Commercial Mortgage Analysis and Underwriting

Commercial mortgages represent a significant investment vehicle in real estate finance. Understanding how to analyze default risk and apply proper underwriting procedures is essential for both lenders and borrowers in this market.

This presentation explores the quantitative aspects of default risk in commercial mortgages and examines the traditional underwriting procedures used by lenders. We'll investigate how expected returns differ from stated yields, analyze the impact of default timing, and review the key metrics used in commercial mortgage underwriting.

Expected Returns vs. Stated Yields

Contract Yield (YTM)

Based on contractual cash flow terms of the mortgage

Assumes all payments will be made according to schedule

This is what lenders typically quote to borrowers

Expected Return (E[r])

Recognizes realistic probability of default and foreclosure

Accounts for potential credit losses

More fundamental measure for investment decisions

The difference between stated yield and expected return quantifies the impact of default risk on the ex ante return that lenders care about. This difference is known as yield degradation.

Understanding Yield Degradation

Credit Losses

Shortfalls to the lender resulting from default and foreclosure

Yield Degradation

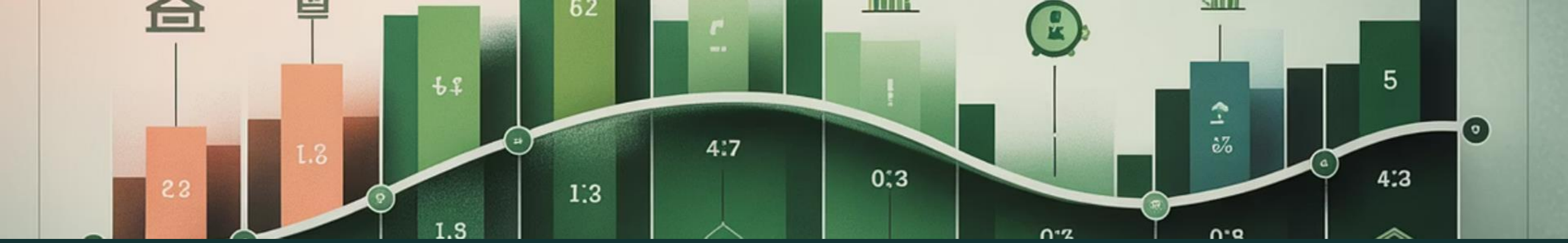
The effect of credit losses on realized yield compared to contractual yield

Recovery Rate

Percentage of outstanding loan balance recovered after default (e.g., 70%)

Loss Severity

Percentage of outstanding loan balance lost after default (e.g., 30%)



Timing of Default Matters

Earlier Default

Greater yield degradation

Higher Loss

Less time to collect interest payments

Property Value

May have declined significantly

Recovery Rate

Critical to final loss calculation

For example, with a 3-year loan at 10% interest rate, default in year 1 with 80% recovery results in 22% yield degradation, while default in year 3 with 70% recovery results in only 11.12% yield degradation.

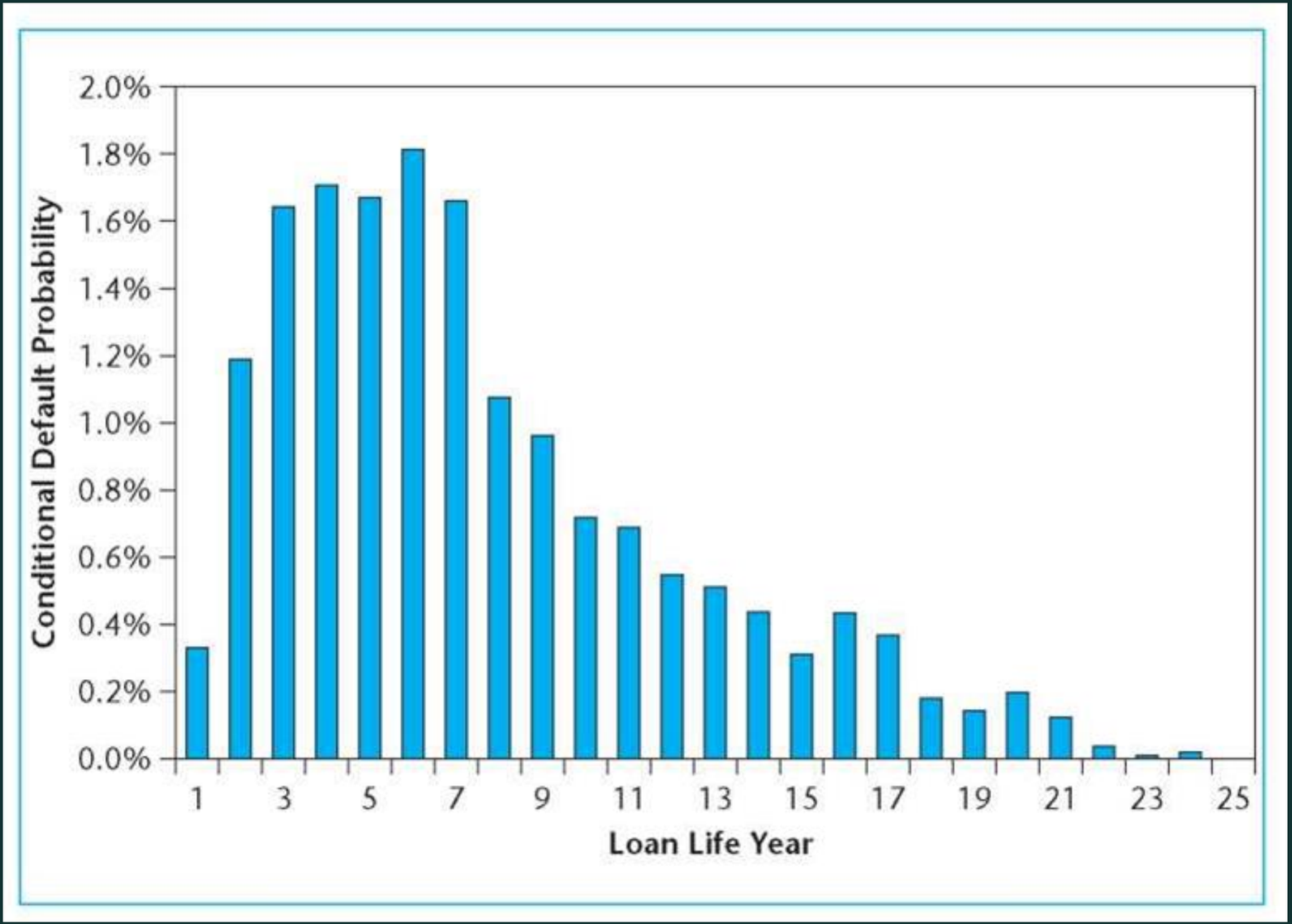
Hazard Functions and Default Probability

The hazard function tells the conditional probability of default at each point in time, given that default has not already occurred before then.

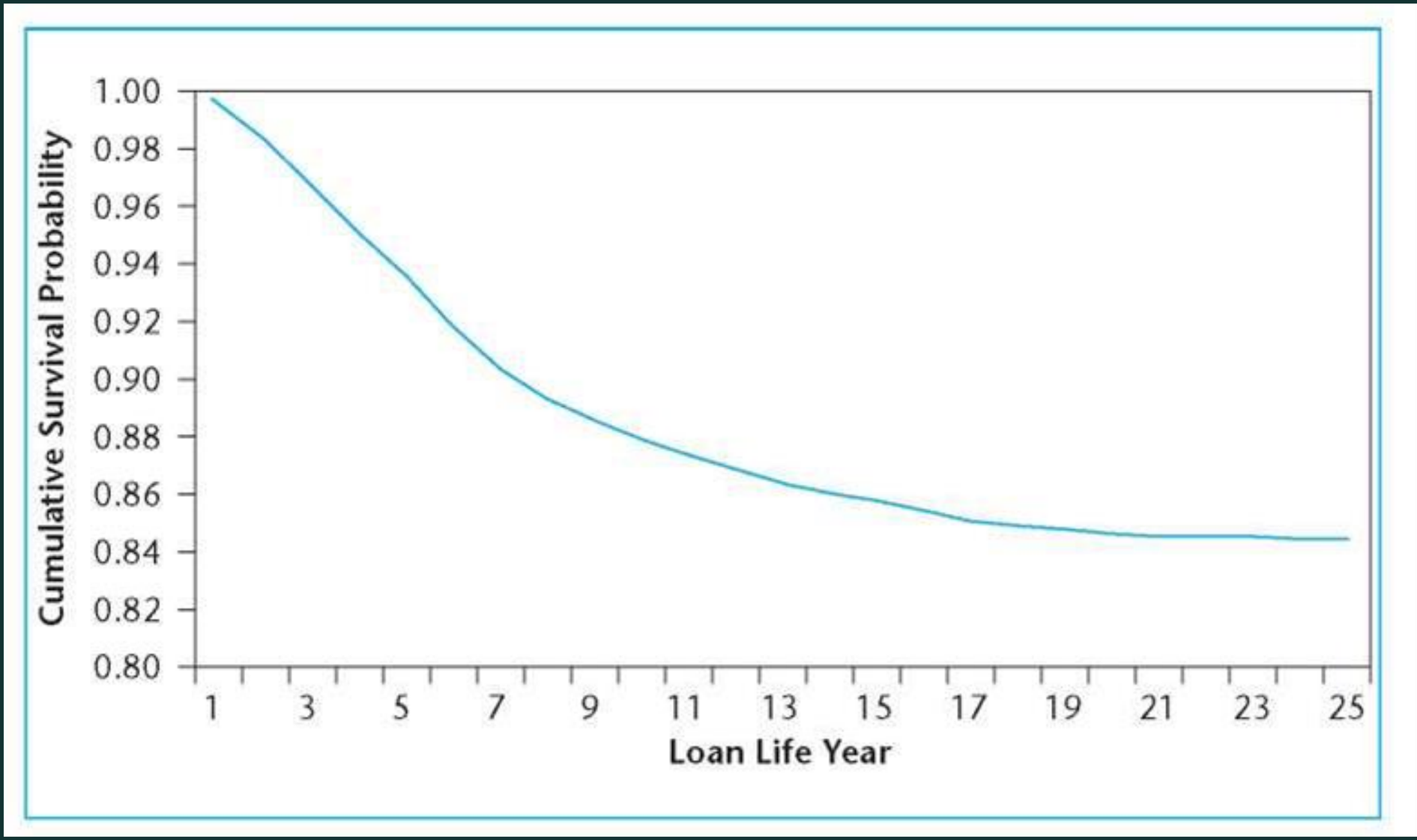
Year	Hazard	Conditional Survival	Cumulative Survival	Unconditional PrDEF	Cumulative PrDEF
1	1%	99.00%	99.00%	100%	1.00%
2	2%	98.00%	97.02%	198%	2.98%
3	3%	97.00%	94.11%	2.91%	5.89%

With hazards of 1%, 2%, and 3% for years 1-3, the ex ante probability of default at some point in the loan's life is 5.89%, which is is less than the sum of all individual hazards (6%).

Typical Commercial Mortgage Hazard Rates by Loan Life Year (from Esaki et al, 2002)



Commercial Mortgage Survival Rates (Esaki et al, 2002)



Default Rates Vary by Loan Vintage

Market Cycles Impact Default

Loans issued when property values were relatively high (early 1970s and mid-1980s) had much higher lifetime default rates, peaking at almost 28% for loans issued in 1986.

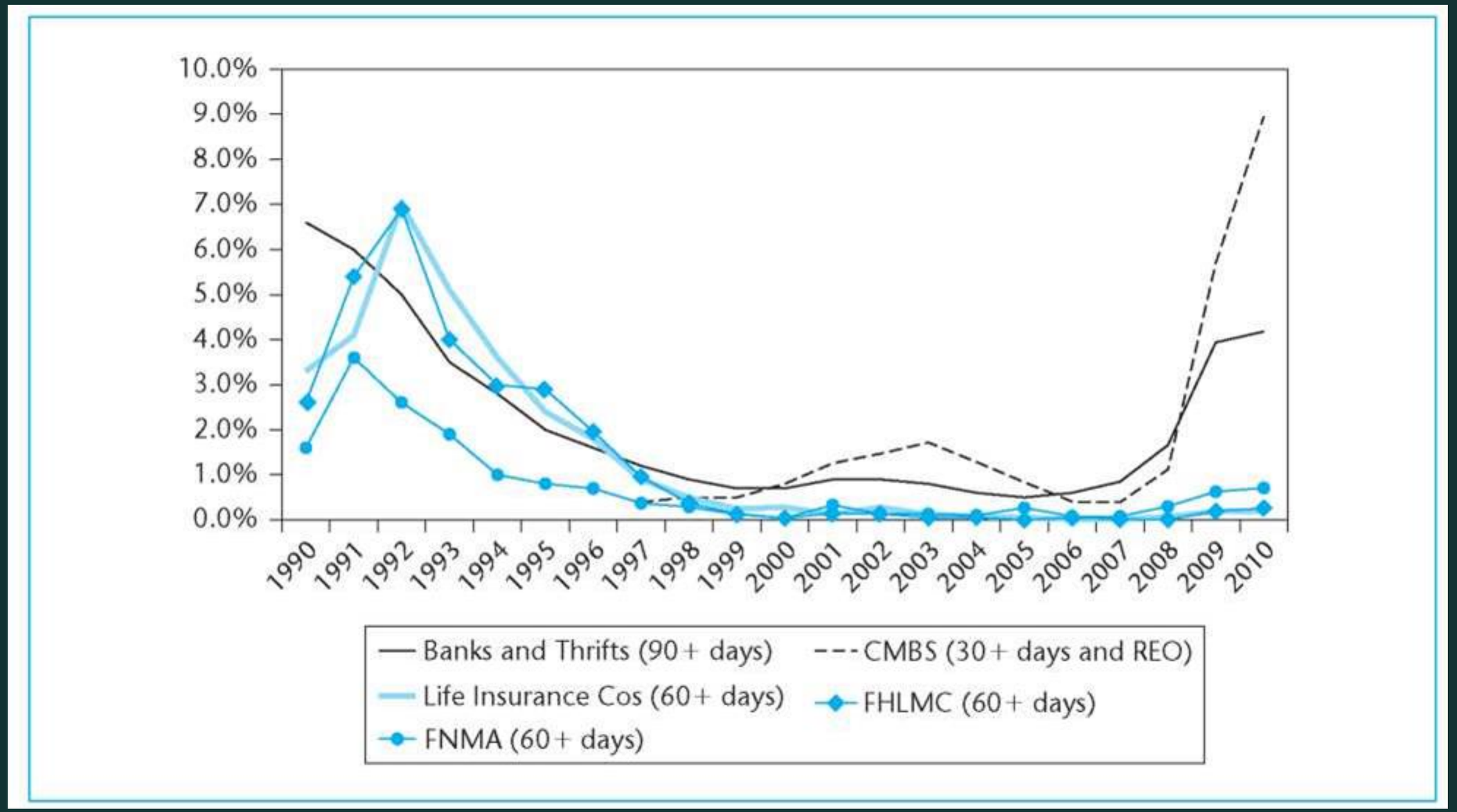
The "Santa Claus Approach"

Borrowers are rewarded (loaned more capital) when they have done well and penalized (given less capital) when they have performed poorly during the recent past.

Cyclical Pattern

If lenders maintain constant LTV ratios while property values cycle, this creates a pattern of higher defaults for loans originated during market peaks.

Default Rates by Lender Type: 1990-2010



Recovery Rates and Loss Severity

69%

Average Recovery Rate

For liquidated loans in the Esaki study

31%

Average Loss Severity

Including foreclosure expenses, lost interest and principal

48.4%

2023 Loss Severity

For $2.1B in loans disposed with losses (Fitch Ratings)

53.2%

Office Sector Loss

Highest loss severity among property types in 2023

A more detailed study by Ciochetti tracked 308 foreclosed mortgages from "cradle to grave" and found that while the average recovery was 57% based on reported property value at foreclosure, the average recovery was only 34% through to final disposition of the property.

Is It Surprising That So Many Commercial Mortgages Default?

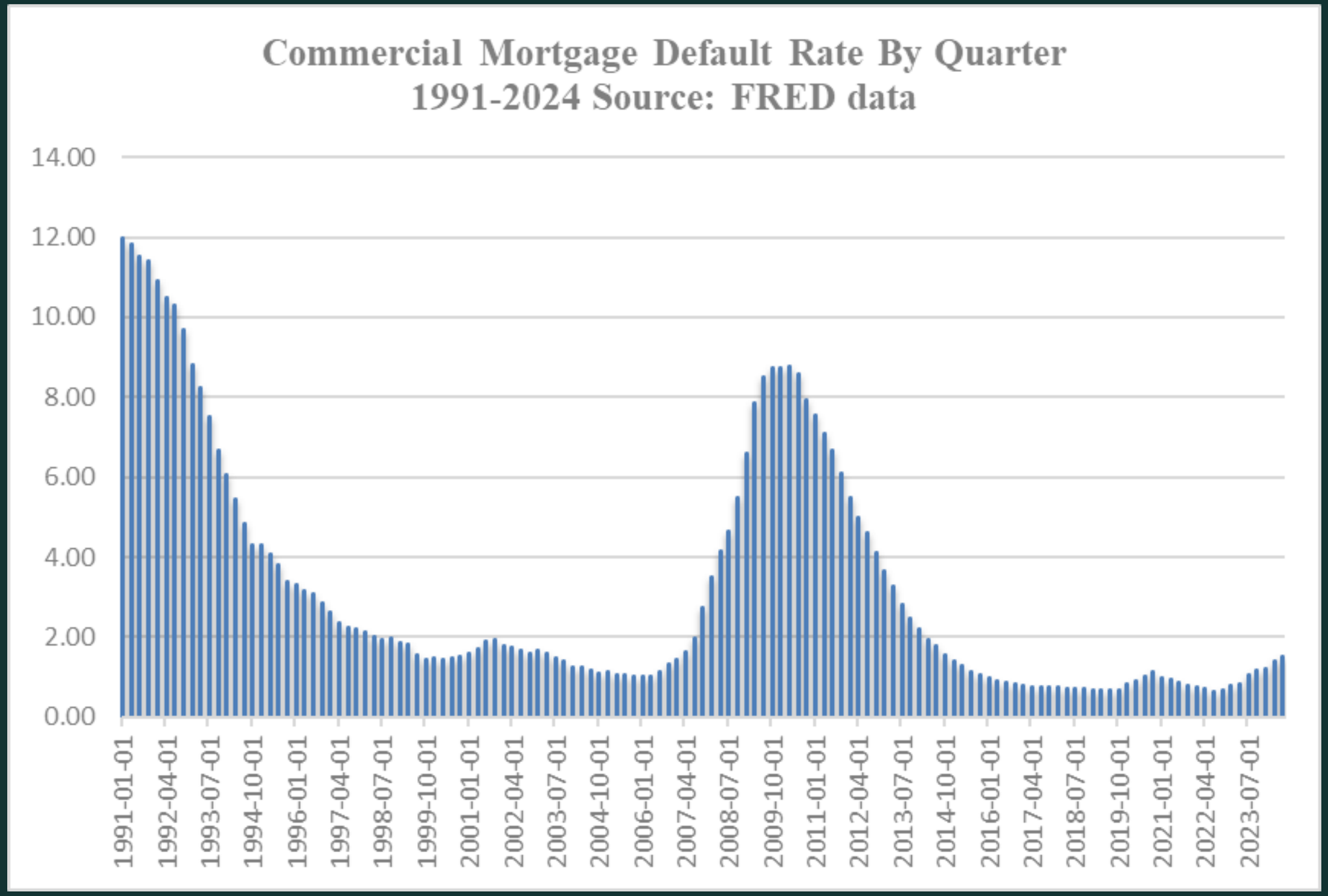
No borrower plans to default on a loan when they take it out. Lenders go to great lengths to avoid making loans that will default. Yet about one out of every six long-term commercial mortgages in the United States defaults. Why?

The answer lies in property market volatility. The typical individual commercial property has an annual volatility in excess of 15%. With a standard 75% LTV ratio and property values following a random walk, there's approximately a one-sixth chance that a property will be worth less than the loan balance after seven years.

Even with modest expected appreciation of 2% per year, there remains about a one-sixth chance that the property would be worth only 75% of its current value or less after seven years - right at the typical LTV threshold.

Empirically observed default rates in commercial mortgages are consistent with evidence about property volatility.

Commercial Mortgage Default Rates Over Time



Commercial Mortgage Underwriting: Purpose and Focus

Purpose of Underwriting

In principle, underwriting aims to make default a rare event. More broadly, it ensures lenders are getting their desired expected return when making loans. Tighter underwriting criteria lower default probability and yield degradation, raising expected returns toward contractual yields.

Focus on Properties

Unlike residential mortgages, commercial mortgage underwriting focuses primarily on the property rather than the borrower. Since many commercial mortgages are non-recourse, and the property itself provides cash to service the loan, property quality and income are critical factors.

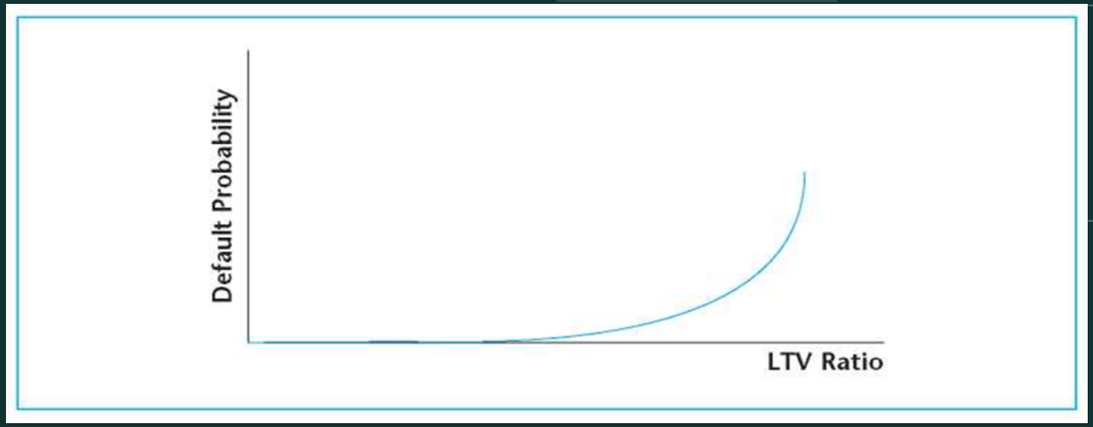
Borrower Considerations

The borrower remains important. Financially troubled borrowers may use healthy properties as "cash cows" to bail out other losses. Conversely, successful borrowers represent potential repeat customers, which may influence lender flexibility.

Initial Loan-to-Value Ratio (ILTV)

Primary Underwriting Criterion

Most fundamental measure of loan risk



Calculation

Loan Amount ÷ Property Value

Note the Nonlinear Relationship

Default probability increases sharply at higher LTVs

Traditional ILTV Limit

75% or lower (65% for riskier properties)

The ILTV ratio is directly related to the ex-ante default probability in the loan. Because the current market value of the property reflects the entire future income stream, ILTV is arguably the most important single underwriting criterion, reflecting both asset value and income coverage in a single measure.

Debt Service Coverage Ratio (DCR)

Primary Income-Based Criterion

Measures income relative to debt service

Calculation =

NOI ÷ Annual Debt Service

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Typical Requirement

120% or higher depending on the quality and resiliency of the tenants

The DCR clearly makes sense as an underwriting criterion, as the NOI generated by the property is normally the primary source of cash to the loan. The buffer provided by requiring DCR above 100% helps protect against cash flow squeezes.

The DCR criterion may be raised higher for riskier property types or during times when lenders are more risk-averse. Conversely, lower DCR hurdles may be accepted during periods of rapid inflation or when the loan market is "hot."

Additional Underwriting Metrics

Break-Even Ratio (BER)

(Debt Service + Operating Expenses) ÷ Potential Gross Gross Income

Typical limit: 85% or less

Equity-Before-Tax Cash Flow

NOI - Debt Service - Capital Improvement Expenditures

Red flag if projected to be negative

Loan Yield

Property NOI ÷ Loan Amount

Relates loan to property pricing metrics

Multi-year Proforma

Cash flow projection extending to loan maturity

Examines criteria for all years, not just initial year

Variables and Loan Terms to Negotiate

Loan Amount

Total principal borrowed

Other Terms

Fees, prepayment options, recourse provisions

Loan Term

Maturity length

Interest Rate

Contract rate

Amortization

Principal repayment schedule

Commercial mortgages present a potentially large array of possible loan terms and variables that can be negotiated. The art of putting together a a successful deal lies in finding a combination that maximizes both sides' preferences, requiring an understanding of how changing loan terms affects the ex ante risk and return.

Numerical Example: Bob's Office Building Loan

Loan Request

- $9,167,000 purchase-money mortgage
- 100,000-SF single-tenant office building
- Purchase price: $12,222,000 (75% ILTV)
- 10-year interest-only, nonrecourse loan
- No prepayment permitted (lockout)

Market Conditions

- 10-year Treasury bonds: 6% yield
- Commercial mortgage spreads: 200 basis points
- Required mortgage rate: 7.87% (MEY)

Underwriting Criteria

- Maximum ILTV < 75%
- Maximum terminal LTV < 65%
- Minimum DCR > 120%
- Maximum BER < 85%

Analyzing Bob's Loan Application

Year	1	2	5	8	10
NOI	$1,100,000	$1,150,000	$1,200,000	$1,218,214	$1,299,428
Debt Service	$721,443	$721,443	$721,443	$721,443	$9,888,443
EBTCF	$378,557	$428,557	$478,557	($1,028,229)	$4,405,266
DCR	152%	159%	166%	169%	180%
BER	60%	59%	57%	56%	54%

The income-based metrics look good: DCR starts at 152% (above the 120% minimum) and improves over time. BER starts at 60%, well below the the 85% maximum.

However, there are two problems: 1) A sharply negative EBTCF in year 8 when the lease expires, and 2) The DCF valuation at a 10% discount gives a present value of only $11,557,000, implying a 79% ILTV, which violates the 75% ILTV criterion.

Negotiating a Solution

Identify the Problems

The loan application fails the ILTV criterion (79% vs. 75% limit) and would also fail the terminal LTV criterion without amortization.

Develop Alternatives

Offer a smaller loan of $8.7 million (75% of $11,557,000) with some amortization to meet the terminal LTV requirement of 65%.

Structure the Counterproposal

With 40-year amortization, the balloon payment after 10 years would be $8,230,047, implying a TLTV ratio of 63%, below the 65% limit. Annual debt service would be $715,740, slightly less than Bob's original proposal.

This example demonstrates how trade-offs among loan terms can be manipulated to meet underwriting criteria. If the lender's underwriting criteria are competitive and the property market valuation is accurate, Bob should find it difficult to secure better terms elsewhere.