CHARTA LEARNING · LESSON NOTES

Securitization, mortgage-backed and asset-backed securities

CFA Level I · Fixed Income

You will learn: Explain how a pool of loans becomes securities, the risks of mortgage pass-throughs, how credit and time tranching work, and how asset-backed securities, covered bonds and CDOs differ.

Running example: Worked examples follow one made-up lender, Marlow Bank, with a pool of 100 (million dollars) of loans. Every figure is an example, not market data.

1. Securitization, the SPE and the true sale

- Securitization pools loans and sells claims on the pool's payments as securities. The originator (Marlow) sells the loans in a true sale to a special purpose entity (SPE), a company with no other business, so bankruptcy remote. The SPE issues the securities; a servicer collects payments for a fee.
- Benefits: cheaper funding, because the securities are rated on the pool and not on the bank, and access for investors to loan exposures in slices that suit their risk appetite.
- A true sale takes the loans out of reach of the bank's creditors; a pledge does not. The SPE does not guarantee the securities: investors depend on the loans and on how the securities are layered. Servicing is a paid job; ownership moved in the sale.

WHY MARLOW SECURITIZES, AND WHY TRUE SALE MATTERS

Own bonds at 7%; securities at 5%	7% × 100; 5% × 100	**7.0; 5.0**
Saving each year	7.0 − 5.0	**2.0**
Bank fails, loans only pledged: creditors recover 40%	40% × 100	**40**
Bank fails, true sale, pool loses 3	100 − 3	**97**
True sale is better by	97 − 40	**57**

Watch out: Thinking the bank still owns the loans because it collects the payments; saying the SPE guarantees the securities.

2. Mortgage pass-throughs and prepayment risk

- A pass-through is a claim on a pool of home loans. Each month interest and principal are passed through pro rata. The servicer keeps a fee: here the mortgages carry 6.5% and the security pays 6.0%, with 360 monthly payments left.
- Cash to investors is net interest plus scheduled principal plus prepayment. A prepayment is principal repaid early (sale, refinancing, extra payment). Interest and scheduled principal can be worked out in advance; prepayments cannot.
- CPR (conditional prepayment rate) is the yearly speed; SMM (single monthly mortality) is the monthly one, and applies to the balance after scheduled principal. A higher CPR means faster prepayment.
- Prepayment is a timing risk, not a default risk. Falling rates raise CPR: contraction risk (money back early, reinvested at low rates). Rising rates cut CPR: extension risk (stuck with a below-market coupon). The homeowner holds a free option.

SMM = 1 − (1 − CPR)^(1/12); Prepayment = SMM × (balance − scheduled principal)

MONTH ONE, POOL 100, CPR 6%

Net interest	100 × 6% ÷ 12	**0.500**
Scheduled principal	0.632 − 0.542	**0.090**
Prepayment	SMM 0.514% × 99.91	**0.514**
Cash to investors	0.500 + 0.090 + 0.514	**1.104**
Average life: CPR 6%; 24%; 1.5%	base; contraction; extension	**10.7; 3.5; 16.6 years**

Watch out: Thinking a low pool rate makes prepayments slow; it makes them fast.

3. Credit tranching

- A tranche is a slice of the securities. The junior (equity) tranche absorbs the first losses, then the mezzanine, and the senior tranche is hit last and paid first. This ranking is subordination. Juniors earn higher yields.
- The senior tranche can earn a far higher rating than the average loan, because the juniors stand in front of it. The order of losses never changes.
- The ladder protects seniors only if losses stay small. If defaults share a cause (a housing crash) they are correlated, and even senior tranches can suffer for the same average loss.

TRANCHES: EQUITY 5, MEZZANINE 15, SENIOR 80 (LOSSES IN $M)

Pool loses 3	equity takes 3	**senior loses 0**
Pool loses 12	equity 5, mezzanine 7	**senior loses 0**
Pool loses 25	equity 5, mezzanine 15	**senior loses 5 (6.25%)**
Shared cause: pool loses 1 in 9 years, 31 in 1 year of 10	average loss 4.0 as when independent	**senior loses 31 − 5 − 15 = 11**
Senior expected loss	10% × 11	**1.1**

4. Time tranching

- Credit tranching splits losses. Time tranching splits when principal is paid. In sequential pay, all principal goes to Class A until it is repaid, then Class B, then Class C.
- All classes are claims on the same pool and equally exposed to credit losses. A becomes a short bond, B a medium one and C a long one.
- Time tranching redistributes prepayment risk; it does not remove it and does not touch credit risk. The later classes carry most of the extension. Other designs shield one class more and leave a support class to absorb the rest.

PRINCIPAL BY YEAR 25, 25, 20, 15, 15; CLASSES A 50, B 30, C 20

Class A: years 1 and 2	(25×1 + 25×2) ÷ 50	**1.50 yrs**
Class B: years 3 and 4	(20×3 + 10×4) ÷ 30	**3.33 yrs**
Class C: years 4 and 5	(5×4 + 15×5) ÷ 20	**4.75 yrs**
Whole pool	270 ÷ 100	**2.70 yrs**
Fast pool (50, 30, 20) vs slow (10 a year): A; C	A swing 3.0 − 1.0; C swing 9.5 − 3.0	**A 1.0 to 3.0; C 3.0 to 9.5**

Watch out: Mixing up the two kinds of tranching.

5. Asset-backed securities: autos and credit cards

- Asset-backed securities (ABS) are backed by other loans: autos, credit cards, equipment leases, student loans. The structure follows how the loans repay.
- Auto loans amortize: the balance shrinks to zero on a fixed schedule, so the pool runs off and needs no extra device.
- Credit card balances revolve, so the trust keeps buying new receivables. During the lockout period investors get interest only and principal collected buys more receivables; then the amortization period pays principal out. An early amortization trigger stops the revolving at once if the pool performs badly, and protects investors.
- Excess spread is yield less coupon, servicing and charge-offs (loans written off as lost). Only card securities need a lockout and trigger.

AUTO LOANS 60 AT 6%, FIVE LEVEL PAYMENTS OF 14.24; CARD POOL 100

Year 1	3.60 + 10.64 = 14.24	**balance 49.4**
Year 5	0.81 + 13.44 = 14.24	**balance 0.0**
Card excess spread, charge-offs 4%	18 − 6 − 2 − 4	**6%**
Charge-offs rise to 11%	18 − 6 − 2 − 11	**−1%, trigger fires**
Paid out at 12 a month	100 ÷ 12	**8.3 months**

6. Covered bonds and CDOs

- A covered bond is senior bank debt backed by a ring-fenced pool that stays on the bank's balance sheet (in an ABS it is sold to an SPE). Dual recourse: first the bank, then the cover pool. Usually one tranche. Overcollateralization: the pool is worth more than the bonds.
- After an issuer default: hard bullet (due on the date, else default), soft bullet (maturity can be extended), conditional pass-through (pool cash passed through as it arrives).
- A collateralized debt obligation (CDO) holds a diversified pool of debt (leveraged loans make a CLO), run by a manager and funded by senior, mezzanine and equity tranches. A synthetic CDO uses credit default swaps. Equity gets the residual, so it is leveraged.

Covered bond recovery = Pool value + Recovery rate × (Bonds − Pool value); Equity income = Collateral interest − Senior − Mezzanine − Fees

COVERED BOND 100, POOL 110; CDO 100 (SENIOR 70 AT 4%, MEZZ 20 AT 6%, EQUITY 10, FEES 0.5)

Cover pool after a 15% fall	110 × 85%	**93.5**
Shortfall; from the bank's estate (30%)	100 − 93.5; 30% × 6.5	**6.5; 1.95**
Total recovered	93.5 + 1.95	**95.45**
CDO equity, collateral yields 7%	7.0 − 2.8 − 1.2 − 0.5	**2.5 = 25%**
Collateral yields 6%; break-even yield	6.0 − 2.8 − 1.2 − 0.5; (2.8 + 1.2 + 0.5) ÷ 100	**1.5 = 15%; 4.5%**

Key takeaways

- SPE plus a true sale makes the pool bankruptcy remote; the servicer only collects.
- Pass-through cash = net interest + scheduled principal + prepayment; SMM = 1 − (1 − CPR)^(1/12).
- Falling rates bring contraction risk, rising rates extension risk; prepayment is timing risk, not default risk.
- Credit tranches split losses (junior first); time tranches split when principal is paid and move prepayment risk.
- Autos amortize; cards revolve with a lockout and an early amortization trigger.
- Covered bonds have dual recourse; CDO equity is the leveraged residual.

Quick check

1. Rates fall sharply. What happens to a pass-through's life, and what is the risk?
   Answer: Prepayments speed up. Life shortens: contraction risk.
2. Equity 5, mezzanine 15, senior 80. The pool loses 12. What does the senior lose?
   Answer: Equity takes 5, mezzanine 7. Senior loses 0.
3. Covered bond 100, pool worth 90 at failure, bank recovers 50%. Total recovered?
   Answer: 90 + 50% × 10 = 95.