

Mission Possible: Producing Defendable and Reasonable CECL Results With or Without Models

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How to Make Estimates Defendable?



A “reasonable and supportable” argument depends on...



- » Benchmarking/Backtesting
- » Applicability
- » Transparency
- » Monitoring
- » Assumptions
- » Narrative

Agenda

1. C&I Credit Loss Estimation
2. CRE Credit Loss Estimation
3. Retail Credit Loss Estimation
4. Key Take-Aways

1

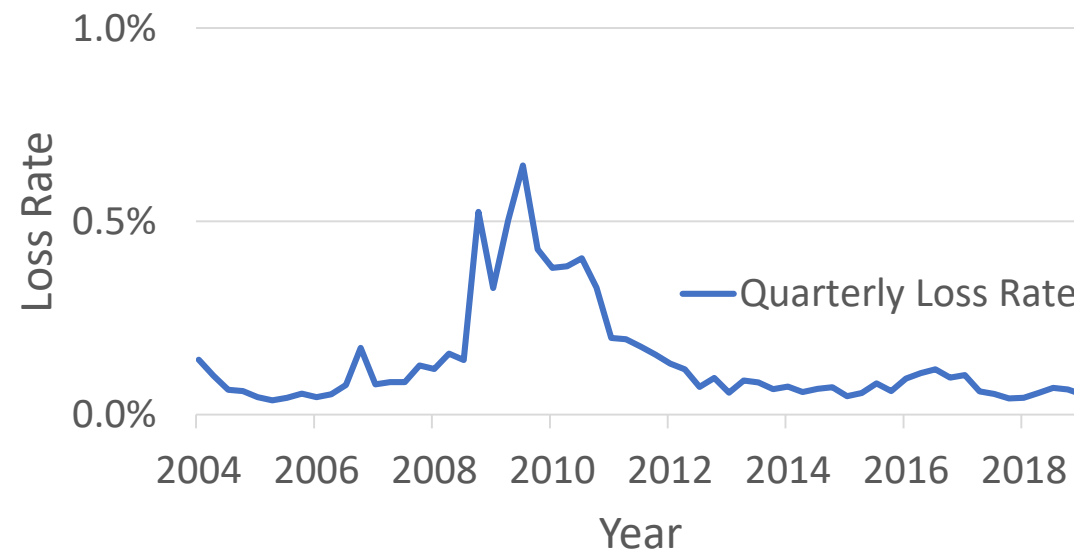
C&I Credit Loss
Estimation

Benchmarking/Backtesting



- » Weighted Average Remaining Maturity (WARM): calculating average historical quarterly net charge off rate over a time window, applying it to the current portfolio with balance run off projections to produce a lifetime loss rate

	Stressed Period (2008-2011)	Benign Periods
Avg Quarterly Loss Rate	0.32%	0.07%
WARM	2.55%	0.62%

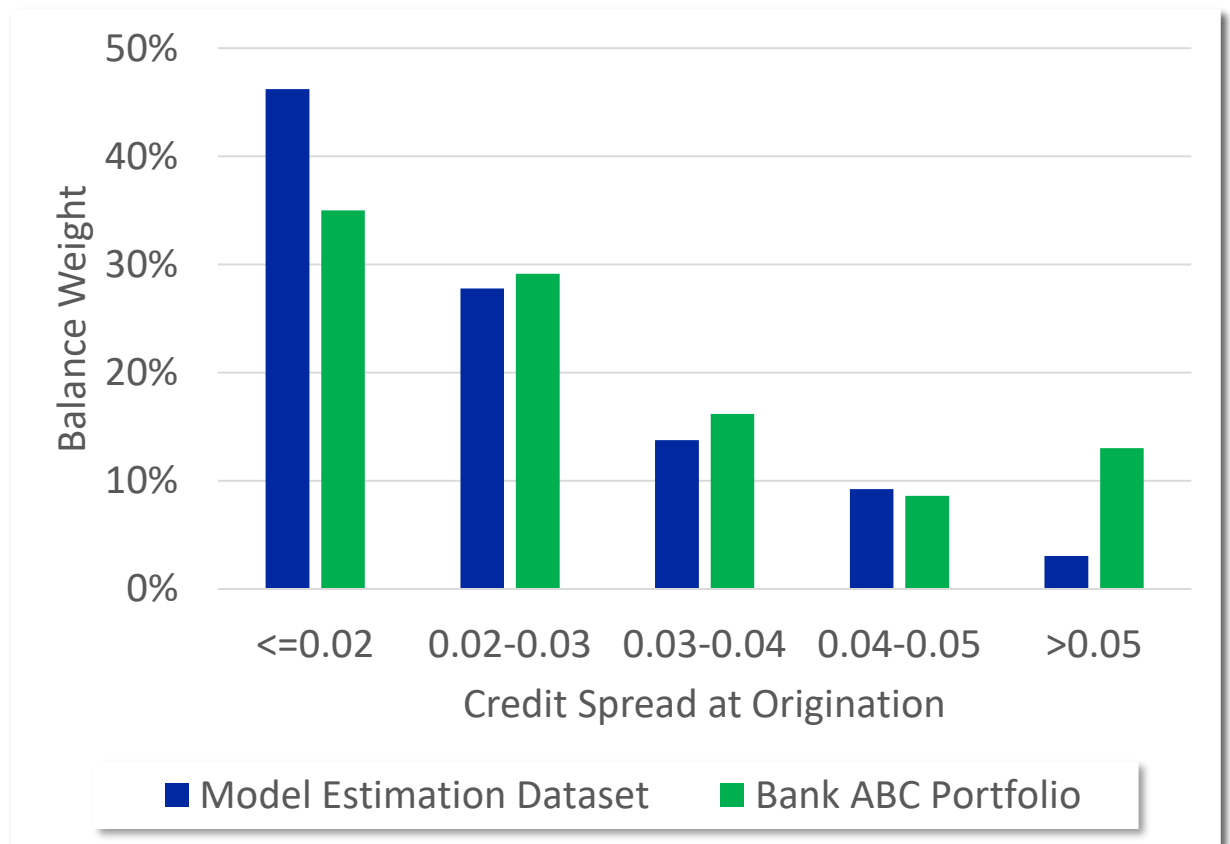
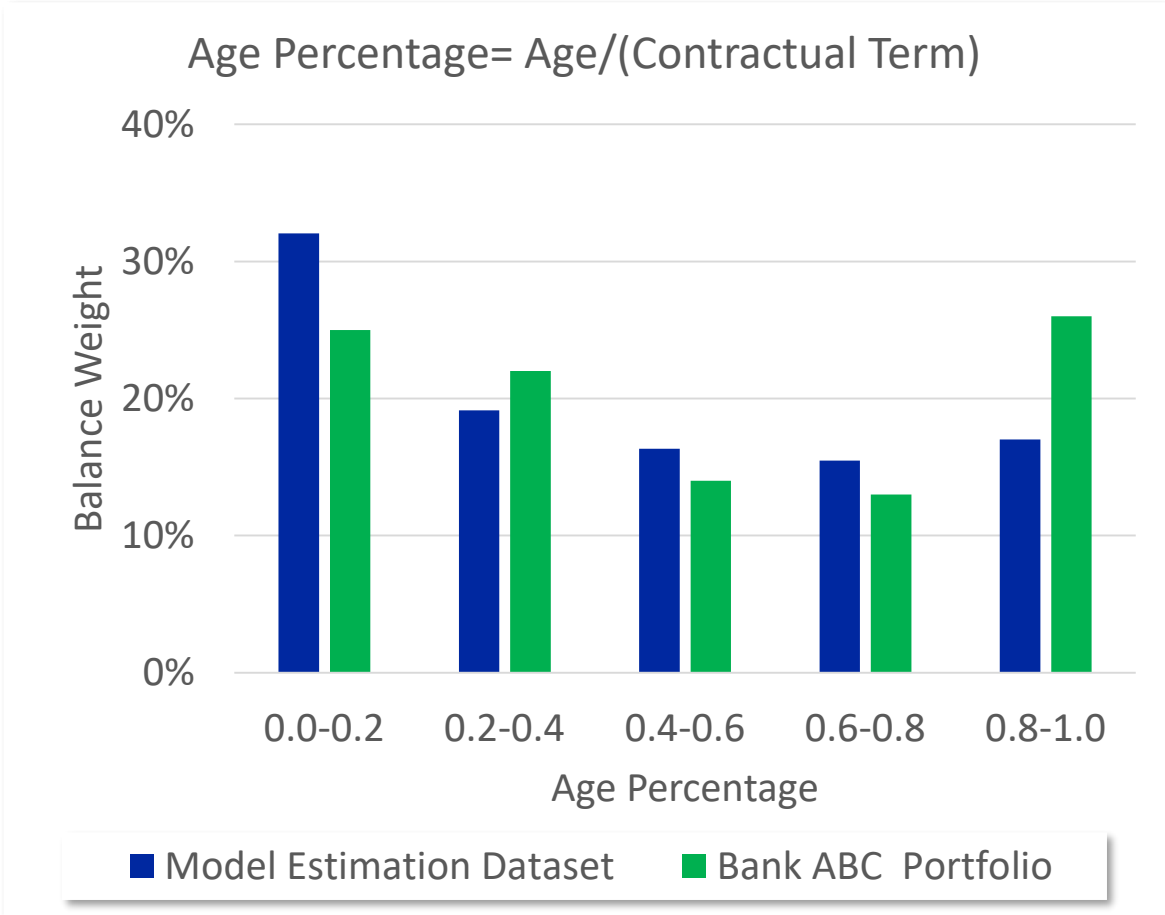


- » Model-free approaches to CECL

Applicability Analysis: Risk Drivers Distribution



How to justify using a vendor model estimated on proxy data?



Transparency of Methodology



Approach	PD/LGD	Loss Rate	Non-Model Approach
Advantages	Borrower-level, granular Explicit R&S period	Simple Data readily available	Simplest
Challenges	Requires more input data	Prepayment/amortization embedded	Relies on qualitative adjustments
Moody's Solutions (as Examples)	RiskCalc + GCorr Macro	Lifetime Loss Rate	Historical Loss Analyzer
Input Portfolio Data	Borrower Financial Statements (e.g., EBIDTA, Leverage)	Loan Characteristics (e.g., age, size)	None
Macroeconomic Variables	US Unemployment, Equity, VIX, and BBB Spread	US Unemployment Rate, BBB Spread	N/A

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**MODELING
METHODOLOGY**

C&I Lifetime Loss Rate Model Validation Support

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Abstract

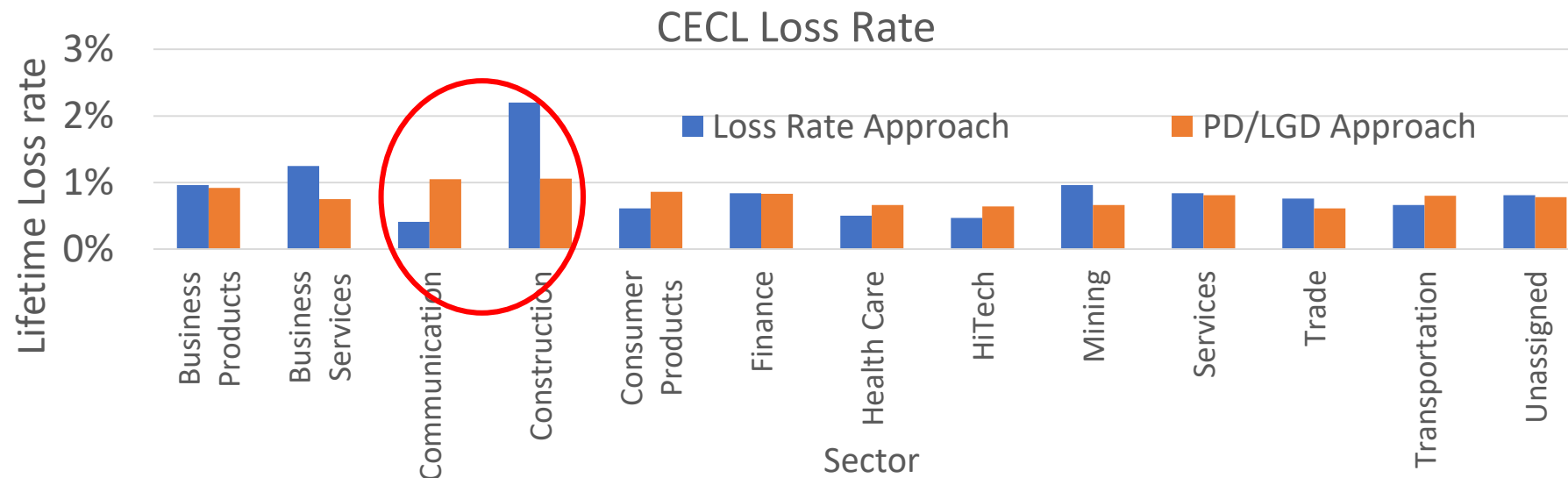
This document consolidates relevant C&I Lifetime Loss Rate Model materials to support financial institutions performing validation of a vendor model, as outlined by the U.S. supervisory guidance on model risk management, known as SR 11-7.

The organization of the document follows the three key elements of effective model validation outlined in SR 11-7: Evaluation of Conceptual Soundness, **Ongoing Monitoring**, and Outcome Analysis. The first section describes the model development process in detail, including methodology and specification, data processing, variable selection, as well as assumptions and limitations. The second section establishes the **ongoing monitoring process**, presenting the process verification testing done for the model and creating the performance monitoring report that will be executed on a regular basis. Finally, we conduct diagnostic and performance evaluation tests to ensure that the model is statistical valid, and that model results are reasonable.

Assumptions

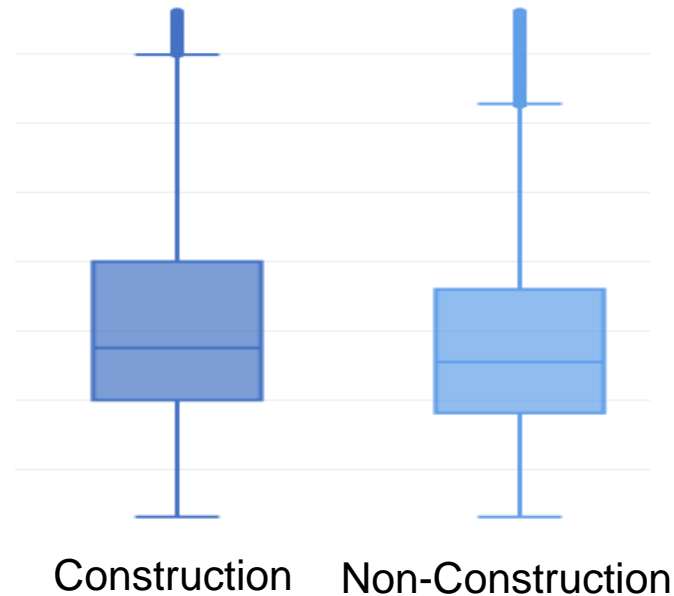
Credit losses are driven by the risk factors in a selected Methodology

- » Applied PD/LGD and loss rate models on a 2018Q4 portfolio from Moody's CRD
- » Portfolio lifetime loss rates
 - » Moody's Loss Rate = 0.85%
 - » Moody's PD/LGD = 0.79%



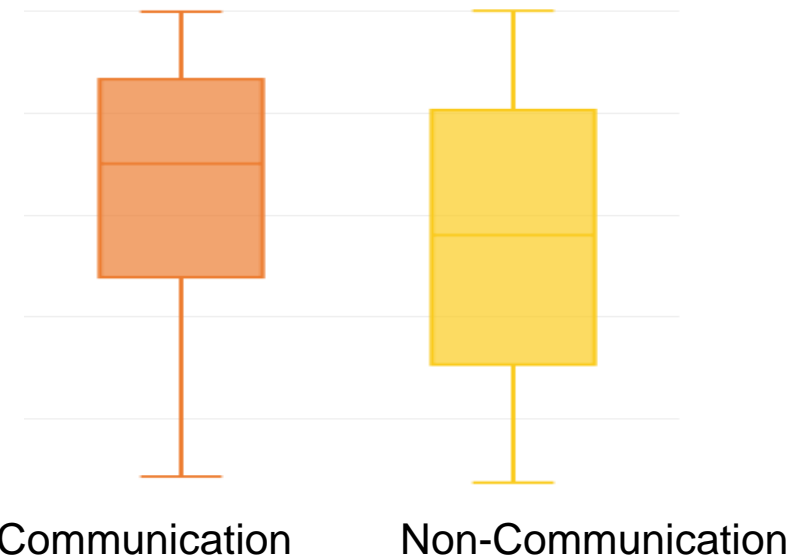
Narrative

Loss Rate Approach:
Credit Spread at Origination



- » Construction sector has a higher credit spread at origination, driving the loss rate higher

PD/LGD Approach:
Current Liability to Sales Ratio



- » Communication has a higher current liability to sales ratio, driving the loss rate higher

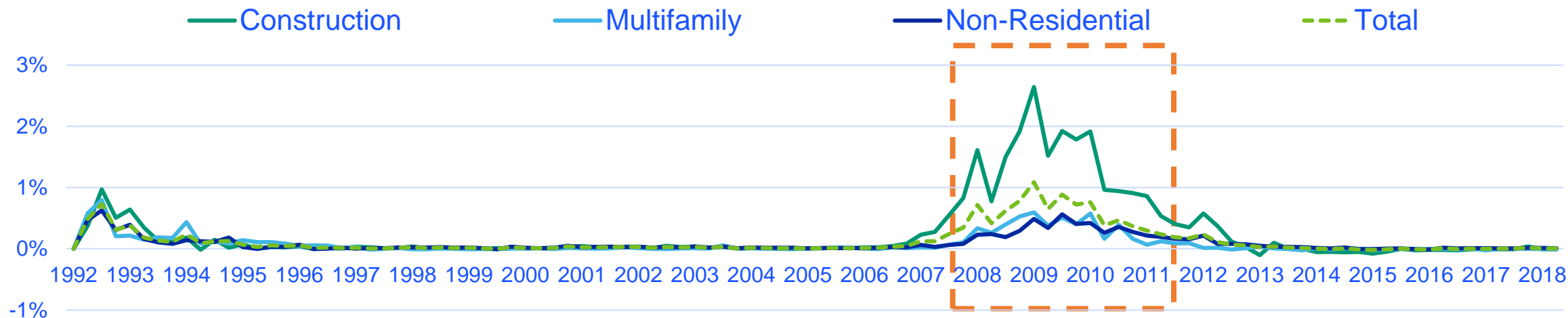
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CRE Credit Loss Estimation

Benchmarking + Applicability



Historical CRE Call Report Net Charge-Off Rates



Segment	Balance (\$ mil)	Remaining Life (years)	Net Charge-Off (Benign periods)		Net Charge-Off (Stressed periods)	
			Annual NCO Rate	CECL	Annual NCO Rate	CECL
Construction	\$ 24,343	2.68	0.31%	\$ 202	5.13%	\$ 3,347
Multifamily	\$ 19,619	3.93	0.04%	\$ 31	1.40%	\$ 1,079
Non-Residential	\$ 50,134	3.97	0.17%	\$ 338	1.27%	\$ 2,528
Total CRE	\$ 94,096	3.63	0.17%	\$ 581	2.25%	\$ 7,685

» Benchmark CECL: **\$1.3 billion** ← **\$2.0 billion** ← 90% 80% 10% 20%

Transparency of Methodology



Methodology	PD/LGD Model	Loss Rate Model	Non-Model Approach
Input Requirement	High	Low	None
Output Granularity	Loan level	Pool level	Segment level
Key Financial Drivers	LTV, DSCR	Origination LTV	Historical loss
Geographic Granularity	Metro/submarket	National	None
Property Types	Multifamily, Office, Retail, Industrial, Hotel	Multifamily, Non-Residential	Multifamily, Non-Residential

Monitoring



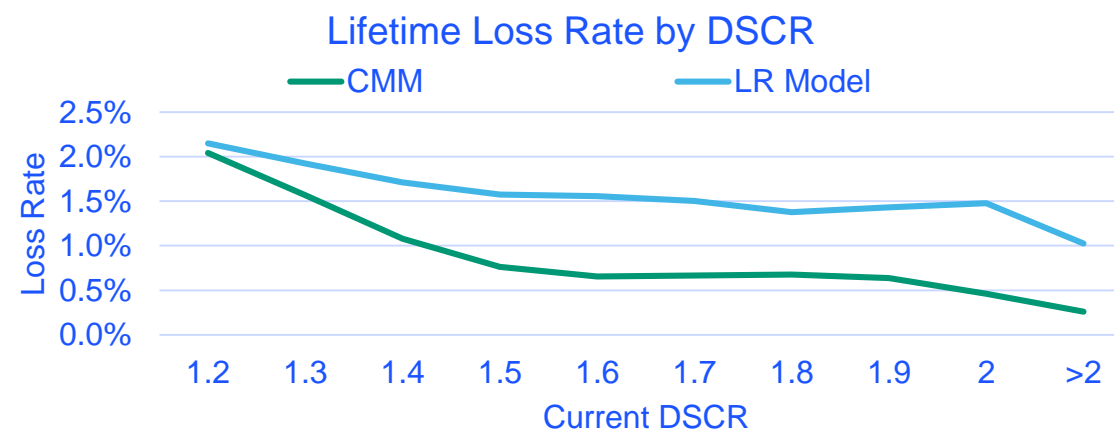
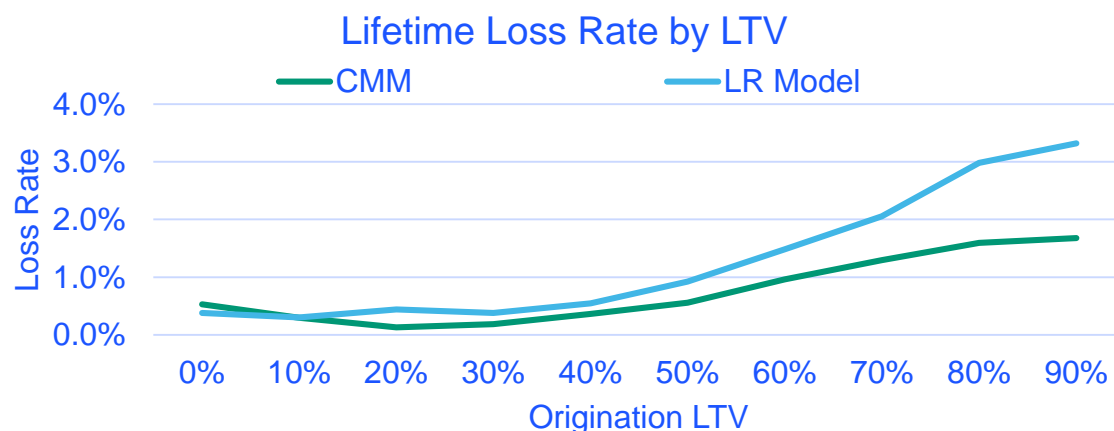
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Table of Contents	
1. Conceptual Soundness	3
1.1. Model Design	3
1.1.1. Modeling Conditional Loss Rate	3
1.1.2. Variable Definition	3
1.1.3. Model Specification	4
1.1.4. Probability of Default	6
1.1.5. Lifetime Loss Rate	6
1.2. Development Data	7
1.2.1. Data Sources	7
1.2.2. Loan-Level Data Summary	8
1.2.3. FDIC Data Summary	11
1.2.4. Univariate Analysis	12
1.2.4.1. Loan Characteristics	13
1.2.4.2. Macro Variables	17
1.2.5. Multivariate Analysis	18
1.3. Assumptions and Limitations	19
2. Ongoing Monitoring	20
2.1. Process Verification Testing	20
2.2. Performance Monitoring	21
2.2.1 Report Design	21
2.2.2 Model Status	22

Assumptions and Narrative



Property Status	Total Balance (\$ million)	CMM		Loss Rate Model	
		Loss Amount (\$ million)	Loss Rate	Loss Amount (\$ million)	Loss Rate
Permanent	\$ 69,752	\$ 663	0.95%	\$ 1,018	1.46%
Construction	\$ 24,343	\$ 674	2.77%	\$ 679	2.79%
Total	\$ 94,096	\$ 1,336	1.42%	\$ 1,694	1.80%

- » As expected, CRE loss rates increase with origination LTV
- » If provided, DSCR can improve loss rate estimates

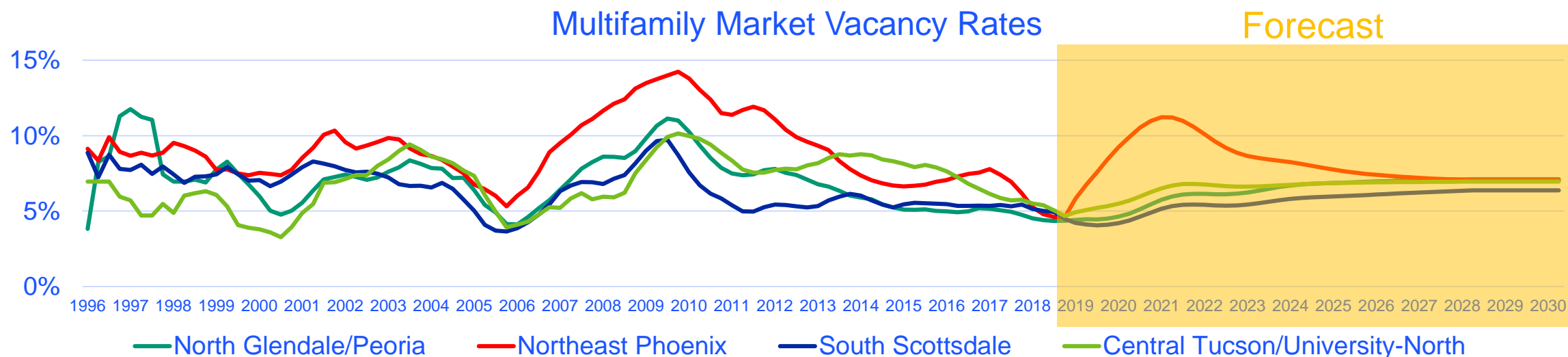


A Secret Weapon



Loans with similar ratios may have vastly different risks due to market conditions

Loan ID	Origination Date	Maturity Date	Market	Submarket	LTV	DSCR	Loss Rate
1	7/20/2016	8/1/2026	Phoenix	North Glendale/Peoria	71.1%	1.62	0.6%
2	9/22/2015	10/1/2022	Phoenix	Northeast Phoenix	65.4%	1.27	6.2%
3	6/17/2016	6/17/2021	Phoenix	South Scottsdale	72.8%	1.47	0.2%
4	3/8/2016	8/29/2020	Tucson	Central Tucson/University-North	66.1%	1.55	0.1%



3

Retail Credit Loss Estimation

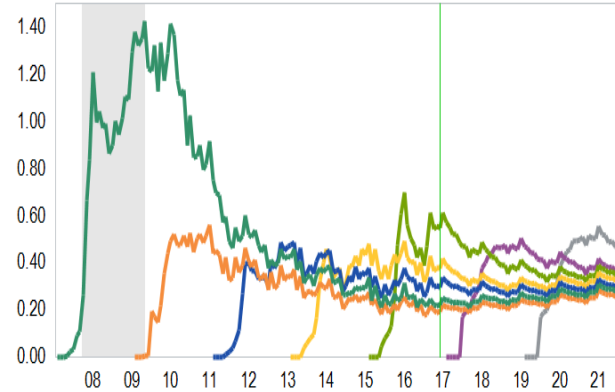
Benchmarking & Applicability

Industry Models + Internal Portfolio = CECL Estimate



Product	State	Credit Score	Origination Quarter	Outstanding Balance
Consumer	CA	700-719	2009Q2	\$100
Consumer	CA	660-699	2011Q2	\$300
Consumer	CA	660-699	2013Q2	\$500
Consumer	CA	700-719	2015Q2	\$200
Consumer	CA	700-719	2017Q2	\$700
Consumer	CA	700-719	2019Q2	\$1,000
Sum				\$2,800

+



=

Product	State	Credit Score	Origination Quarter	Outstanding Balance	PD Rate	LGD Rate	ECCL Rate	CECL
Consumer	CA	700-719	2009Q2	\$100	4%	99%	4.0%	\$ 4
Consumer	CA	660-699	2011Q2	\$300	6%	95%	5.7%	\$ 17
Consumer	CA	660-699	2013Q2	\$500	7%	90%	6.3%	\$ 32
Consumer	CA	700-719	2015Q2	\$200	4%	85%	3.4%	\$ 7
Consumer	CA	700-719	2017Q2	\$700	5%	95%	4.8%	\$ 33
Consumer	CA	700-719	2019Q2	\$1,000	6%	95%	5.7%	\$ 57
Sum				\$2,800				\$ 150

Transparency of Methodology

What will you need to disclose?



- » Estimation methodology
- » Model structure
- » Drivers
- » Parameter estimates
- » Development process
- » Testing

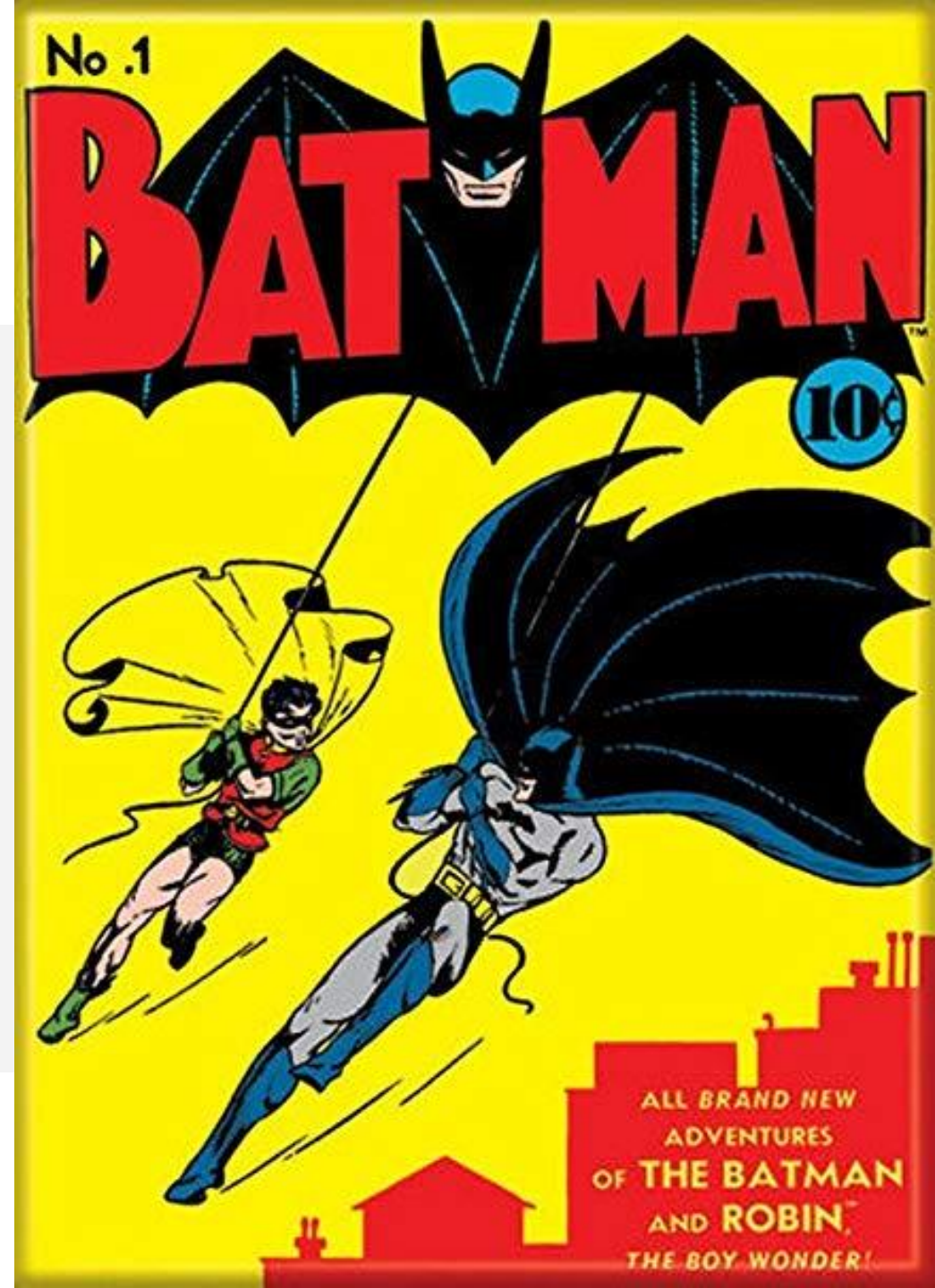
Monitoring and Assumptions



Narrative

In the end...

...it's all about the story



4

Key Take-aways

Key Take-aways

Producing defensible forecasts *is* possible...

...with either a modeled or non-modeled approach.

Remember:

- » **Benchmarking/Backtesting**
- » **Applicability**
- » **Transparency**
- » **Monitoring**
- » **Assumptions**
- » **Narrative**

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