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LEVEL 1: FIXED INCOME

Reading 42 (4th out of 6): ASSET-BACKED SECURITIES

Difficulty: **medium**

Benchmark Study Time: **3.5h**

2022

THIS E-BOOK:

- is a selective summary of the corresponding Reading in your CFA® Program Curriculum,
- provides place for your own notes,
- helps you structure your study and revision time!

How to use this e-book to maximize your knowledge retention:

1. **Print** the e-book in duplex and bind it to keep all important info for this Reading **in one place.**
2. **Read** this e-book, best twice, to grasp the idea of what this Reading is about.
3. **Study** the Reading from your curriculum. **Here add** your notes, examples, formulas, definitions, etc.
4. **Review** the Reading using this e-book, e.g. write your summary of key concepts or revise the formulas at the end of this e-book (if applicable).
5. **Done?** Go to your study plan and change the Reading's status to **green**:
   (it will make your Chance-to-Pass-Score™ grow ☺).
6. **Come back** to this e-book from time to time to **regularly review for knowledge retention!**

NOTE: While studying or reviewing this Reading, you can use the tables at the end of this e-book and mark your study/review sessions to hold yourself accountable.

INTRODUCTION TO SECURITIZATION

Definition

Securitization is a process through which we take a pool of assets (collateral) and issue fixed-income securities (asset-backed securities) that are backed or collateralized by this pool of assets. Cash flows from the collateral are used to pay interest and repay the principal to investors that bought the asset-backed securities (ABS).

Examples of assets used as collateral (securitized assets):

residential mortgage loans, commercial mortgage loans, auto loans, credit card receivables, etc.

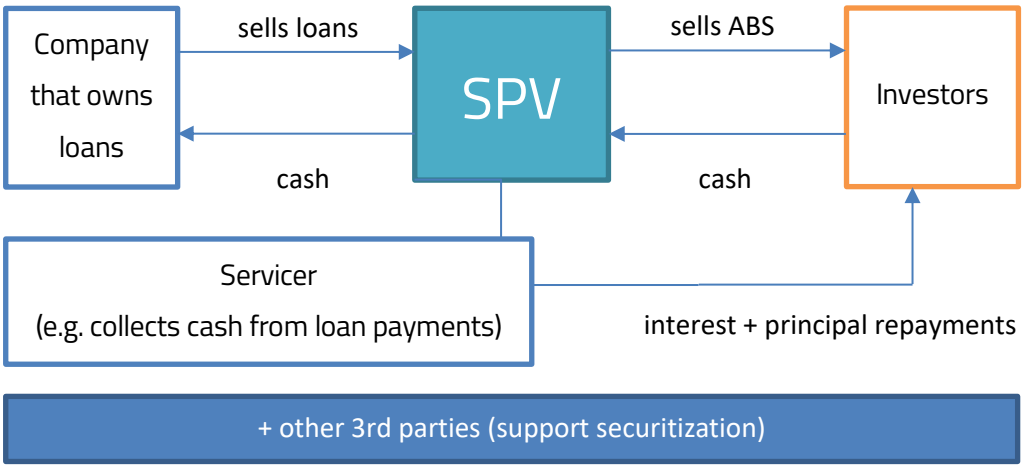
Examples of fixed-income instruments created through securitization:

residential mortgage-backed securities (RMBS), e.g. mortgage pass-through securities, collateralized mortgage obligations (CMOs); commercial mortgage-backed securities (CMBS); non-mortgage asset-backed securities (non-mortgage ABS); collateralized debt obligations (CDOs);

Securitization process: parties & their roles

There are 4 groups of entities taking part in the securitization process:

- A financial institution or other company that owns loans (e.g. mortgages, receivables),
- A special purpose vehicle (SPV) that buys loans from the financial institution/other company and issues new securities backed by these loans.
- Third parties to securitization (lawyers, trustees, rating agencies, guarantors, etc. + the servicer if it's different from the seller of the collateral) that support the securitization process and are responsible for e.g. preparing legal documents, collecting the loan payments, etc.
- Investors that buy securities meeting their appetite for risk and return issued by the SPV.



HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Benefits of securitization

- Investors get direct exposure to portfolios of mortgages and receivables without a bank as an intermediary (aka. increased disintermediation).
- Investors can invest in securities with maturity, risk, and risk-adjusted return tailored to their needs.
- Banks can increase the amount of funds available to lend and raise their fee income.
- Created securities have better liquidity than the original loans and receivables.
- Gives the opportunity to create innovative financial products.
- For companies owning assets that might be used for securitization, it is very often a better (cheaper) way to fund operations than e.g. issuing bonds.

Typical structures

Risks associated with securitization:

- prepayment risk,
- credit risk.

Because of these 2 types of risks, multiple class bond structures can be created:

- **time tranching** (which is created to distribute the prepayment risk among the investors): short-term vs long-term tranches,
- **credit tranching** (which is created to distribute the credit risk among the investors): senior vs subordinate bond classes.

Remember:

Creating different tranches doesn't reduce the risks but allows to redistribute the risks to different investors.

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RESIDENTIAL MORTGAGE LOANS

A **mortgage loan (aka. mortgage)** is a loan secured by the collateral of some real estate property.

If the borrower is not able to pay the principal and interest, the lender has the right to **foreclose** on the loan or – in other words – to take the possession of the property and sell it. Because the market value of the property might be lower than the present value of payments that the borrower owes to the lender, we distinguish 2 types of mortgage loans:

- recourse loans,
- non-recourse loans.

In the case of **recourse loans** if the bank forecloses on the loan it might require that the borrower pays the difference (shortfall) between the PV of outstanding loan payments (the outstanding mortgage balance) and the amount of money the bank received from selling the property.

In the case of **non-recourse loans**, the bank has no such right.

Mortgage loans characteristics

- maturity,
- interest (fixed, variable (adjustable), convertible rates),
- amortization schedule – how the loan principal is paid:
    a. fully amortizing loans,
    b. partially amortizing loans with a balloon payment at the end,
    c. interest-only mortgages.
- prepayment option and prepayment penalties,
- rights of the lender in case of foreclosure.

Loan-to-value ratio

Usually, the value of the property that is used as the collateral is higher than the loan. The lower the loan-to-value ratio, the lower the risk that the lender bears.

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RESIDENTIAL MORTGAGE-BACKED SECURITIES (RMBS)

3 sectors

1. RMBSs guaranteed by the federal agency, e.g. Ginnie Mae.
2. RMBSs guaranteed by government-sponsored enterprises (GSEs), e.g. Fannie Mae, Freddie Mac.
3. Non-agency RMBSs issued by private entities and not guaranteed by the government or any GSE.

From the perspective of investors, agency RMBSs are a lot safer than non-agency RMBSs. For the loan to be included as collateral for an agency RMBS, it has to meet underwriting standards (e.g. max LTV, documentation, etc.). The loan that meets the standards is called a **conforming mortgage**.

Credit enhancements for non-agency RMBS

Because non-agency residential mortgage-backed securities are not guaranteed by the government or any GSE, they have credit risk. To reduce the risk and redistribute it among different investors, non-agency RMBS include credit enhancements.

Examples of internal credit enhancements:

credit tranching (senior/subordinated structure), overcollateralization, reserve accounts,

Examples of external credit enhancements:

insurance

Types of RMBS

- mortgage pass-through securities,
- collateralized mortgage obligations (CMOs).

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MORTGAGE PASS-THROUGH SECURITIES

mortgage pass-through securities = securities created by holders of mortgages forming a pool of the mortgages they own and then selling shares or participation certificates in the pool of these mortgages

monthly cash flow for a mortgage pass-through security = monthly mortgage payments representing interest **+** scheduled repayment of principal **+** prepayments **–** servicing and other fees

pass-through rate (%) = mortgage rate (%) **–** servicing and other fees (%)

Because the mortgages in the pool differ in terms of maturity and mortgage interest, it is convenient to compute:

- weighted average coupon (WAC),
- weighted average maturity (WAM).

Prepayment rate & Prepayment risk

Because the monthly cash flow from a mortgage pass-through security depends also on not scheduled prepayments of the loans, investors don't know what the future cash flows will be. We call this a prepayment risk.

Prepayment risk:

- contraction risk,
- extension risk.

contraction risk = occurs when interest rates decrease → the prepayment of loans increases because borrowers will refinance using lower market interest rates

extension risk = occurs when interest rates increase → the prepayment of loans decreases because borrowers will prefer the interest they have agreed to

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Prepayment risk measures

2 most important prepayment risk measures:

- single monthly mortality rate (SMM),
- conditional prepayment rate (CPR).

Note: The CPR is an annualized SMM.

SMM formula

$$\text{SMM}\ (\%) = \frac{\text{prepayment for the month}}{\text{beginning outstanding mortgage balance for the month} - \text{scheduled principal repayment for the month}}$$

Public Securities Association (PSA) prepayment benchmark

Generally, prepayment rates for the collateral of pass-through securities are lower for new mortgages and increase over time.

The Securities Industry and Financial Markets Association (SIFMA) provides a **prepayment benchmark for mortgages for consecutive months (PSA model).** This model is used by investors to describe the prepayment rates for a given pool of mortgages that serves as collateral for residential pass-through securities.

Examples:

- 100 PSA means that investors can expect the prepayment rates to be in line with the standard PSA model
- 200 PSA means that investors can expect the prepayment rates to be 2x bigger than in the standard PSA model
- 50 PSA means that investors can expect the prepayment rates to be 2x lower than in the standard PSA model

the lower the prepayment rates → the higher the average age of pass-through securities

the higher the prepayment rates → the lower the average age of pass-through securities

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COLLATERALIZED MORTGAGE OBLIGATIONS (CMOs)

Collateralized mortgage obligations (CMOs) are created when the cash flows of mortgage pass-through securities or pools of loans are redistributed to different bond classes (tranches).

Because different institutional investors have a different appetite for different forms of prepayment risk (extension risk or contraction risk), creating different bond classes (tranches) gives us an opportunity to meet their expectations.

It's very important to remember that creating CMOs doesn't eliminate prepayment risk but redistributes it to different investors.

CMOs structures

- sequential-pay CMOs,
- Planned Amortized Class (PAC) and support tranches,
- other CMOs structures (e.g. tranches with a floating rate).

Sequential-pay CMOs

In sequential-pay CMOs, each bond class is retired sequentially.

Example:

There are 3 tranches (A, B, C) in a sequential-pay CMO.

Payment rules may be as follows:

first, disburse the **principal payments** to tranche A → then, to tranche B → finally, to tranche C

Note: In sequential-pay CMOs, shorter-term tranches are protected against extension risk and longer-term tranches are protected against contraction risk. It is because shorter-term tranches are paid first and longer-term tranches are paid later.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Planned Amortized Class (PAC) and support tranches

It is very common to include the so-called PAC tranches in CMOs. PAC tranches protect investors against prepayment risk (both extension and contraction risk).

If a prepayment rate is within a specified interval, the cash flows for PAC tranches are easy to predict.

Note: Prepayment risk reduction for PAC tranches is possible only thanks to support tranches (companion tranches) which absorb the prepayment risk (lower or higher than expected prepayment rates).

COMMERCIAL MORTGAGE-BACKED SECURITIES (CMBS)

Commercial mortgage-backed securities (CMBS) are backed by a pool of commercial mortgage loans on income-producing properties.

Credit risk of commercial mortgages

The credit risk of commercial mortgages is relatively big because usually the commercial mortgages are non-recourse loans. Thus, the lender foreclosing on the loan doesn't have the right to require that the borrower pays the difference (shortfall) between the PV of outstanding loan payments (the outstanding mortgage balance) and the amount of money the lender received from selling the property.

Credit performance measures

- Debt-Service-Coverage Ratio (DSC, DSCR),
- Loan-To-Value Ratio (LTV).

The greater the debt-service-coverage ratio (DSC, DSCR), which is defined as the ratio of the net operating income (NOI) to the debt service (interest payments plus principal repayments), the better for CMBS investors.

The lower the loan-to-value ratio (LTV), the better for CMBS investors.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

CMBS structure

Credit tranching (subordination) is often used to distribute credit risk among investors.

If defaults on the loans (from collateral) occur, the losses are charged against the outstanding principal balance of the equity tranche first. The equity tranche is also called the residual tranche or the first-loss piece. Generally, equity tranches are not rated by credit-rating agencies.

Call protection

One thing that largely distinguishes CMBS from RMBS is the call protection (thus, lower prepayment risk).

The call protection is available on 2 levels:

- loan level, and
- structure level.

Loan-level call protection forms:

a prepayment lockout, prepayment penalty points, a yield maintenance charges, a defeasance

Structure-level call protection:

CMBS are structured to have sequential-pay tranches. The higher-rated tranches get paid first (note that principal losses are absorbed by the lower-rated tranches first).

Balloon payment

Note that loans that are used as collateral for CMBS are usually balloon loans with high principal repayments at maturity.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

NON-MORTGAGE ASSET-BACKED SECURITIES

Non-mortgage assets used as collateral in securitization:

- auto loan and lease receivables,
- credit card receivables,
- personal loans,
- commercial loans.

Amortizing vs non-amortizing collateral

Cash flows from amortizing loans include:

- interest,
- scheduled principal repayment,
- prepayments.

If there is no principal repayment schedule, we deal with non-amortizing loans.

Examples of ABS backed by amortizing loans:

RMBS, auto loan ABS

Examples of ABS backed by non-amortizing loans:

Credit card receivable ABS

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Auto loan ABS

Cash flows for auto loan ABS:

- interest,
- scheduled principal repayment,
- prepayments resulting from sales and trade-ins requiring the payoff of the loan in full, repossession and selling cars to other parties, insurance payments in case of car destruction, early payments.

Credit enhancements available:

- Senior/subordinate structure,
- reserve account,
- overcollateralization,
- excess spread.

Credit card receivable ABS

Cash flows for credit card receivable ABS:

- finance charges (interest paid by the borrower on the unpaid balance outstanding after the grace period; fixed or floating),
- fees,
- principal repayments.

During the lockout period, the cash flows include only finance charges and fees. The principal repayments are invested in new credit card receivables.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

COLLATERALIZED DEBT OBLIGATION (CDO)

Collateralized debt obligation (CDO) is a security backed by a diversified pool of debt obligations.

CDOs are actively managed by collateral managers who buy and sell debt obligations for and from the CDO's collateral.

CDO structure:

- senior bond classes,
- mezzanine bond classes, and
- residual (equity) tranches.

The riskiest are equity tranches and the least risky are senior bond classes. However, the potential return is the highest for equity tranches.

The ultimate goal of a collateral manager is to buy debt obligations (the collateral) using the money from the issuance of bond classes and then generate a return exceeding the cost.

The sources of return are:

- interest,
- proceeds from selling the debt obligation from the collateral,
- principal repayments and prepayments.

If the collateral performs worse than expected and some pre-specified limits and tests are failed, the collateral manager is obliged to pay off some part of the principal of senior bond classes to deleverage the CDO and meet the limits and tests.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Summarizing key concepts:

☐ Securitization process: parties & their roles

My summary:

☐ Residential mortgage loans

My summary:

☐ Residential mortgage-backed securities (RMBS)

My summary:

☐ Mortgage pass-through securities

My summary:

☐ Prepayment risk: contraction risk, extension risk

My summary:

☐ Credit risk, tranching

My summary:

☐ Collateralized mortgage obligations (CMOs)

My summary:

☐ Commercial mortgage-backed securities (CMBS)

My summary:

☐ Non-mortgage asset-backed securities

My summary:

☐ Collateralized debt obligation (CDO)

My summary:

Keeping myself accountable:

TABLE 1 | STUDY

When you sit down to study, you may want to **try the Pomodoro Technique** to handle your study sessions: study for 25 minutes, then take a 5-minute break. Repeat this 25+5 study-break sequence all throughout your daily study session.

✓ Tick off as you proceed.

POMODORO TIMETABLE: study-break sequences (25' + 5')													
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TABLE 2 | REVIEW

Never ever neglect revision! Though it's not the most popular thing among CFA candidates, regular revision is what makes the difference. If you want to pass your exam, **schedule & do your review sessions.**

REVIEW TIMETABLE: When did I review this Reading?													
date		date		date		date		date		date		date	
date		date		date		date		date		date		date	