Western Independent Bankers
CFO, Investments & Operational Risk Conference

Larry Sorensen
Hyatt Regency Resort & Spa

CREDIT STRESS TESTING

A TOOL FOR ASSESSING CONCENTRATION RISK

A PATH TO IMPROVING RISK MANAGEMENT

PRESENTATION OVERVIEW

- CRE concentration risk--the emerging issue
- Developing the approach
  - More MacGyver than Einstein
- Credit Stress Model
  - As adapted for our needs
  - As applied to our portfolio
- Enhancing risk management
- Learning and insights

THE EMERGING ISSUE OF CRE CONCENTRATION RISK

- Historically heavily concentrated in CRE lending
- Policy level regulatory agency anxiety over CRE concentrations
- Exam level anxiety over CRE concentrations
- Debating with opinions, not facts
- Self assessment on concentration risk and risk management capabilities
- Establishing defensible concentration risk limits
- Improve risk management capabilities
- In 12/06, concentration risk guidelines published

WHAT WOULD MACGYVER DO?

- **Combine sound methods with rigorous tools and relevant market data**
  - **DBRS analytical framework (www.DBRS.com)**
  - **OCC's Credit Stress Model**
  - **Historical benchmark data (by geography/property type)**
    - **Vacancy rates: Torto Wheaton**
    - **Capitalization rates: Global Real Analytics**
    - **Interest Rates: Federal Reserve**
- **Bring DBRS framework, OCC model and historical benchmark data together with internal loan and property performance data**
- **Apply against sample loans, aggregate results and see what you learn**

DOMINION BOND RATING SERVICE CRE CONCENTRATION RISK STUDY

- Published in June 2006
- Framework based upon public information and historical market data
- Stress parameters benchmarked around the S & L crisis (50-year flood approach)
  - Default risk: historical highs by property type
  - Valuation risk: Maximum historical peak-to-trough value declines by property type
- Applied against a hypothetical bank portfolio
- Impact measured in context of earnings, loss reserves and capital

DBRS STRESS TEST ASSUMPTIONS

ASSET CLASS	LOAN DEFAULT PROBABILITY [1]	LOSS SEVERITIES (property level)	PERIOD COVERED
COMMERCIAL PROPERTIES			
Manufacturing/Industrial	15%	29.5%	1989 - 1994
Office buildings	**16%**	**56.5%**	**1985 - 1995**
Retail	12%	26.4%	1989 - 1997
Hotel/motel	13%	40.0%	N/A
Medical/nursing	13%	35.0%	N/A
Multi-Family	10%	17.9%	1985 - 1993
R & D/Office	14%	42.0%	1985 - 1994
All other income producing	15%	50.0%	N/A
CONSTRUCTION LOANS			
Single Family	10%	20.0%	N/A
All Other	16%	60.0%	N/A
LAND LOANS			
Acquisition and Development	14%	40.0%	N/A
All other Land Loans	15%	50.0%	N/A

[1] **Note that default probabilities and loss severities are national averages; localized results can be much higher. Additionally, note that loss severities are peak to trough valuations over the multi-year periods indicated.**

Source: Dominion Bond Rating Service (www.dbrs.com); used with permission

DBRS STRESS TEST APPLIED TO A HYPOTHETICAL BANK

ASSET CLASS (Amounts in millions)	LOAN AMOUNT $	DEFAULT PROBABILITY %	LOANS IN DEFAULT	LOSS SEVERITIES %	LOAN TO VALUE	ADJUSTED LOSS SEVERITY	ESTIMATED LOSS
COMMERCIAL PROPERTIES							
Manufacturing/Industrial	$473	15%	$71	29.5%	80%	9.5%	$7
Office	**1,043**	**16%**	**167**	**56.5%**	**80%**	**36.5%**	**61**
Retail	705	12%	85	26.4%	70%	N/A	0
Hospitality	633	13%	82	40.0%	75%	15.0%	12
Medical	176	13%	23	35.0%	72%	7.0%	2
Multi-Family	**438**	**10%**	**44**	**17.9%**	**80%**	**N/A**	**0**
R & D/Office	160	14%	22	42.0%	80%	22.0%	5
All Other	660	15%	99	50.0%	80%	30.0%	30
CONSTRUCTION LOANS							
Single Family	1,121	10%	112	20.0%	78%	N/A	0
All Other	1,219	16%	195	60.0%	76%	36.0%	70
LAND LOANS							
Acquisition and Development	1,132	14%	158	40.0%	77%	17.0%	27
All other Land Loans	240	15%	36	50.0%	80%	30.0%	11
TOTALS/AVERAGES	**$8,000**	**13.7%**	**$1,094**			**20.5%**	**$224**

Source: Dominion Bond Rating Service (www.dbrs.com; used with permission

DOMINION BOND RATING SERVICE STUDY OUTCOMES

- **“50-year flood” approach measured in context of:**
  - **Earnings**
    - **Lost interest income from defaulted loans**
  - **Loss reserves**
    - **Loan charge-offs**
    - **Replenishment of reserves**
  - **Capital**
    - **Depending on level of risk exposure, capital could be impacted**
- **DBRS can’t evaluate at loan, sub-portfolio, or portfolio level because they don’t have the data**
- **But we do…**

APPLYING THE STRESS MODEL TO YOUR BANK

- **What you know that DBRS doesn't:**
  - **Historical loan and borrower performance**
  - **Property performance data at origination and from ongoing monitoring**
  - **Geography**
  - **Local market conditions**
    - **Cap rates, vacancy rates, absorption, etc.**
  - **Other relevant loan terms**
    - **Fixed vs. variable rate loan**
    - **Credit enhancements (guarantees, excess collateral, etc.)**
    - **Lease structure and tenant credit standing**

CREDIT STRESS MODEL: STRUCTURE AND OBJECTIVES

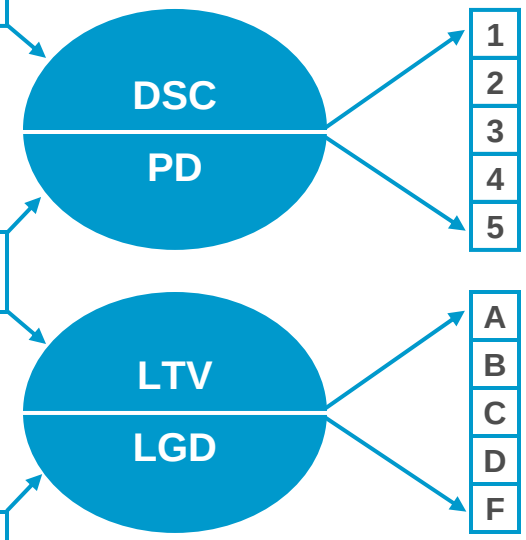
- Current property and loan performance data
- Independent variables (based upon benchmark data)
  - Interest rates
  - Capitalization rates
  - Vacancy rates
- Dependent variables
  - Debt service coverage ratio
  - Loan to value ratio
- Three scenarios
  - Baseline (current loan, property and market conditions)
  - Stress increments derived from benchmark data
  - Moderate stress (typical adverse market conditions)
  - Severe stress (rare, but possible adverse market conditions)
- Imbedded two tiered loan grading system
  - 1 through 5: DSC Ratio (maps to probability of default)
  - A through F: LTV Ratio (maps to loss given default)
- Aggregate results to portfolio level
- Evaluate concentration risk

INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

		MODEL INDEPENDENT VARIABLES		
		INTEREST RATE	**VACANCY RATE**	**CAPITALIZATION RATE**
MODEL DEPENDENT VARIABLES	**DSC and PD**	Increasing interest rates <u>increase</u> debt service requirements and therefore <u>decrease</u> the DSC ratio and <u>increase</u> the Probability of Default	Increasing vacancy rates <u>decrease</u> the collateral property's Net Operating Income and therefore <u>decrease</u> the DSC ratio and <u>increase</u> the Probability of Default	Capitalization rates have <u>no impact upon</u> the DSC ratio or the Probability of Default
	LTV and LGD	Interest rates have <u>no impact upon</u> the LTV ratio or The Loss Given Default	Increasing vacancy rates <u>decrease</u> the collateral property's Net Operating Income and therefore <u>increase</u> the LTV ratio and <u>increase</u> the Loss Given Default	Increasing capitalization rates <u>decrease</u> the multiplier effect upon the collateral property's net operating income and therefore <u>increase</u> the LTV ratio and <u>increase</u> the Loss Given Default

INDEPENDENT VARIABLES AND DEPENDENT VARIABLES

Independent Variables	Stress Scenarios and Stress Increments			Loan and Property Impact	Dependent Variables	Credit Grades
	Baseline	Moderate	Severe			
Interest Rates	Current	+ 100 bps	+ 200 bps	Debt Service	DSC / PD	1, 2, 3, 4, 5
Vacancy Rates	Current	+ 5 %	+ 10 %	Net Operating Income	LTV / LGD	A, B, C, D, F
Capitalization Rates	Current	+ 50 bps	+ 100 bps	NOI Multiplier		



CREDIT STRESS MODEL: LOAN DATA INPUT

CREDIT STRESS MODEL		
Loan and Borrower Data Input		
Borrower Name:	Fred Smith	
Address:	123 Main Street	
City, State:	San Francisco	California
Zip Code:		98765
Loan Number:		135792468
Next Loan Repricing Date:		6/30/2007
Original Loan Balance		$1,000,000
Current Loan Balance		$975,000
Current Loan Interest Rate		7.50%
Original Amortization Period		360
Remaining Amortization Period		300
Secondary Collateral Value		$200,000
STRESS TEST DATE		12/31/2006

CREDIT STRESS MODEL: PROPERTY INPUT

Loan and Collateral Performance Data		
Select Loan Type (Variable or Fixed)	Variable	
Select Property Type	Office -- CRE Conventional	
Loan Amount		$975,000
Loan Amortization Period		300
Loan Interest Rate (current loan rate)		7.500%
Annual Debt Service Requirement (P+I)		$86,462
Rental Income		$125,000
NNN/CAM/Parking/Other Income		$12,500
Vacancy Rate % (current property vacancy %)		7.50%
Property Operating Expenses		$25,000
Property Net Operating Income (NOI)		$102,188
Capitalization Rate (current market)		7.500%
Estimated Core Collateral Value		$1,363,000
Baseline Conditions	DSC Ratio	1.18
	LTV Ratio	72%

CREDIT STRESS MODEL: STRESS TEST RESULTS

Primary Model Variables	Stress Test Scenarios		
	Baseline Conditions	Moderate Stress	Severe Stress
Cap Rate	7.50%	8.00%	8.50%
Interest Rate	7.50%	8.50%	9.50%
Vacancy Rate	7.5%	12.5%	17.5%
NOI	$102,188	$95,313	$88,438
P+I Payment	$86,462	$94,212	$102,223
Core Collateral	$1,363,000	$1,191,000	$1,040,000
DSC Ratio	1.18	1.01	0.87
LTV Ratio Core Collateral	72%	82%	94%
LTV Ratio All Collateral	62%	70%	79%
Credit Grade Core Collateral	3C	4D	5D
Credit Grade All Collateral	3B	4C	5C
Estimated Loss Exposure =	No Loss Expected	No Loss Expected	No Loss Expected
Action Required:	Special Monitoring		

BENCHMARK DATA

- Historical data (1985 to 2006)
- By property type:
  - Office, Industrial, Retail and Multi-family
- By market area:
  - San Francisco, Oakland, Sacramento and Phoenix
- Vacancy rates: Torto Wheaton
- Capitalization rates: Global Real Analytics
- Interest Rates: Federal Reserve
- Analyzed data for typical one-year net change and maximum one-year net change
- Became basis for stress test increments

AGGREGATING STRESS TESTING RESULTS

INVESTOR OWNED CRE LOAN PORTFOLIO
PROBABILITY OF DEFAULT: DSC RATIO < 1.00 UNDER SEVERE STRESS

Property Type	Total Loans Analyzed with Stress Model	DSC Ratio < 1.00 Severe Stress	DSC Ratio < 1.00 % by Prop Type	Estimated Losses for DSC Ratio < 1.00	% Loss on DSC < 1.00 Loans
Industrial -- CRE Conventional	40,000,000	15,000,000	38%	(2,000,000)	-13%
Multifamily -- CRE Conventional	25,000,000	15,000,000	60%	(1,500,000)	-10%
Office -- CRE Conventional	100,000,000	45,000,000	45%	(6,500,000)	-14%
Retail -- CRE Conventional	85,000,000	17,000,000	20%	(2,500,000)	-15%
Totals	**250,000,000**	**92,000,000**	**37%**	**(12,500,000)**	**-14%**

LOSS GIVEN DEFAULT: ASSUMING A 40% DEFAULT RATE FOR DSC < 1.00 LOANS

Property Type	DSC Ratio < 1.00 Severe Stress	Assumed Default Rate	Loans in Default	% Loss	Expected Pre-Tax $ Loss Severe Stress
Industrial -- CRE Conventional	15,000,000	40%	6,000,000	-13%	(800,000)
Multifamily -- CRE Conventional	15,000,000	40%	6,000,000	-10%	(600,000)
Office -- CRE Conventional	45,000,000	40%	18,000,000	-14%	(2,600,000)
Retail -- CRE Conventional	17,000,000	40%	6,800,000	-15%	(1,000,000)
Totals	**92,000,000**		**36,800,000**		**(5,000,000)**

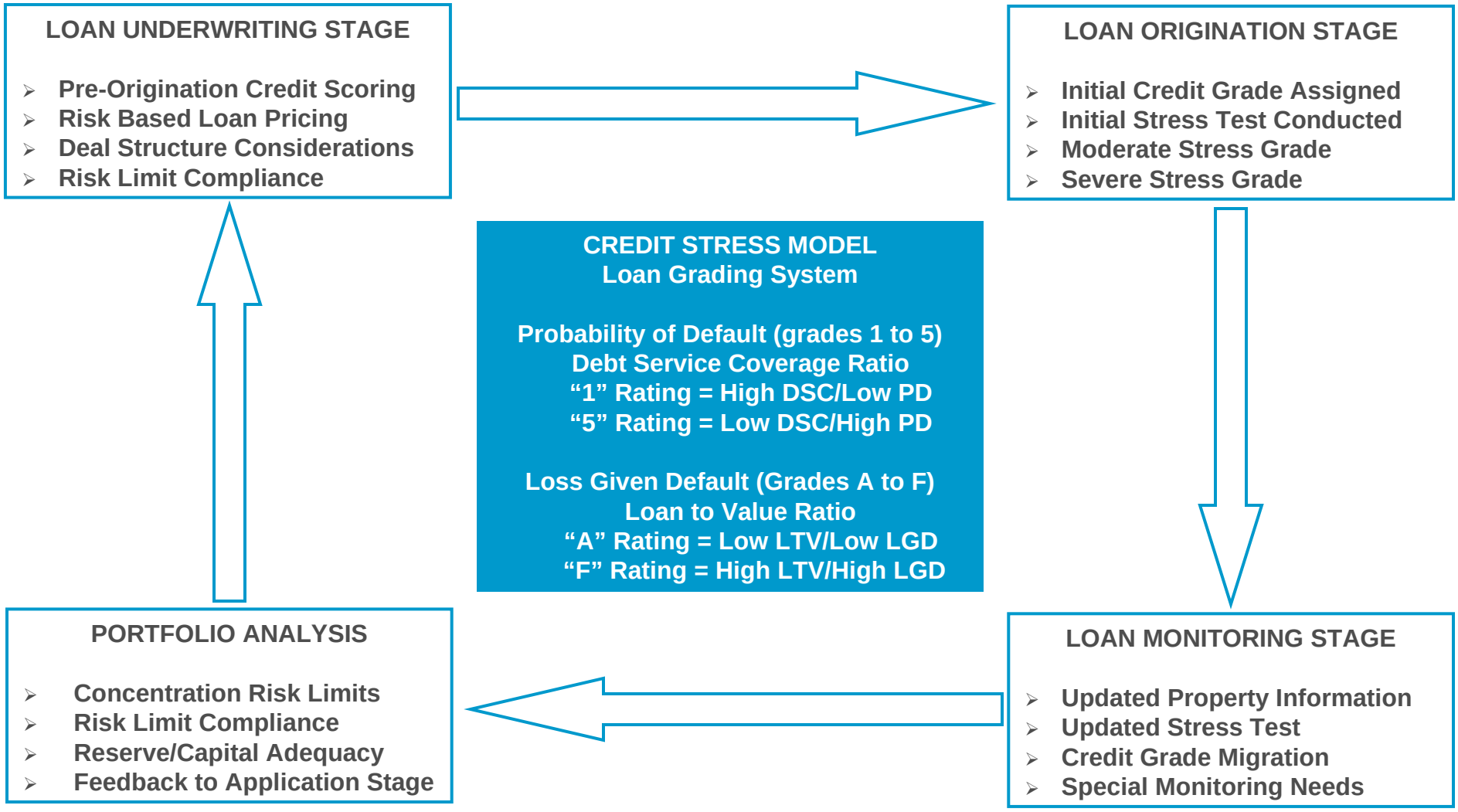
LOSS GIVEN DEFAULT: STRESSED DATA APPLIED TO TOTAL CRE PORTFOLIO

Property Type	Total CRE Investor Loans in Portfolio	DSC Ratio < 1.00 % by Prop Type	Assumed Default Rate	Loans in Default	Expected Pre-Tax $ Loss Severe Stress
Industrial -- CRE Conventional	90,000,000	37.5%	40%	13,500,000	(1,800,000)
Multifamily -- CRE Conventional	60,000,000	60.0%	40%	14,400,000	(1,440,000)
Office -- CRE Conventional	250,000,000	45.0%	40%	45,000,000	(6,500,000)
Retail -- CRE Conventional	120,000,000	20.0%	40%	9,600,000	(1,412,000)
Totals	**520,000,000**		**16%**	**82,500,000**	**(11,152,000)**

SETTING SENSIBLE CONCENTRATION RISK LIMITS

- Quantify loan performance under stress
- Develop rational sub-portfolios for analysis
- Aggregate results
- Evaluate risks (market variability) by segments and exposures
- Get it right “directionally”
- Understand correlations across portfolios
- Relate portfolio performance under stress to reserves, earnings and capital
- Take a position on risk tolerance
- Be proactive managers of risk

INTEGRATED CREDIT RISK MANAGEMENT SYSTEM



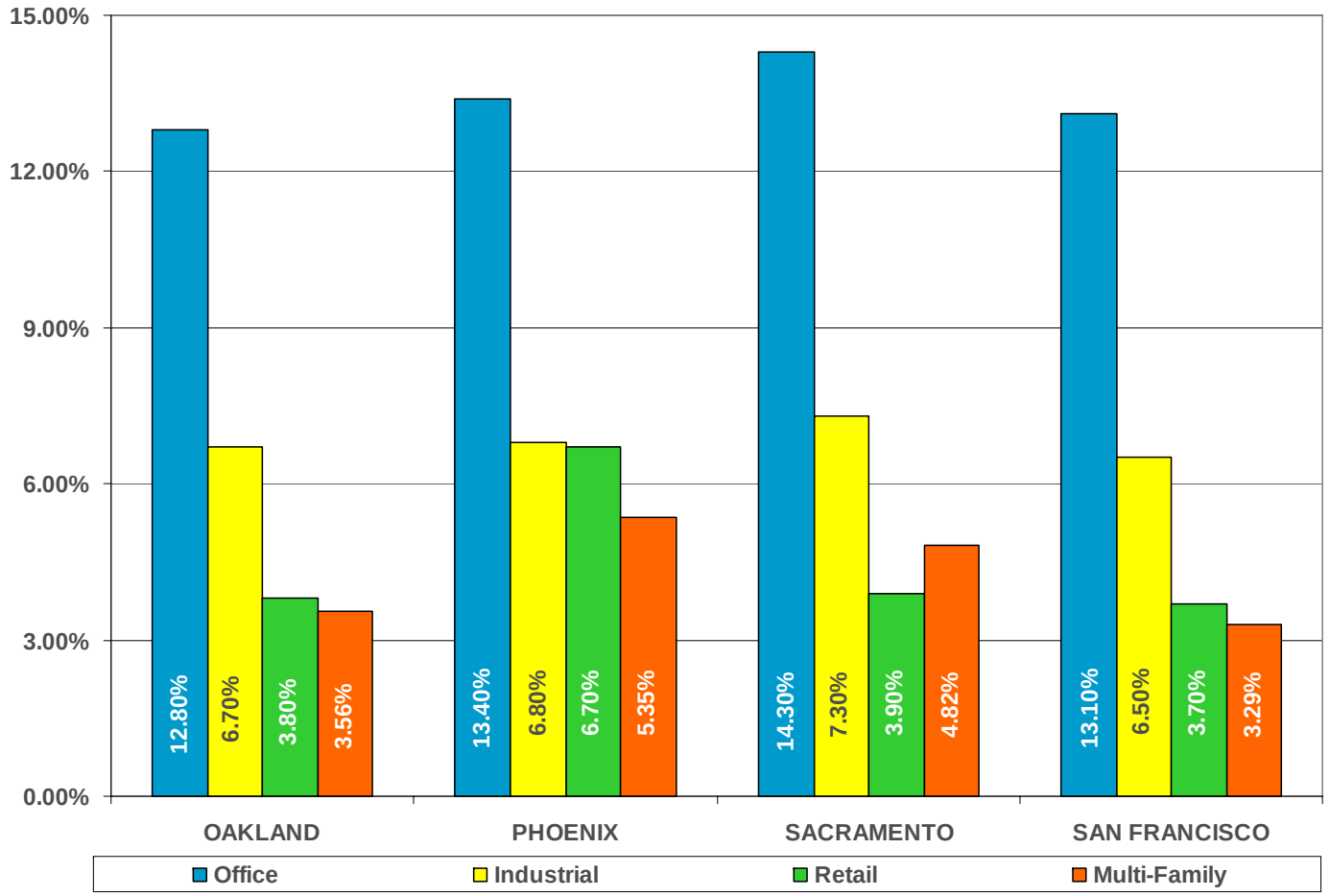
LEARNING AND INSIGHTS

- **What benchmark data reveals about markets and credit risk**
- **Risk based pricing**
- **The importance of MIS data**

2006 VACANCY RATES BY PROPERTY TYPE AND MARKET

OBSERVATION:

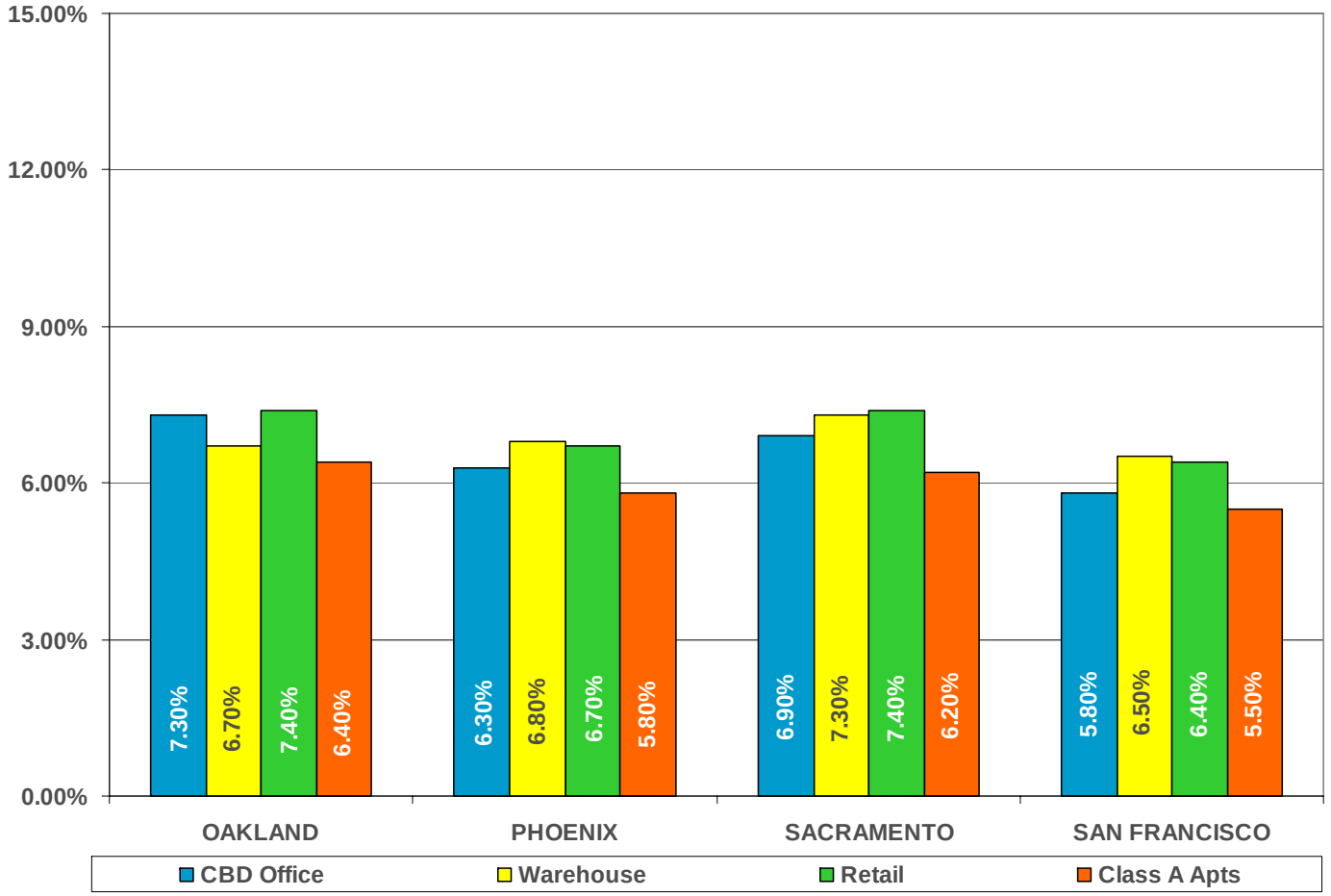
- Vacancy rates across property types vary significantly
- Vacancy rates across geographies also vary significantly
- The key factor for concentration risk limits is the variability over time



2006 CAPITALIZATION RATES BY PROPERTY TYPE AND MARKET

OBSERVATION:

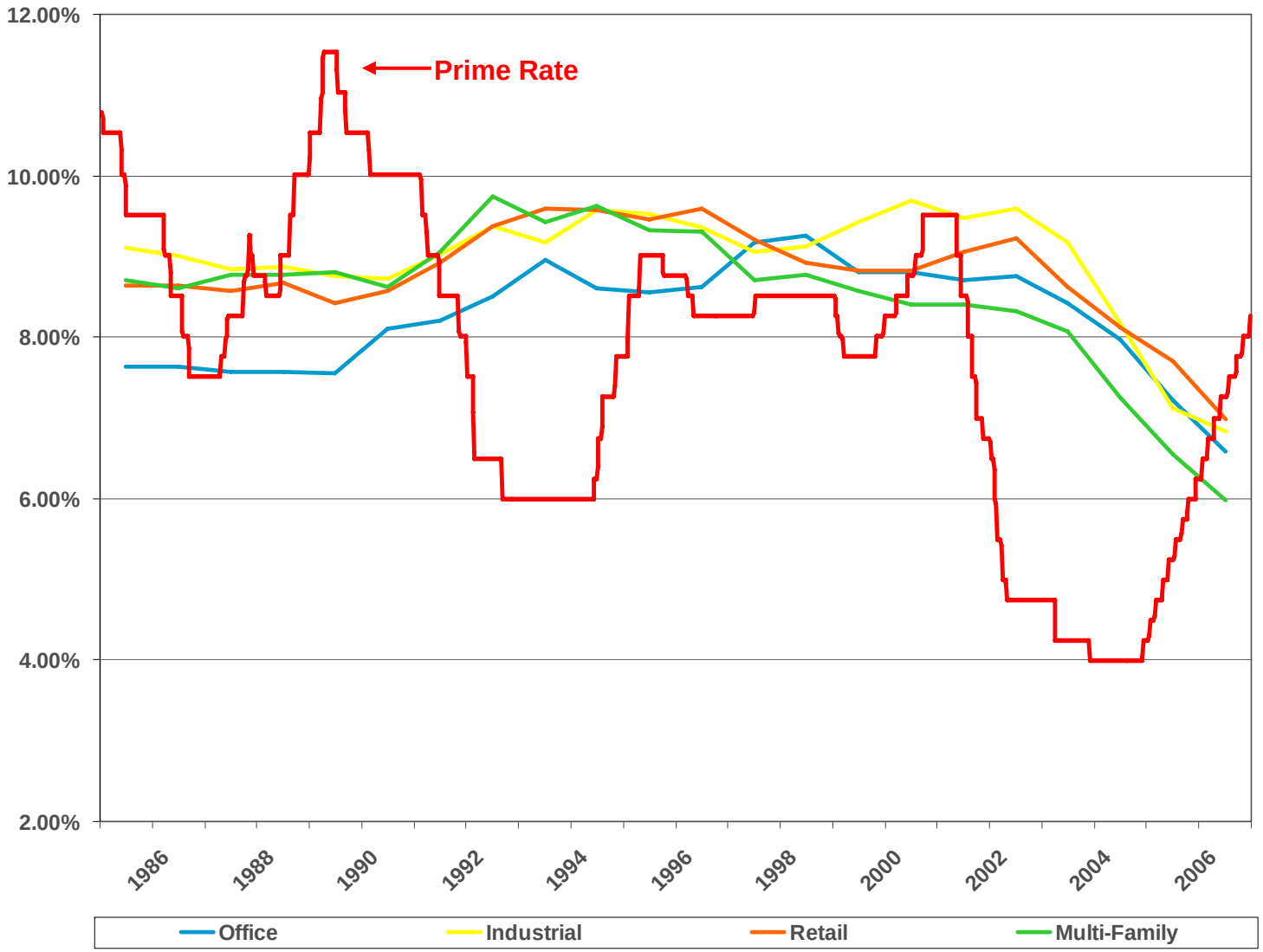
- Cap rates across property types are fairly consistent
- Cap rates across our markets are fairly consistent
- As a multiplier of NOI, cap rates are powerful determinants of property values



HISTORICAL CAP RATES BY PROPERTY TYPE

OBSERVATIONS:

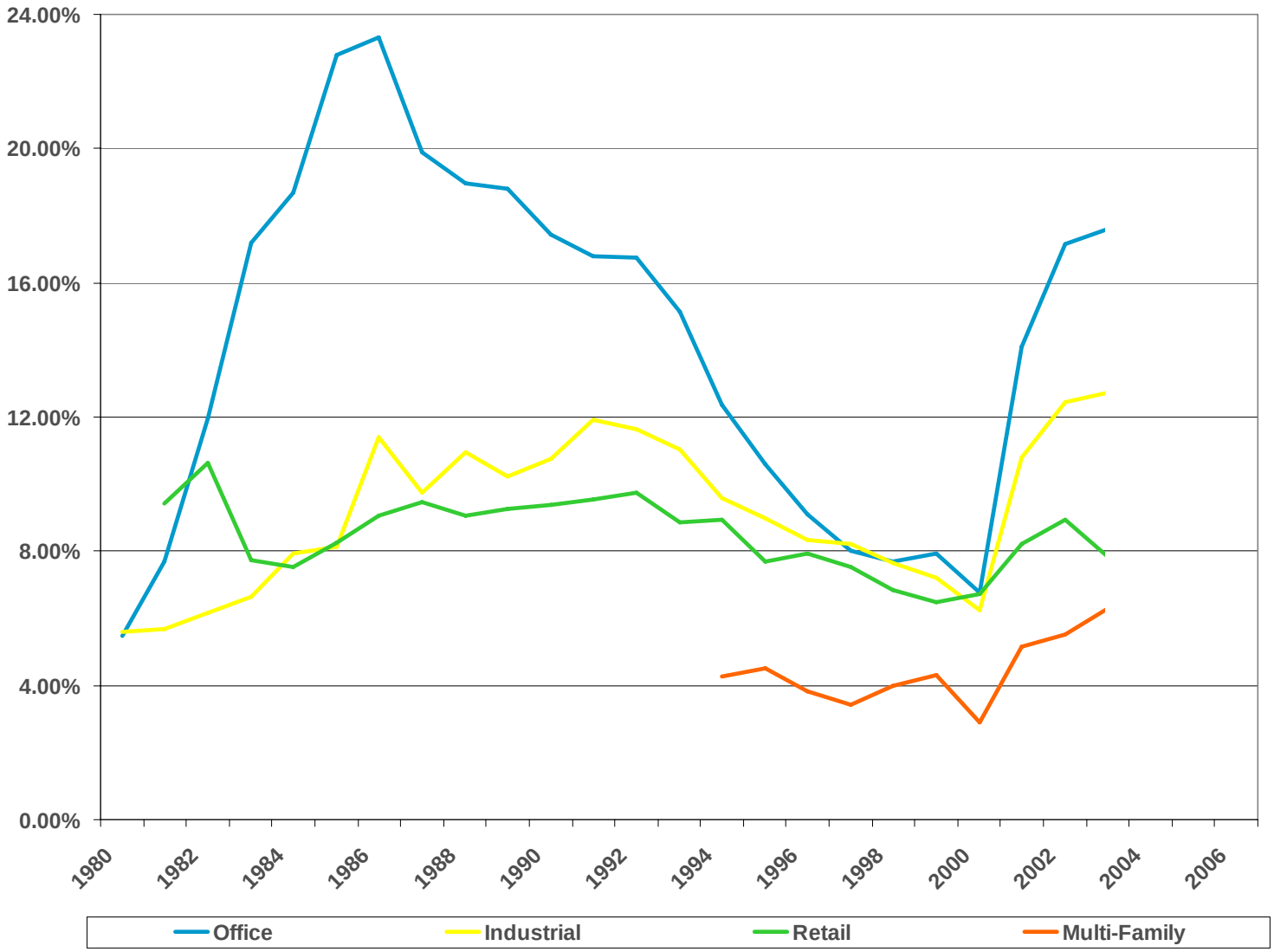
- Cap rates across property types appear to be well correlated
- Cap rate variability is modest compared to short term interest rates
- Stress test increments should reflect degree of variability in historical data
- As a multiplier of NOI, cap rates are powerful determinants of property values
- Short term interest rates have turned up decidedly, but cap rates haven't



VACANCY RATES BY PROPERTY TYPE

OBSERVATIONS:

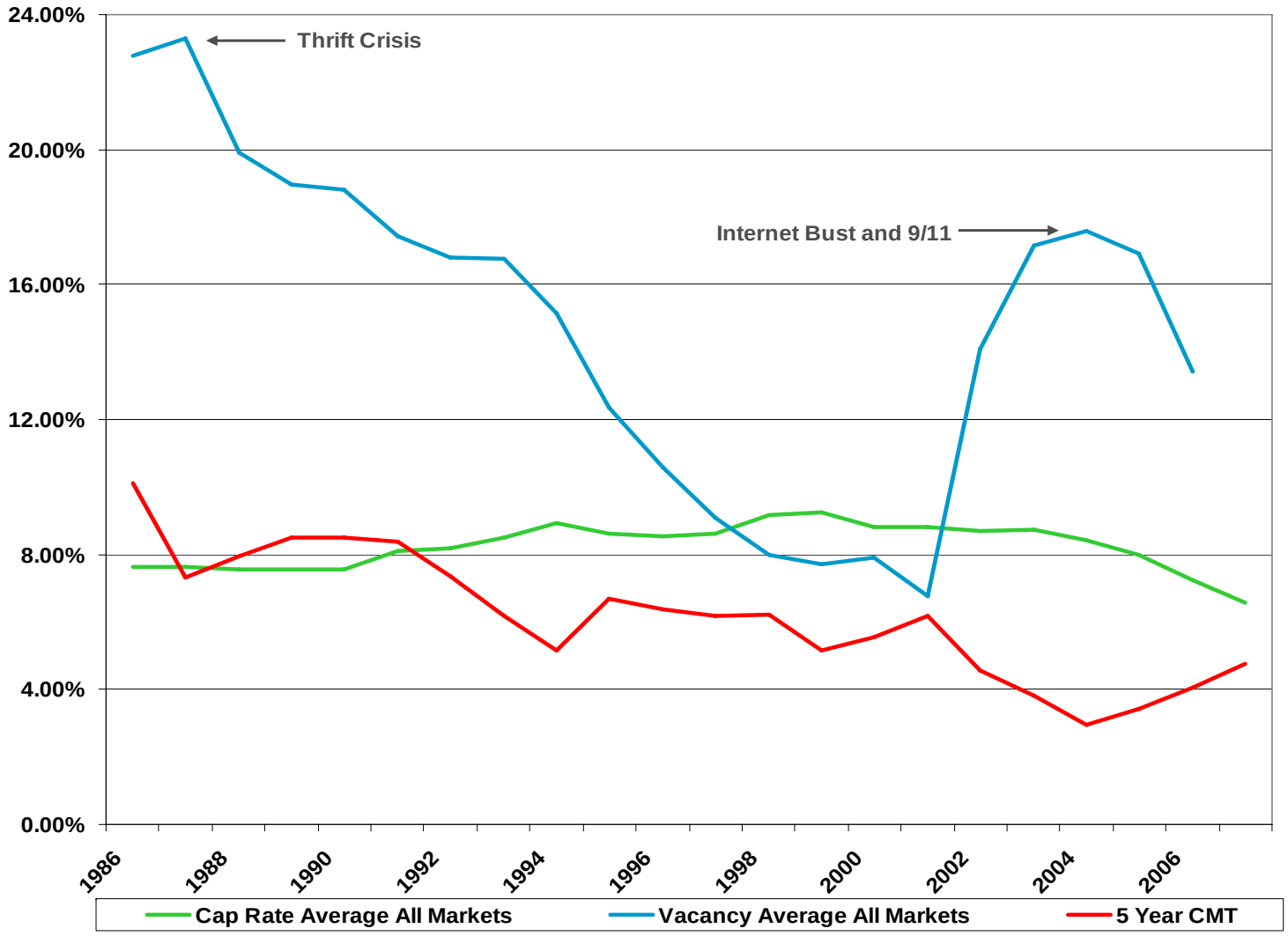
- Different property types have varying vacancy rate volatilities
- From a risk standpoint, volatility is the enemy
- Office is clearly the most volatile property sector
- Vacancy rate variability should be considered when establishing concentration risk limits



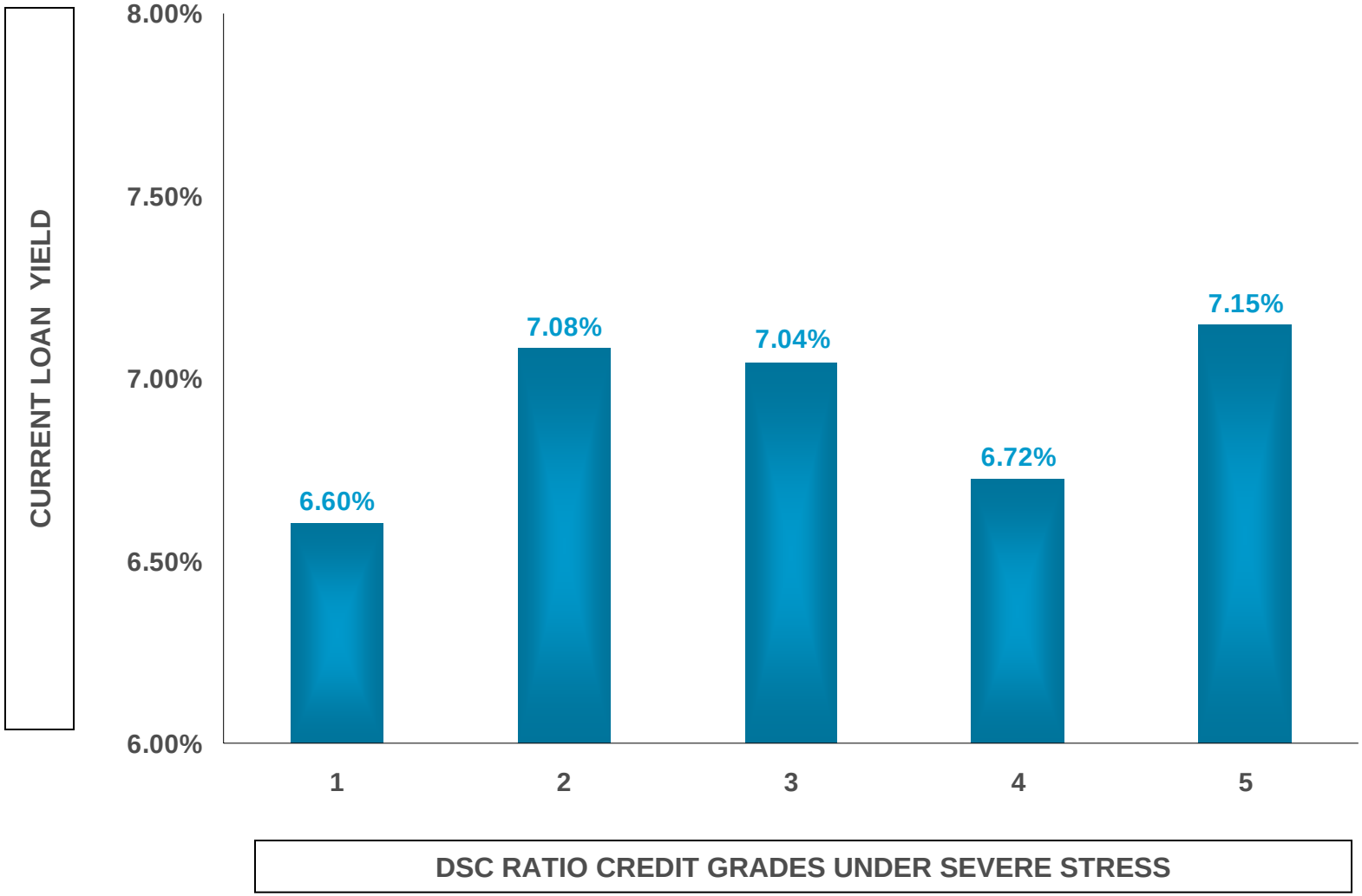
AVERAGE CAP, INTEREST AND VACANCY RATES

OBSERVATIONS:

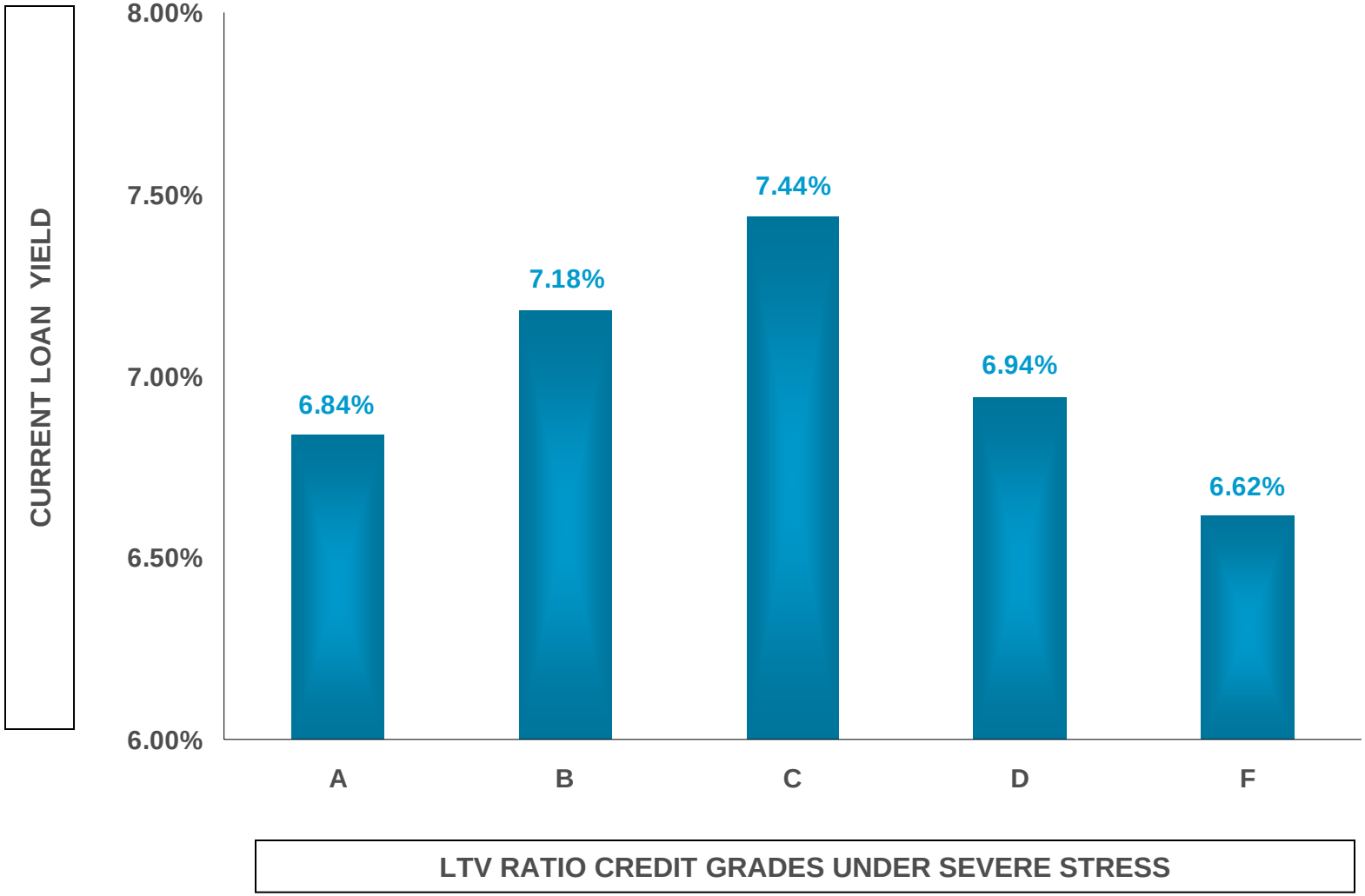
- Cap, interest and vacancy rates do not always move in unison
- The stress test model drivers do not always move adversely at the same time
- Align your stress increments with historical market behavior



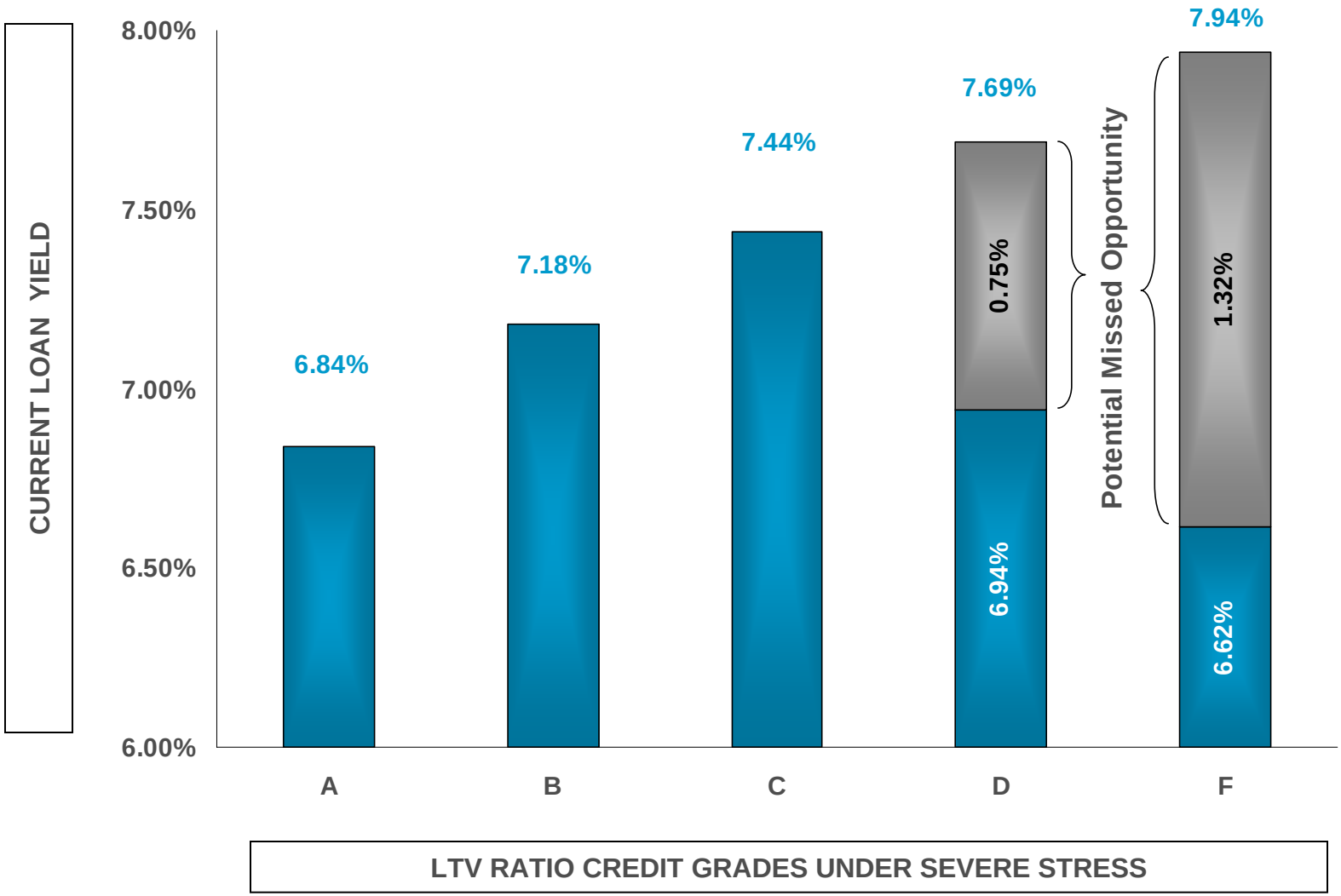
RELATING LOAN PRICING TO RISK



RELATING LOAN PRICING TO RISK



RELATING LOAN PRICING TO RISK



MIS DATA INTEGRITY MATTERS

- Evaluate the state of your data capture and MIS
- Identify key data you want captured
  - Initial underwriting parameters (i.e., appraised value, DSC, credit enhancements, secondary collateral, rents, lease structures, tenant quality, operating expenses, appraised value, cap rate, NOI, property type, geography, owner occupied/investor, etc.
  - Ongoing monitoring parameters and credit performance
    - 30, 60 and 90+ day delinquency occurrences
    - Property performance (rents, vacancy, expenses, NOI, etc.)
    - stress testing results
    - Credit grading (for migration purposes)
- Identify portfolio segments and map to risk limits
- Assess segment correlations
- Become an information driven organization
- Position yourself for fact based discussions with examiners

OVERVIEW POINTS TO CONSIDER

- My model was a hand-crafted, garage built solution to an important emerging issue
- It is instructive when you build it yourself—the organization benefits from the journey
- The process forces creative thought and internal debate
- Improved credit risk management structures and methods result
- While my model is not a sustainable, long-term solution…
- …you will be better prepared to evaluate and understand your vendor's approach


THE END