



## BlackRock Solutions CMBS Modeling Overview

8 December 2010

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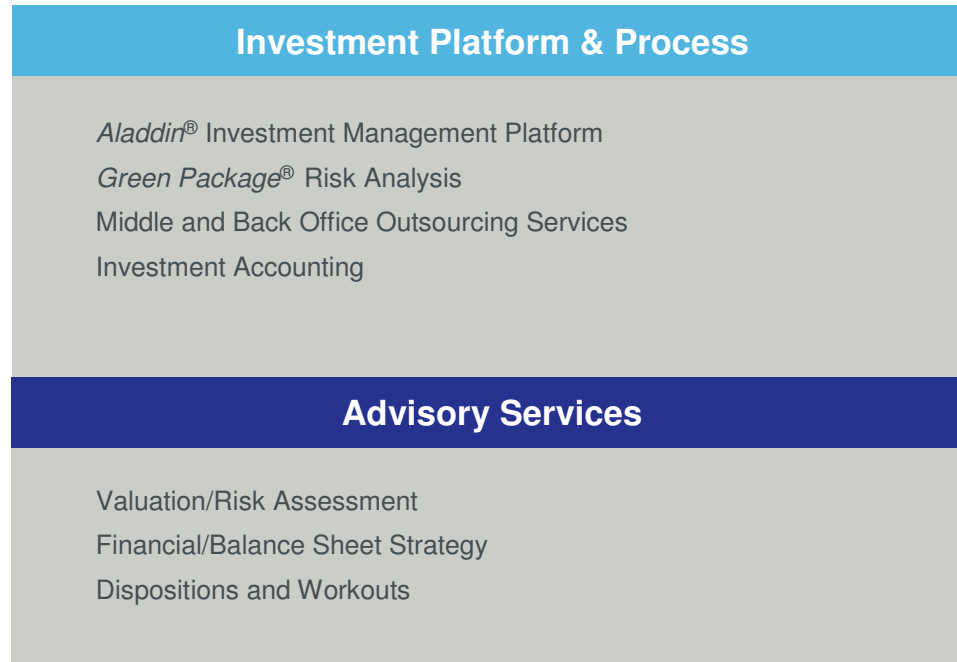
**I. BlackRock Solutions Overview**

**II. BlackRock Solutions CMBS Methodology and CMBS Fundamentals**

**III. BlackRock Solutions Commercial Real Estate Assumptions**

# BlackRock Solutions Overview: Risk Management & Advisory Services

BlackRock Solutions (“BRS”) is a separate business division within BlackRock, Inc. (NYSE: BLK) and focuses on risk management, investment technology, financial modeling and advisory services



***BlackRock Solutions, through its Financial Markets Advisory Group, is performing CMBS modeling and advisory services for the NAIC***

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II. BlackRock Solutions CMBS Methodology and CMBS Fundamentals

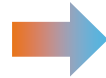
III. BlackRock Solutions Commercial Real Estate Assumptions

# CMBS Overview: RMBS Modeling vs. CMBS Modeling

## RMBS

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- Tends to be backed by relatively homogeneous collateral – mortgages are secured by single family residences
- Each securitization typically contains thousands of mortgages
- The default of a single mortgage does not tend to materially impact deal performance
- More consistency in loan documentation for residential mortgages
- Modeling is typically based on law of large numbers, applying a probabilistic approach to projecting performance outcomes (e.g. CDR, CPR, Severities, etc.)



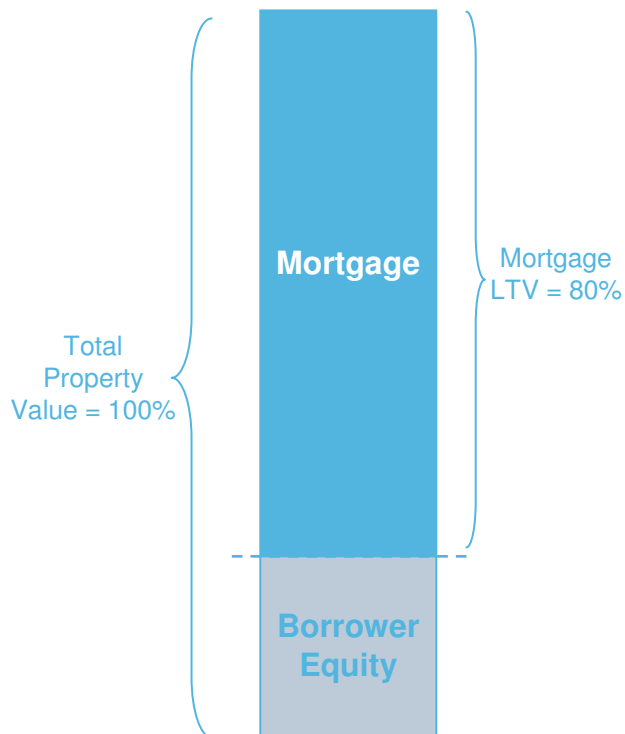
## CMBS

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- Tends to be more heterogeneous collateral – mortgages are secured by a variety of property types including office, retail, multifamily, industrial and hospitality
- Most securitizations contain approximately 15-300 mortgages  
• Generally the Top 15 loans account for approximately 50% of the balance of a CMBS trust
- The default of a single mortgage can have a significant impact to the owners of all related CMBS tranches
- Loan documentation tends to be unique for each borrower/mortgage
- Commercial real estate is less amenable to statistical modeling due to idiosyncratic aspects of each underlying commercial property and mortgage

# CMBS Overview: Commercial Mortgage Loan Basics

## Sample Property Capital Structure



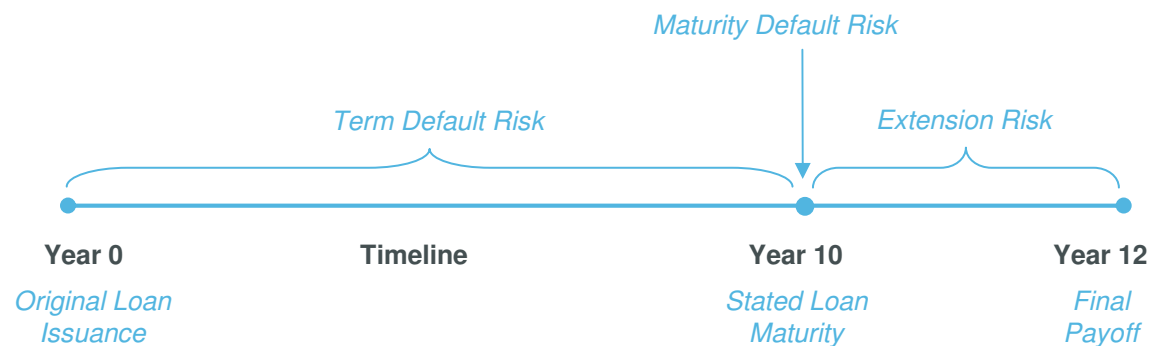
## Life Cycle of a Sample Commercial Mortgage Loan

Commercial mortgages have inherent risks to the lender

**Term Default Risk:** Borrower is unable to meet its interest obligations and defaults on its mortgage before maturity

**Maturity Default:** Borrower is unable to refinance or payoff loan balance at maturity

**Extension Risk:** Servicer/Lender may extend loan maturity



## Key Term Definitions

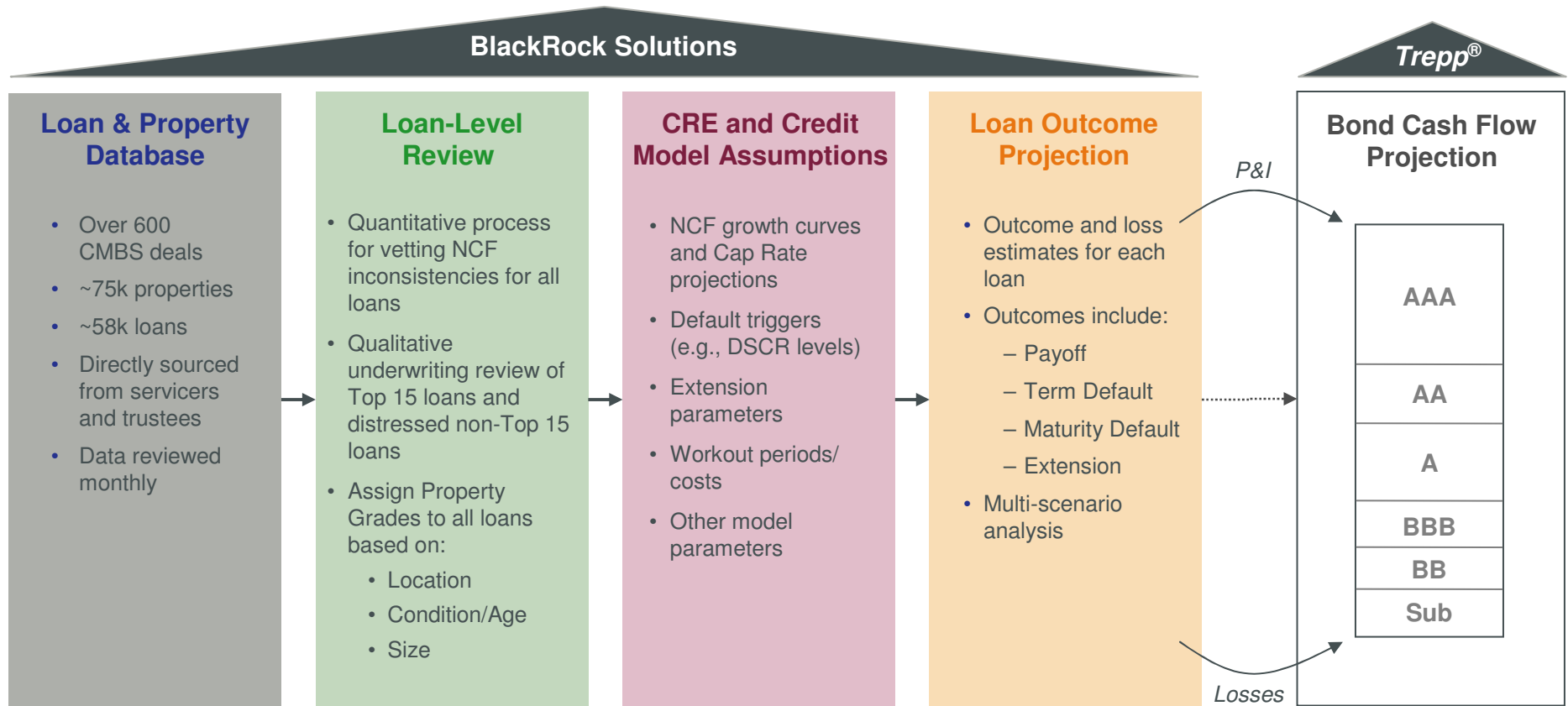
$$\text{Property Value} = \frac{\text{Annual Net Cash Flow ("NCF")}}{\text{Capitalization Rate}}$$

$$\text{Loan to Value ("LTV")} = \frac{\text{Loan Balance}}{\text{Property Value}}$$

$$\text{Debt Service Coverage Ratio ("DSCR")} = \frac{\text{Annual NCF}}{\text{Annual Debt Service}}$$

# BRS CMBS Modeling Framework

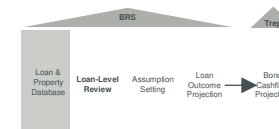
BRS uses a bottom-up approach to analyzing CMBS, built on loan-level data and a forward-looking deterministic modeling framework



# BRS CMBS Modeling Framework: Loan and Property Database

## BRS maintains its own database of commercial mortgage and property information backing US CMBS transactions

- All loan- and bond-level analysis and projections are derived using this data
- Initial dataset aggregated from original offering documents
- Updates sourced directly from CMBS servicers and trustees on a monthly basis
- Dataset includes > 600 CMBS transactions, comprised of ~58k loans and ~75k properties



## The BRS CMBS database is organized to relate multi-note loan structures with underlying properties and reported financials

Property and loan data are reviewed period-over-period and versus issuance to assess any potential servicer reporting errors or data ambiguities

### Examples of BRS CMBS Loan Database Structure & Process

Data	BRS Structure
Loan capital structure	<ul style="list-style-type: none"> <li>• BRS manually maps the capital stacks for all multi-note loans included in CMBS trusts from original Offering Documents</li> <li>• Tie-out of note/loan information to capture and attribute property cash-flows on complete loan capital structures</li> <li>• Identify cross-default provisions with associated loans / ‘notes’</li> </ul>
Financial reporting	<ul style="list-style-type: none"> <li>• Partial-year financials reported by servicers are compared to prior reported periods to determine whether the amounts reported are annualized, partial or errant</li> <li>• BRS identifies the controlling servicer for multi-note loans (dubbed the “Paymaster”) and uses its financial reporting for all notes associated with the unique underlying property(s)</li> </ul>



# BRS CMBS Modeling Framework: Loan-Level Review

**BRS performs a qualitative review of the Top 15 loans for each CMBS trust, along with any non-top 15 loans meeting certain review criteria (e.g. delinquent or specially serviced loans)**

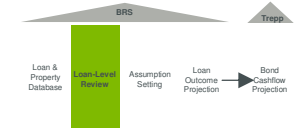
- All other loans undergo a quantitative vetting process

**Loan review process assesses the reasonableness of servicer reported information to account for the following:**

- Stale or dated income information (e.g. income reporting 9 – 12 months old) or partial year reporting
- Recent credit events that may materially alter property values (e.g. tenant/sponsor bankruptcy)
- Idiosyncratic credit characteristics (e.g. credit tenant or ground leases, environmental issues)

**Loan reviews create a starting point for forward-looking modeling by incorporating property-level risk attributes, which are not captured by static income reporting**

**As a final step, loan outcomes are reviewed for consistency with underwriting inputs**



1. The BRS Sustainable NCF is a value that reflects the recent, actual income performance of the subject property (adjusted for any discernible reporting anomalies) and any expected cash flow performance changes over the next 24-month period.

# BRS CMBS Modeling Framework: Assumption Setting

Property-level Cap Rate and NCF projections vary by scenario and are used to estimate loan outcomes



## NCF Generation Process

### Property-Level Data

- Recently reported income and operating history

### Third Party Research

- Cap Rates and NCF Projections are informed by third party research
- Third party research incorporates macro-economic forecasts

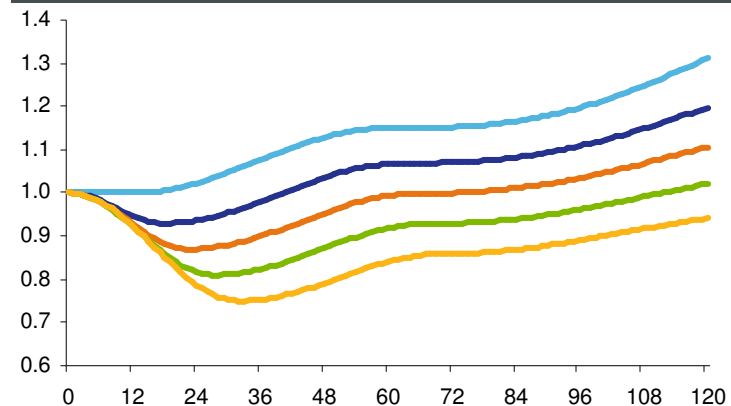
### BRS Commercial Real Estate Professional Review

- Analysis and review of third-party forecast information
- Adjustments to forecasts when necessary

## NCF Curves

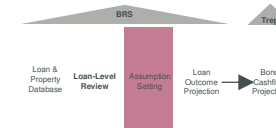
- The BRS Sustainable NCF value is used as the starting point in income forecast
- NCF curves project property income across multiple scenarios
- Capitalization rates are applied to NCF projections to determine property valuations over time

### Illustrative NCF Growth Curves



# BRS CMBS Modeling Framework: Assumption Setting

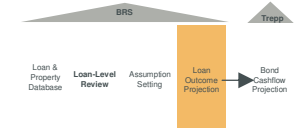
BRS employs a forward-looking deterministic credit model to estimate loan-level outcomes. Major assumptions and credit model parameters include the following:



## Primary Deterministic Model Parameters

	Assumption	Description
Income and Property Value Drivers	<b>Income growth curves</b>	<ul style="list-style-type: none"> <li>MSA and property-type based projections of property-level NCF through time</li> </ul>
	<b>Cap rates</b>	<ul style="list-style-type: none"> <li>Cap rate curves (term structure) by property type</li> <li>Adjusted by property grades to account for individual property location and quality</li> <li>Combined with income projections to determine property value</li> </ul>
	<b>Property grades</b>	<ul style="list-style-type: none"> <li>Individually assigned grades based on location, condition and size</li> <li>Used to adjust cap rates to account for individual property quality</li> </ul>
Loan Outcome and Loss Parameters	<b>DSCR default trigger</b>	<ul style="list-style-type: none"> <li>Monthly test that results in a term default if DSCR drops below a defined level</li> <li>Triggers are property type based</li> </ul>
	<b>Loan extensions</b>	<ul style="list-style-type: none"> <li>Loans are extended at maturity if LTV falls within a defined band</li> </ul>
	<b>Workout period</b>	<ul style="list-style-type: none"> <li>Time to resolution after a term or maturity default</li> <li>Jurisdiction-based (by State)</li> </ul>
	<b>Liquidation costs</b>	<ul style="list-style-type: none"> <li>Percentage of property value at liquidation</li> </ul>
	<b>Servicer reserves</b>	<ul style="list-style-type: none"> <li>Reserves held by the servicer are used to fund debt service payment shortfalls if income drops below the DSCR threshold</li> </ul>

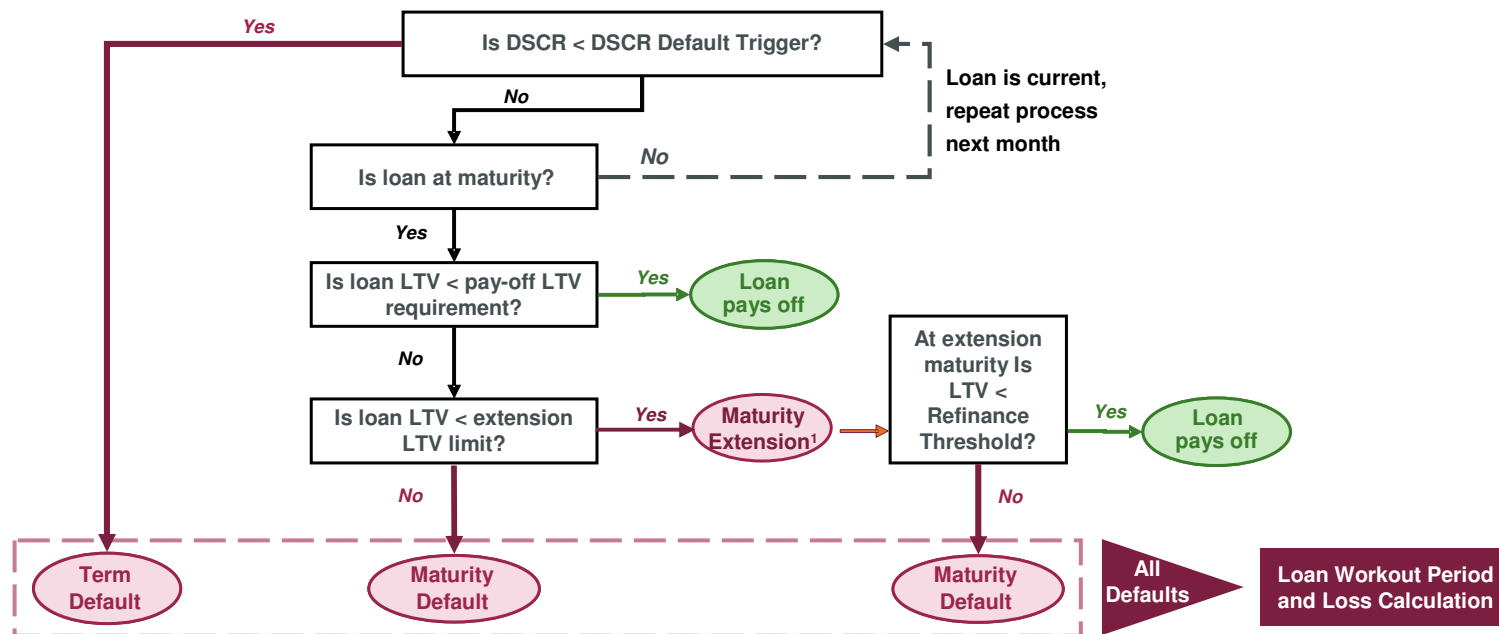
# BRS CMBS Modeling Framework: Loan Outcome Projection



## Loan outcomes are determined by a series of DSCR and LTV tests over time

- Term default: DSCR < Default Trigger at any point during initial term of loan or extension
- Pay-off at original maturity: LTV < pay-off LTV requirement
- Extension at original maturity: LTV between extension LTV bounds at original maturity
- Default at original maturity: LTV > extension LTV limit at original maturity
- Default at extension maturity: LTV > Refinance Threshold at extension maturity

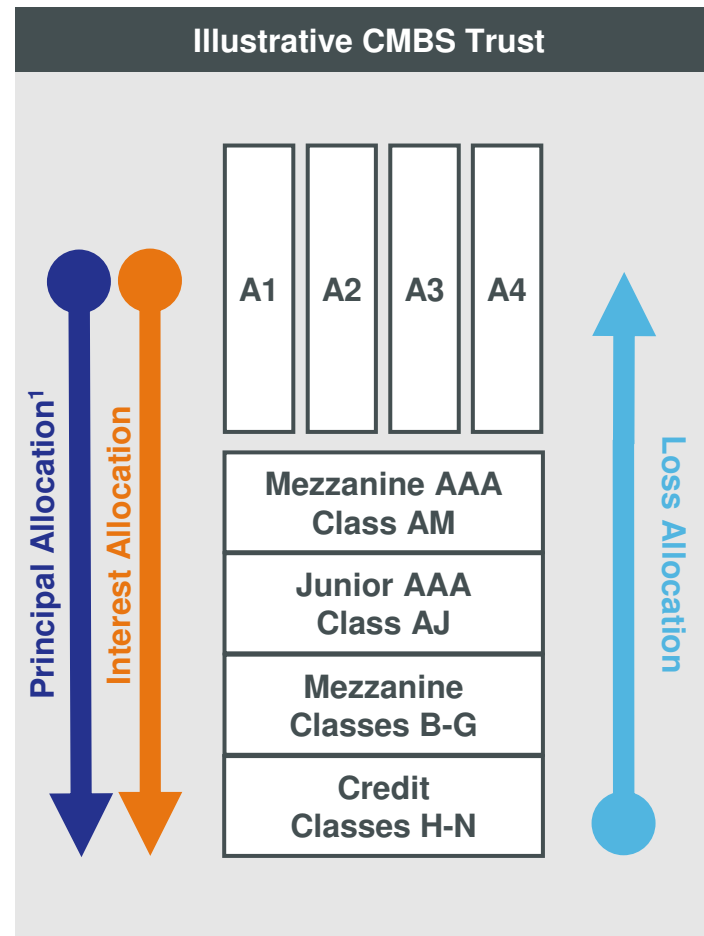
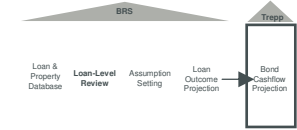
## Monthly Default, Extension and Payoff Logic Tree



1. DSCR tests are run throughout the extended lifetime of the loan. If a DSCR test fails, the loan will go into default.

# BRS CMBS Modeling Framework: Bond Cash Flow Projection

The passing of income and losses in the collateral pool through the bond structure in a CMBS trust is often referred to as “the waterfall structure”



### Principal Income

- Principal distributions arise from:
  - Maturity payoffs
  - Scheduled amortization
  - Prepayments
  - Liquidation recoveries
- Payments are generally allocated sequentially through the CMBS trust

### Interest Income

- Interest payments arise from debt service payments remitted by the underlying borrowers
- Payments are generally allocated sequentially through the CMBS trust

### Principal Losses

- Principal losses arise from a defaulted loan that is:
  - Liquidated with a partial recovery
  - Released at a discounted payoff
  - Modified with a write-down of the principal amount
- Losses are generally allocated in reverse sequential order from the most junior classes to the senior classes

1. Principal is allocated sequentially from A-1 to A-4

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# Commercial Real Estate Peak-to-Trough Assumptions

Under the supervision and direction of the NAIC, BRS calibrated four scenarios reflecting a range of potential CRE valuation outcomes consistent with the NAIC's macroeconomic assumptions across vendors

Variance in property valuations across scenarios is modeled by stressing NCF growth rates and Cap Rate projections

Estimated Peak-to-Trough Across Scenarios				
Scenario	Probability	Peak to Trough Property prices	Timing of Trough	Peak to 12/2015 Property prices
Aggressive	20%	-32%	Q1 2010	-9%
Baseline	55%	-32%	Q2 2011	-22%
Conservative	20%	-37%	Q4 2012	-34%
Most Conservative	5%	-49%	Q1 2014	-46%

While not direct inputs into the model, Peak-to-Trough and related timing/price thereof are provided as context to understand relative severity and timing across scenarios

- BRS' peak-to-trough estimates are derived by first estimating Peak-to-Current, or current valuations versus the market highs of 2007/08
- Forward valuations, calculated using NCF and Cap Rate projections across scenarios, are indexed together with Peak-to-Current values to generate Peak-to-Trough estimates

**BRS estimates a Peak-to-Current value decline of 32% at the national level<sup>1</sup>**

- BRS estimate is based on a value weighted index and derived using 2007 CMBS appraisal data versus BRS' estimate of current values

1. As of 9/30/10

# Benchmarking BRS Peak-to-Trough Projections to Market Indices

NCREIF Property Index and Moody's/REAL CPPI are the two most commonly referenced national CRE value indices which may be used as benchmarks to BRS' projections

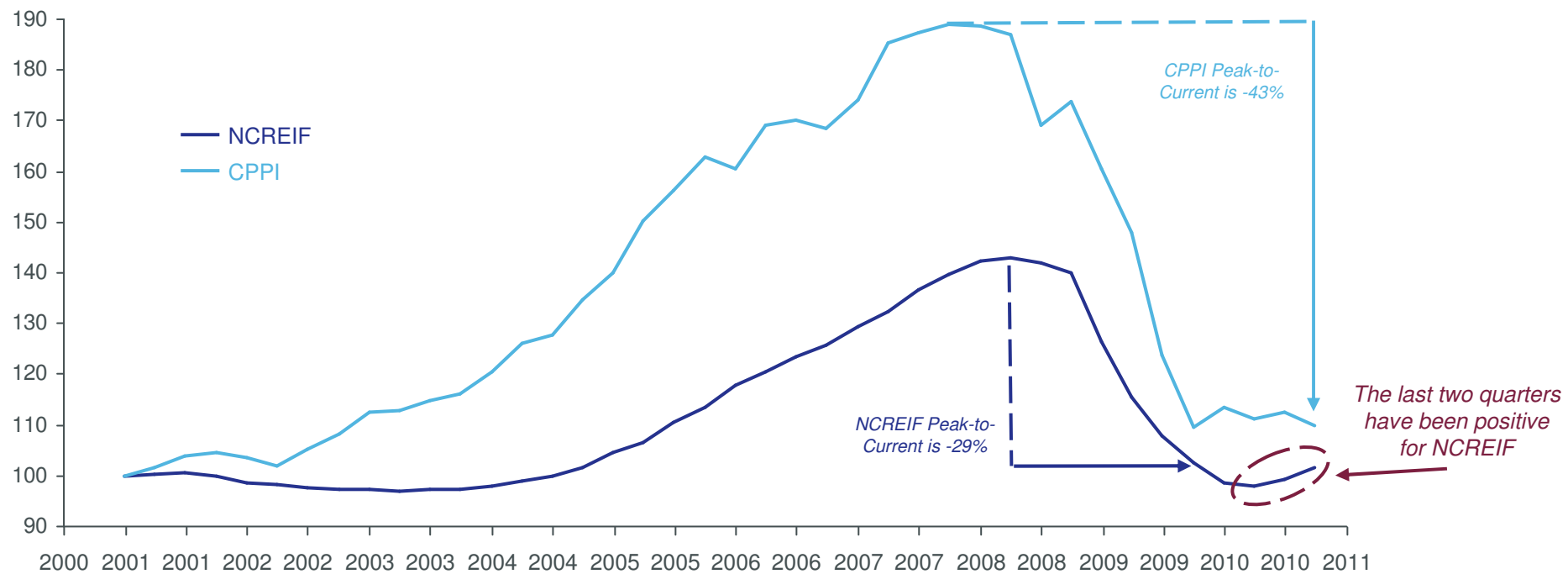
## NCREIF

- The NCREIF Property Index is an appraisal based property value index based on rolling quarterly appraisals of institutional quality properties owned by NCREIF-member CRE funds. The index is value weighted.

## Moody's/REAL CPPI

- Moody's/REAL CPPI is a monthly transaction based value index calculated using repeat sales transactions/data from Real Capital Analytics (RCA). The index is un-weighted (each transaction is equally weighted).

### NCREIF and CPPI Property Indices – Historical Values



Source: NCREIF and Moody's/REAL CPPI as of 9/30/2010, data indexed to 100 as of 12/31/2000



## Important Notes

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