

PLANA617_001-2017 Real Estate Debt Securitization Outline

Steven Bloom, April 23, 2017

The following outline lists most of the topics and concepts presented and discussed during class since the midterm. It is presented in the same format as that posted prior to the midterm. **Practice questions** follow, and the pre-midterm outline is also presented at the end of this document. This version also contains practice problems.

The final will emphasize material covered during the last three classes. You are expected to understand structuring principles and apply rules for hypothetical and real example.

- 1) Material covered prior to the midterm which should still be fresh!
 - a) Securitization definition, benefits, parties, and rules
 - b) Property/collateral types
 - c) Relationship between certificate classes and ratings
 - d) Types of amortization
 - e) Changes in LTV which accompany amortization and changing property values
 - f) Duration definition, application, and shortcomings
 - i) Refer to Class 2 slides
 - g) Types of credit enhancements
 - i) Internal and external, hard and soft
 - h) Tranche valuation in terms of YTM spreads
 - i) Quality, seniority, maturity, collateral performance, enhancements
 - i) Waterfall
 - i) Priority, subordination
 - ii) Interest and principal
 - iii) Sequential versus pari passu and variations covered in Class 3 slides
 - (1) Distribution restrictions (cash maintenance, priority class amortization, shortfalls)
 - j) Understand definition and use of Herfindahl index and prepayment curves, but do not expect detailed questions
- 2) Ratings agency approaches to debt ratings
 - a) Fundamental factors
 - b) Pro forma adjustments
 - c) Haircuts
 - d) Debt yield
 - e) Debt grades—we used the following system, from highest to lowest: AAA+, AAA, AAA-, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-. BBB- is the lowest investment grade rating. Lower ratings are BB+, BB, BB-, and so on.
 - i) Understand how ratings migration works. Be able to interpret the table on page 23 of Class 5 slides and page 11 of Class 6 slides

- f) You do not need to memorize risk factor weightings, DSCR cut-offs, sensitivity weights by rating, cap rates by sector, historical volatility by sector,
 - i) You should know that DSCR above 1.5 are strong and below 1.0 very weak, an 8%-9% cap rate is likely a stressed cap rate and a 5-6% cap rate is indicative of current market conditions (i.e., a stressed cap rate is going to be at least 200-300bps higher than current cap rates),
- 3) Role of Primary Servicer, Master Servicer, and Special Servicer
 - a) This would be good to memorize
- 4) Other Terms and implications, actions, rights, responsibilities
 - a) Controlling class and replacement
 - b) Appraisal reduction: methods, consequences
 - c) Pooling and Service Agreements
 - d) Representations and Warranties
 - e) To be announced
 - f) CMBX
 - g) Hard and soft lockboxes, why are they used
 - h) IOs and Pos
 - i) You will not be asked to make calculations
- 5) Other Points:
 - a) Know how to read the tables discussed in class, especially related to tranche subordination, thickness, coupon rate, rating, class, LTV, DSCR, etc.
 - b) You will have some questions asking you how and when to apply cash flows to various tranches according to seniority, waterfall, restrictions, type (interest vs principal), shortfalls, etc.
 - c) Most of the math can be done with pen and paper.
 - d) BRING CALCULATORS, just in case.
 - i) Do NOT do the calculations on smartphones or any device which has internet access or used to communicate.
 - ii) Do NOT bring laptops
 - e) The questions which proved to be most difficult on the midterm will appear again in multiple choice format.

Types of Questions

- What is securitization?
- Why and how does securitization take place. What are the benefits, who is involved?
- What does duration measure, what is the standard of measure
 - If a certificate class has a duration of 7, what would happen if interest rates changed by 100bps
 - The bond price would rise more than 7% or decline less than 7%
 - Why would two certificate classes with the same credit rating and coupon have different durations?

- They have different maturities.
- A certificate class increases in price by 7.5% when interest rates decline by 100bps and declines 6.5% when rates increase 100bps. What is its duration.
 - The average of the two figures.
- Which has a larger/longer duration, a fully amortization note, a partially amortizing note, or an interest only note.
 - Duration is shortest for the fully amortizing note, longest for interest only note.
- What would cause the duration for a certificate class to increase?
 - A rise in rates could slow prepayments, thereby lengthening the maturity and the time it takes to pay back the class.
 - Slower prepayments
 - Higher defaults early in the life of a certificate class, causing principal repayments to take longer than modeled.
 - Etc.
- Credit enhancements
 - What are external credit enhancements? What are the risks to the enhancements?
 - What happens if a guaranteeing counterparty declares bankruptcy.
 - What might that do to the waterfall.
 - What happens to the creditworthiness of the underlying pool if:
 - The lowest LTV loans repay first
 - The most overcollateralized loans repay early
 - The cash collateral account is used to make interest payments? Principal payments?
 - The cash collateral account is released to the provider or the equity tranche
 - Low interest rate loans repay early
 - The excess interest spread diminishes
 - A borrower becomes bankrupt but remains current on the loan.
- Subordination
 - Know how to read the tables and answer questions based on the tables!
 - Answer the next set up questions based on the accompanying JPMCC 2017-JP5 table:

Rating	Class	Balance		
		Original (\$-000s)	% or Total	Sub level %
AAA-Super Senior	A1	\$ 43,930	4.02%	30
AAA-Super Senior	A2	82,828	7.58%	30
AAA-Super Senior	A3	38,000	3.48%	30
AAA-Super Senior	A4	135,000	12.35%	30
AAA-Super Senior	A5	396,306	36.26%	30
AAA-Super Senior	ASB	69,023	6.32%	30
AAA	AS	71,044	6.50%	23.5
AA- Sub Senior	B	51,917	4.75%	18.75
A-	C	56,015	5.12%	13.625
BBB	D	36,888	3.37%	10.25
BBB-	D-RR	27,325	2.50%	7.75
BB-	E-RR	28,691	2.63%	5.125
B	F-RR	17,761	1.63%	3.5
Equity	NR-RR	38,254	3.50%	0
		\$ 1,092,982	100.00%	

- What is the subordination of the A1 Class? 30%
- How much subordination does the A2 Class have? 30%
- What is the credit enhancement level for Class A3? 30% subordination
- How much support do the AAA-Super Senior Classes have? 30%
- How thick is the A1 Class? 4%, 4.0%, or 4.02%
- How thick is Class A2? 7.6% or 7.58%
- How thick are the AAA-Super Senior rated classes? 70%
 - You could also add the thickness of each AAA-Super Senior tranche to tie out to 70%: 4.02% + 7.58% + 3.48% + 12.35% + 36.26% + 6.32%
 - You should also recognize that if the tranches have 30% subordination and there is nothing senior that the tranches make up 70% of the pool.
- Do the AAA-Super Senior rated classes have 70% subordination? No, they have 30% subordination. It is 70% thick.
- What is the credit enhancement for the AAA-rated class? 23.5%
- How much of the pool is senior to the AAA-rated class? 70%
- The AAA tranche has 23.5% subordination. If the AA- tranche has 18.75% subordination, how thick is the AA tranche? 4.75% from the table. Or, calculate 23.5% - 18.75%.
 - You should know how to calculate the difference if it is not presented directly.
- If Class B certificates have 18.75% subordination and the Class C certificates compose 5.12% of the pool, how much subordination do the Class C certificates have? 13.625%, or 18.75% - 5.12%.
- How much subordination will the AAA-Super Senior certificates have if the equity is wiped out? 26.5%, or 30% - the 3.5% thick first-loss piece.
 - To be more precise, it would be all the remaining subordinate classes (71mm + 52mm + 56mm + 37mm + 27mm + 29mm + 18mm) divided by the remaining pool size (1,093MM - 38.3mm)

- Could you make the same set of calculations if Class A, B, and C certificates were fully amortized? How would that affect the calculation? The numerator would be smaller.

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- The top ten loans compose approximately 50% of the pool. How much of a loss could the pool withstand before the investment grade bonds suffer a loss? What about the AAA-Super Senior tranches?
 - Answers: 15.5%, 60%
 - Solution
 - The BBB- tranche has approximately \$85 million, or \$84.7 million, of subordination (either $\$38.3\text{mm} + \$17.8\text{mm} + 28.7\text{mm}$, or 7.75% of the \$1,098mm pool. You should understand both calculations.)
 - The ten largest loans would have a face value of approximately \$549 million, which represents 50% of the \$1,093 million pool.
 - An \$85mm loss represents 15.5% of the value of the ten largest loans.
 - The AAA-Super Senior tranches have 30% subordination, or \$328mm of the \$1,093mm pool. Thus, the ten largest loans would need to lose \$328mm of value, or 59.7% of the value.
 - Do you recall what the typical loss-given default rate is?
- The weighted average coupon rate is 4.67% for the pool. If the weighted average interest rate on the underlying mortgages is 5.0%, what is the excess spread?
 - The excess spread is $5.0\% - 4.67\% = 0.33\%$, or \$3.607mm (33bps on \$1,093mm).
- How long would it take for the pool to accumulate \$5mm based on the excess spread?
 - $\$5\text{mm} / \$3.6\text{mm per year} = 1.4 \text{ years}$.
- At the end of two years, if there were no debt prepayments or certificate amortization, how credit enhancement would be available for the equity tranche and the AAA-Super Senior tranches, respectively?
 - At the end of 2 years, there would be \$10mm of cash which accumulated due to the excess spread.
 - The first-loss piece would now have a \$10mm cushion, or $\$10\text{mm} / (\$10\text{mm} + \$1,093\text{mm})$, which equals 0.9%.
 - The AAA-Super Senior subordination would increase from 30.0% to 30.9%.

The following outline was posted prior to the midterm.

It lists most of the topics and concepts presented and discussed during class, as requested during our last meeting. The emphasis of the midterm is not only understanding structure and analytical tools, but also applying the tools and concepts to structure, analyze, and value CMBS securities.

- 6) Introduction
 - a) Definition
 - b) Benefits & motivations of each participant
 - c) Identify Participants
 - d) History
- 7) Market Overview
 - a) Size
 - b) Underlying property types
 - c) Loan types
 - d) Issuance trends
- 8) Origination and Distribution Process
 - a) Participants
 - b) Steps
 - c) Structures
 - d) Risk transfer
- 9) Mortgage and Bond Basics
 - a) Types of amortization
 - b) Know how to calculate monthly payments using calculator or Excel
 - i) Determine any combination of interest, principal and total payment
 - ii) Price a mortgage
 - iii) No requirement to know the mathematical formula
 - c) LTV at origination and maturity
 - d) Duration—define, calculate, interpret
 - e) Convexity—define, calculate, interpret
- 10) CMBS Basics
 - a) Pool types: conduit, large loan, SASB
 - b) Risks
 - i) Collateral and pool level
 - ii) Prepayment and extension
 - iii) Valuation
 - c) Diversification/concentration
 - d) Underwriting quality and pricing over time
- 11) Credit Enhancements
 - a) External
 - b) Internal
 - i) Soft and hard

- c) Subordination
 - i) Levels, support, rating, spreads

12) Deal Analysis

- a) Basics such as average interest rate, DSCR, LTV, maturity, etc.
- b) Coupon versus yield
- c) Analyze, compare, and contrast pools

13) More on Structure

- a) Advent of tranching
- b) Role of Depositor
- c) REMICs
- d) Tax treatment
- e) Collateral—first and second source

14) More on Valuation

- a) Default probability
- b) OAS
- c) Option characteristics
- d) Prepayment probability

15) Waterfall

- a) Sequential pay, pari passu
- b) Target classes
- c) Support classes