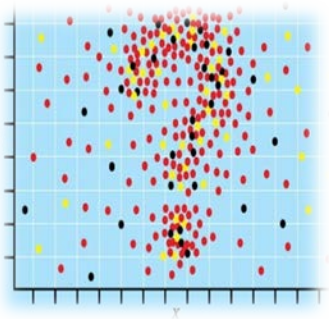
- Limited up to date data and ongoing availability
- Data captured at origination may not be complete for ongoing data analysis
- Data management is important for historical and forward looking analysis

Standardized Processes

How to minimize errors?

- Storing data in a single system of record for consistency
- Improving operational controls by standardizing credit policies
- Setting up workflow processes to ensure systematic loan origination processes

Credit Risk Models



What are the most effective credit risk tools?

- Improve credit origination decisions with accurate and predictive risk models
- Leveraging risk models for capital allocation and reserve setting
- Stress testing models that leverages baseline borrower risk

Expert-based Risk Drivers

What other factors should be taken into consideration?

- Seasoned experts add value to statistically-based ratings
- Incorporate qualitative factors for a comprehensive analysis
- Empower your credit experts to systematically document their opinion

Monitoring & Governance

How to manage counter-party risk and model risk?

- Rating systems must be shown to be appropriate for their intended purpose (validation)
- They must also be maintained
- Model recalibration can be difficult and costly

CMM® (Commercial Mortgage Metrics) Product Overview

Sumit Grover, Product Manager – CRE Solutions

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What is CMM (Commercial Mortgage Metrics)

- CMM is the leading analytical model 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
  - Enterprise-class software

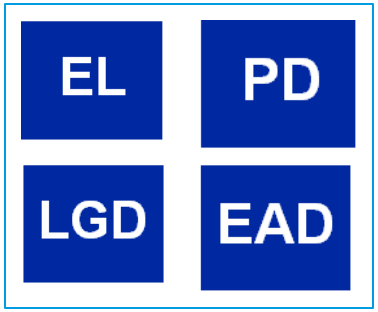
CMM capabilities at a glance

» 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

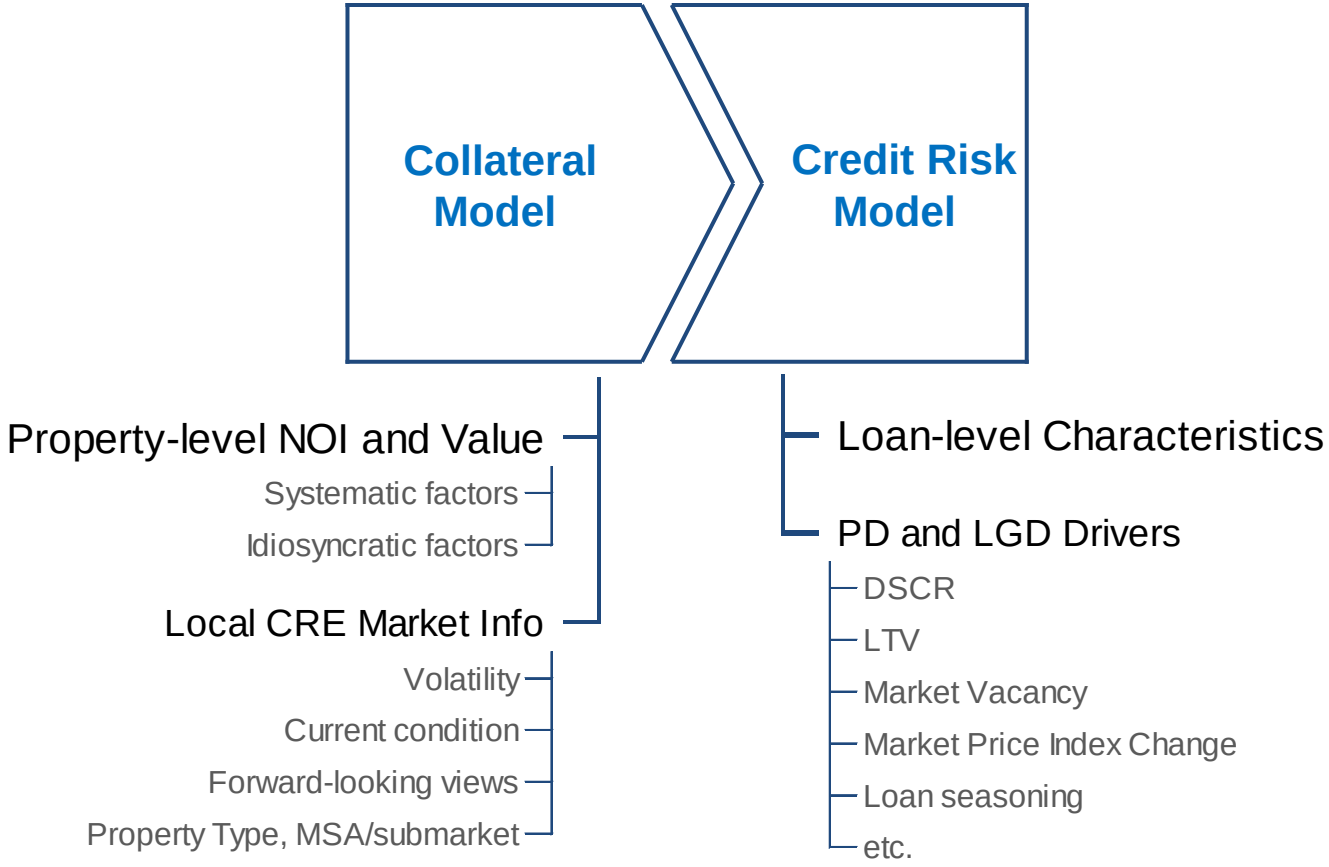
» Provides flexible framework that is ***adjustable*** to your default experience



*Save your CRE portfolio on the **Cloud** and access from **anywhere***

*Combine your CRE portfolio and macro forecast and **instantly** see the impact on risk measures*

Collateral forecasts and credit risk go hand-in-hand



Assessing Loan level risk: Understanding the driving factors in CRE

Loan XYZ:

Office building as collateral

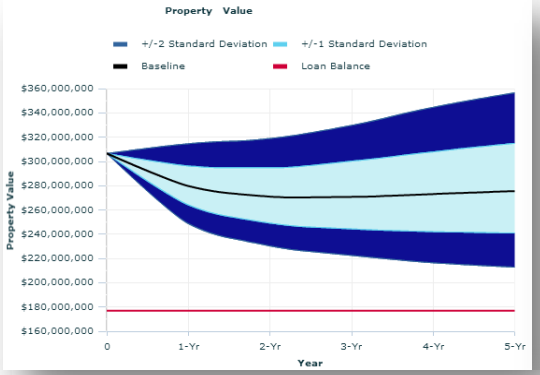
New York, Midtown Manhattan

Originated @ 2nd Qtr, 2007

Origination LTV: 55%

Origination DSCR: 2.30

Interest-only, 5-year bullet loan

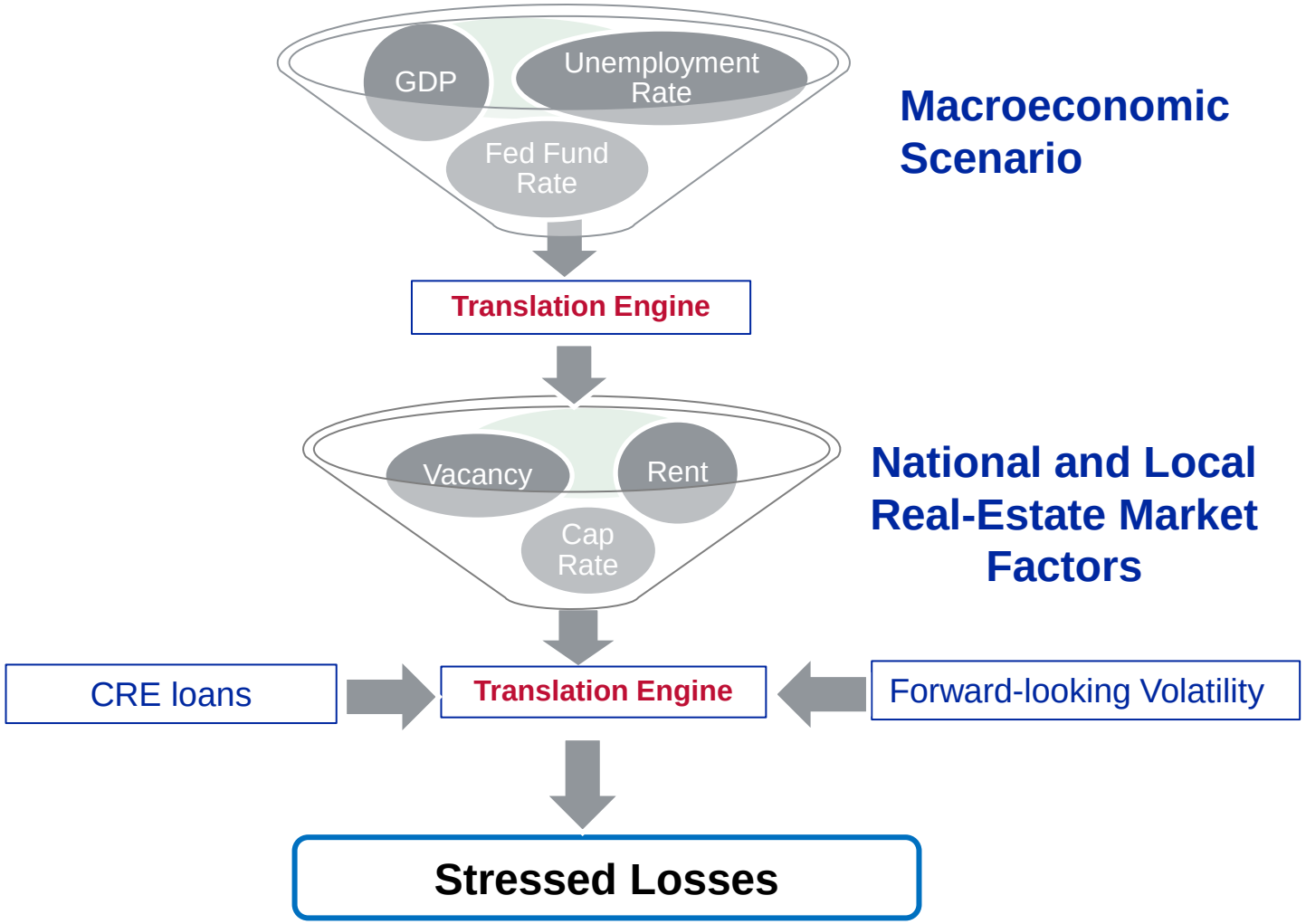


	Loan Balance ($)	Loan Debt Service ($)	NOI ($)	Value ($)	DSCR	LTV
0-Yr	177,000,000.00	8,407,500.00	19,876,825.31	306,522,224.93	2.36	57.74%
1-Yr	177,000,000.00	8,407,500.00	20,075,593.56	279,783,387.34	2.39	63.26%
2-Yr	177,000,000.00	8,407,500.00	20,276,349.50	271,009,182.07	2.41	65.31%
3-Yr	177,000,000.00	8,407,500.00	20,479,112.99	270,874,817.11	2.44	65.34%
4-Yr	177,000,000.00	8,407,500.00	20,683,904.12	273,111,304.79	2.46	64.81%
5-Yr	177,000,000.00	8,407,500.00	20,890,743.17	275,522,053.51	2.48	64.24%

Cumulative Risk Measures — Cumulative Risk

	Cumulative EDF	Cumulative LGD	Cumulative EL	Cumulative Unexpected Loss	Cumulative Stress EDF 95.00%	Cumulative Stress LGD 95.00%	Cumulative Stress EL 95.00%
1-Yr	0.08%	17.50%	0.01%	0.04%	0.15%	17.50%	0.03%
2-Yr	0.16%	17.50%	0.03%	0.05%	0.31%	17.50%	0.05%
3-Yr	0.25%	17.50%	0.04%	0.06%	0.44%	17.64%	0.08%
4-Yr	0.32%	17.51%	0.06%	0.07%	0.57%	17.50%	0.10%
5-Yr	0.37%	17.51%	0.07%	0.07%	0.68%	17.50%	0.12%

Macroeconomic environment drives market environment



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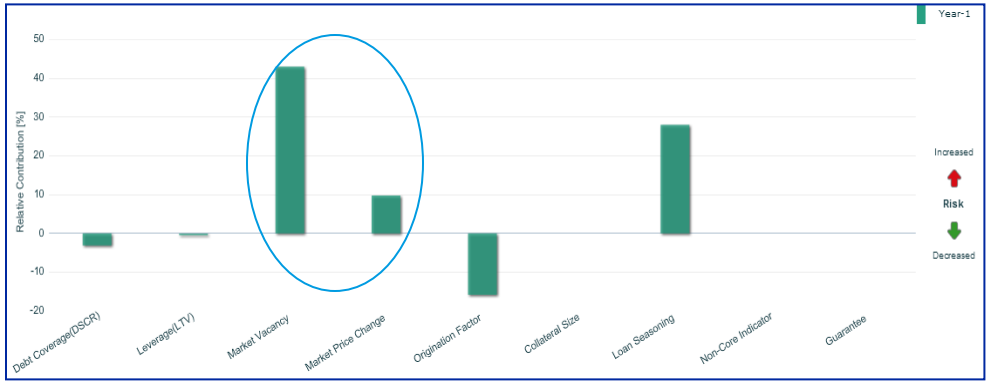
Sample uses for CMM

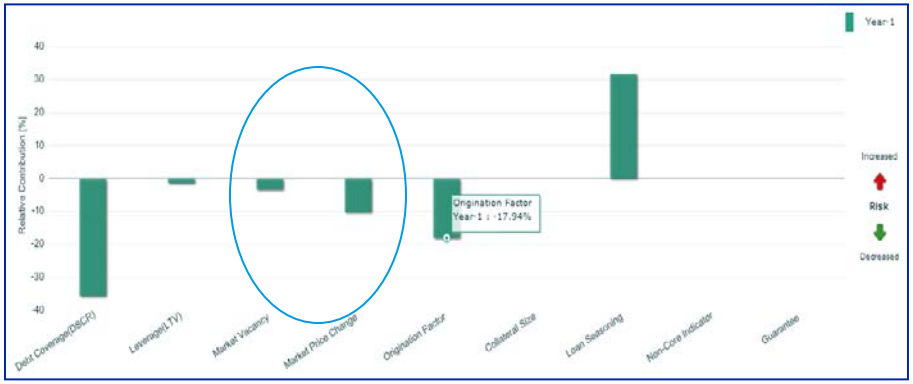
Differentiate Markets with Relative Contributions

- CMM Provides a contribution for all factors impacting probability of default
- Understanding risk contributors can allow for quick comparison and distinguishing market factors vs. underwriting fundamentals
- All factors including DSCR, LTV, Origination Quality, Seasoning and market fundamentals are included
- Below is an example where we ran the same loan in two different markets:

Office, Albuquerque, NM (0.73%)

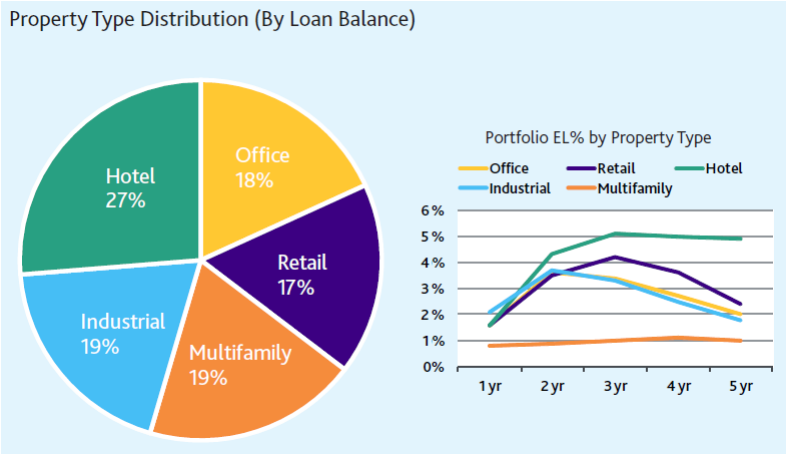


Office, Chicago, IL (0.40%)



Risk Management – Buying/Selling/Portfolio monitoring

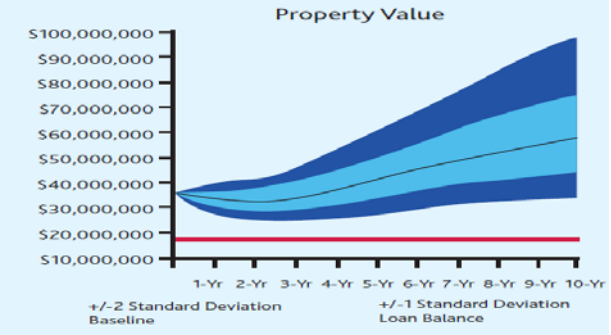
- CMM is built on a vast historical data and can help segment the portfolio for early warning on deteriorating debt
- CMM can help identify **risky mortgages** in a portfolio by segmenting the portfolio based on **property type** or the **location**



- Quarterly market data update on the underlying market conditions ensures you are always in the know

Integrating into Origination, Pricing, Capital Planning

- Ability to foresee property performance under various macroeconomic scenarios makes CMM at optimal tool to use and integrate into Origination process



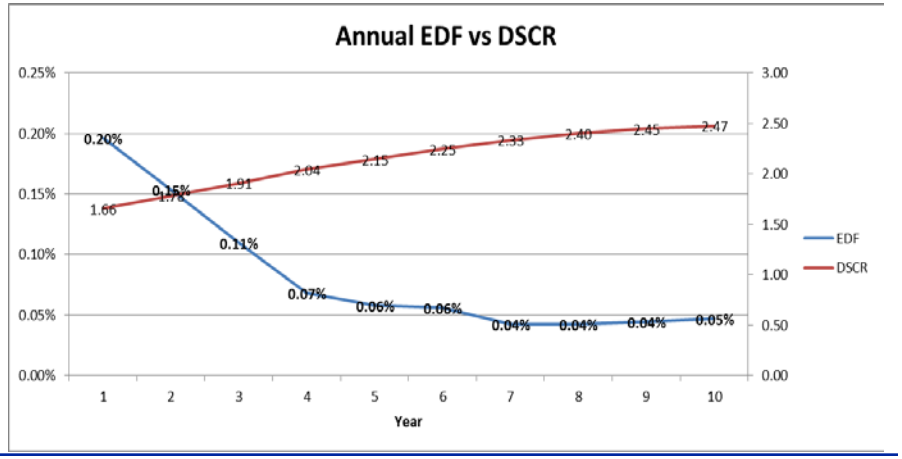
- CMM provides **Yield degradation** risk measure that can aid in pricing decisions

- Expected Default Frequency, Loss Given Default, Exposure at Default and Expected loss reported as results by CMM are actively used in Capital planning by various organizations

Integrate with your analysis workbooks in Excel

- Get CMM results via Microsoft Excel Add-in
- Perform Scenario/ What-if Analysis
- Build Business Specific Templates
  - Build templates that automatically update based on specific user inputs for loan/property
  - Incorporate any external factors and combine with CMM

CMM Input	
Holding Period	8
PD From CMM	2.00%
Annualized PD	0.25%
Score	60
Rating	9
Weight	65%
Final Rating	
Overlay Score	93
Overlay Rating	3



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Questions

clientservices@moodys.com

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