Fixed Income

Mortgage-Backed Security (MBS) Instrument and Market Features

Exam Focus

- Mortgage-backed securities
- Prepayment risk
- Time tranching
- RMBSs
- CMBSs

Mortgage-Backed Securities

- A fixed-income investor pays cash to invest in a security.
- Cash can be used to offer mortgages to real estate purchasers.
- Collateral for the investor is the real estate purchased through the mortgage.

Prepayment Risk

- Mortgage holder makes principal repayments, which are different to their original prepayment schedule
- MBS valuation based on assumed prepayment rate
- If prepayments are slower, MBS investors have to wait longer for their cash flows = **extension risk**
- If prepayments are faster = **contraction risk**

Time Tranching

- Within an MBS structure, different bond classes with different maturities
- Prepayment risks are redistributed among tranches
  - Those maturing first offer protection against extension risk
- Sequential pay time tranching—principal payments flow to tranches in prespecified order

Collateralized Bonds: Example

Issuing the collateralized bond classes with different expected maturities is *most likely* designed to mitigate:

A. credit risk.

B. default risk.

C. prepayment risk.

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Source: CFA Institute. Used with permission.

Bond Classes: Example

Creating bond classes that possess different expected maturities is referred to as:

A. subordination.

B. time tranching.

C. credit tranching.

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Residential MBSs

- Collateral is residential real estate.
- An investor has a legal claim to property upon default and can sell it to recover losses.

Common features of residential mortgage loans

- Prepayment penalties
- Recourse versus nonrecourse loans
- LTV and DTI as measures of default risk

Debt-to-Income: Example

- Calculate the DTI for the following homebuyer:
  - Home price: $800k
  - Loan: $600k
  - Annual interest rate: 4.5%
  - Loan term: 20 years
- Borrower's annual pretax gross income: $141k

Debt-to-Income: Example

1. Calculate monthly debt payment:

N = 240; I/Y = 4.5%/12; PV = 600k; FV = 0; PMT CPT =

2. Compare to monthly pretax gross income:

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Recourse Loan: Example

A real estate investor has obtained a recourse mortgage loan on a shopping center from a bank. The loan has an outstanding balance of USD7,000,000, while the property is valued at only USD5,000,000. In the event of a default on the loan, the bank has a claim on:

A. the property.

B. the borrower's personal assets.

C. both the property and the borrower's personal assets.

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Source: CFA Institute. Used with permission.

Residential MBSs

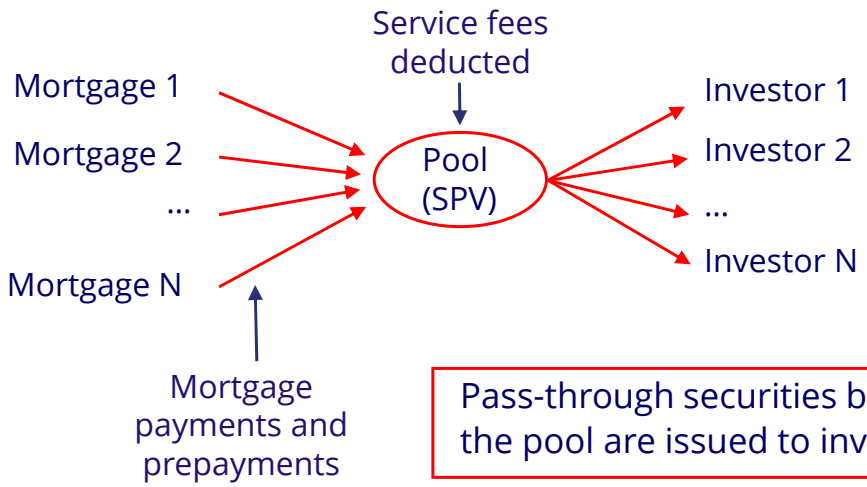
- **Agency RMBSs:** guaranteed by government or government-sponsored enterprise (GSE)
- **Non-agency RMBSs:** issued by private entities such as banks; effectively ceased after credit crisis due to changes in regulations

Residential MBSs

Mortgage pass-through security

- Claim on cash flows from pool of mortgages (net of admin fees)
- Any mortgage in pool is a "securitized mortgage"
- Mortgages in pool may have different maturities
- Investors receive monthly cash flows from mortgages, less servicing/guarantee/insurance fees
- Weighted average coupons and maturities (WACs and WAMs) can be calculated—weighting based on % of total principal

Residential MBSs



Pass-through securities backed by the pool are issued to investors

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Residential MBSs

Collateralized mortgage obligations

- Securities collateralized by pass-through MBSs and pools of mortgage
- Multiple tranches
  - Sequential pay; planned amortization classes; support; floating-rate tranches
- Other CMO structures
  - Z-tranches; principal-only securities; interest-only securities; floating-rate tranches; residual tranches; planned amortization class tranches

Sequential-Pay CMO

- All tranches receive interest.
- The shortest tranche receives all principal (scheduled payments and prepayments) until paid off.
- Each sequential-pay CMO tranche has a mix of contraction and extension risk.

Tranche	Contraction Risk	Extension Risk
A (sequential pay)	HIGH	LOW
B (sequential pay)		
C (sequential pay)		
D (sequential pay)	LOW	HIGH

Commercial MBSs

- Backed by pools of commercial mortgages on **income-producing real estate**
  - Warehouses, shopping centers, offices
- Typically, fewer mortgage in the collateral pool, so less diversification against default risk
- Regular income known as WAMP—weighted average proceeds from the mortgages

Commercial MBSs

- Credit analysis focuses on credit risk of **property**, not borrower:
- Debt service coverage ratio = $\frac{\text{net operating income}}{\text{debt service}}$
- Loan-to-value ratio = $\frac{\text{current mortgage amount}}{\text{current appraised value}}$

Commercial MBSs

- **Call protection**
  - Prepayment protection (i.e., restrictions on early return of principal through prepayments)
- **Balloon payment**
  - Typically not fully amortized; principal is remaining at the end
  - Risk of borrower not being able to arrange refinancing to make this payment (balloon risk)

Real Estate Loans: Example

Which of the following mechanisms is *least likely* to offer investors protection from default on the individual loan level?

A. Defeasance.

B. Balloon payment structure.

C. Prepayment penalty points.

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Source: CFA Institute. Used with permission.

Solutions

Collateralized Bonds: Example

Issuing the collateralized bond classes with different expected maturities is *most likely* designed to mitigate:

A. credit risk. *This pertains to the risk of default in the assets backing the collateralized bonds, not to the timing of payments.*

B. default risk. *This pertains to the risk of default in the assets backing the collateralized bonds.*

C. prepayment risk.

The creation of bond classes with different expected maturities, referred to as time tranching, allows prepayment risk to be redistributed among bond classes.

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Bond Classes: Example

Creating bond classes that possess different expected maturities is referred to as:

A. subordination.

B. time tranching.

C. credit tranching.

An approach for reducing "prepayment risk" or "extension risk" among bond classes is to create bond classes that possess different expected maturities. This is referred to as time tranching.

A and C are incorrect because subordination, also commonly referred to as a waterfall structure, involves directing losses to the subordinated bond classes before the senior bond classes—not creating bond classes that possess different expected maturities.

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Source: CFA Institute. Used with permission.

Recourse Loan: Example

A real estate investor has obtained a recourse mortgage loan on a shopping center from a bank. The loan has an outstanding balance of USD7,000,000, while the property is valued at only USD5,000,000. In the event of a default on the loan, the bank has a claim on:

A. the property. *In a nonrecourse loan, the lender has a claim against only the property for any shortfall between the amount of the outstanding mortgage balance and the proceeds received from the sale of the property.*

B. the borrower's personal assets. *Mortgage lending entails a first lien and security interest in the property, which is the lender's collateral.*

C. both the property and the borrower's personal assets.

In a recourse loan, the lender has a claim against the borrower for the shortfall (deficiency) between the amount of the outstanding mortgage balance and the proceeds received from the sale of the property.

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Real Estate Loans: Example

Which of the following mechanisms is *least likely* to offer investors protection from default on the individual loan level?

A. Defeasance. *Replicates the cash flows of the remaining scheduled principal and interest payments remaining on the loan, and protects the investor*

B. Balloon payment structure.

C. Prepayment penalty points. *Offer investors call protection on the individual loan level*

If the borrower fails to make the balloon payment at maturity and is in default, then balloon risk results. Thus, the balloon payment structure increases risk to investors, rather than protecting against it.

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