FIXED INCOME:

INTRODUCTION TO ASSET-BACKED SECURITIES

Francisco Parga, CFA

ABS

MBS

RMBS

RMBS

CMO

CDO

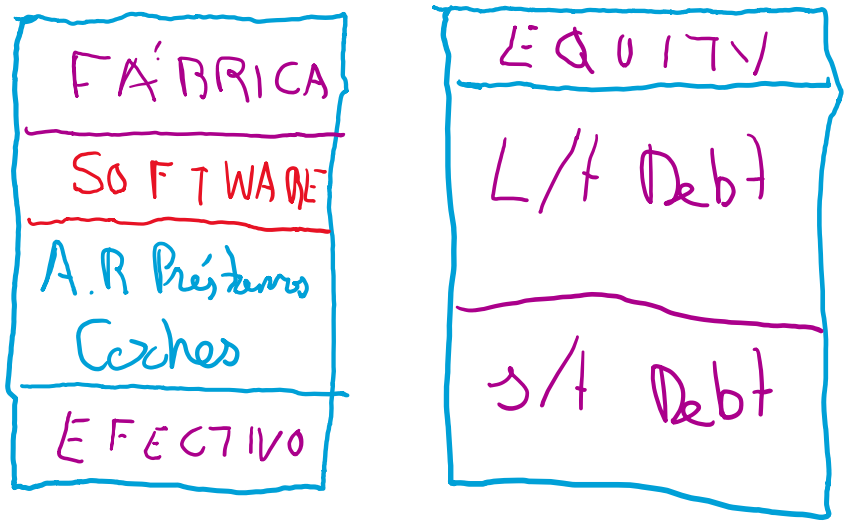
Francisco Parga, CFA

BEGINNING LOSs:

- “explain benefits of securitization for economies and financial markets;”
- “describe securitization, including the parties involved in the process and the roles they play;”
- “describe typical structures of securitizations, including credit tranching and time tranching;”

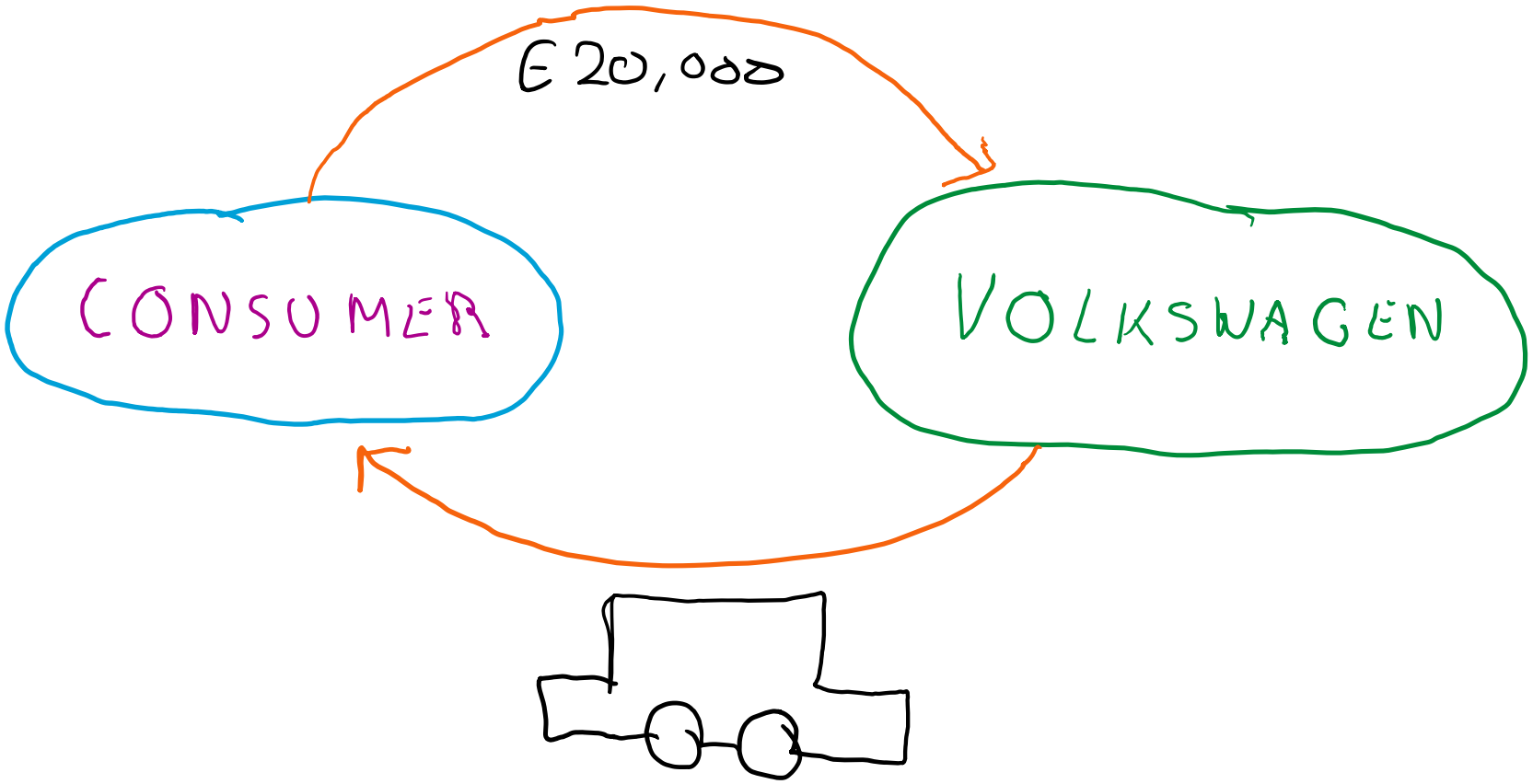
INTRO SECURITIZATION

COMPANY **A**

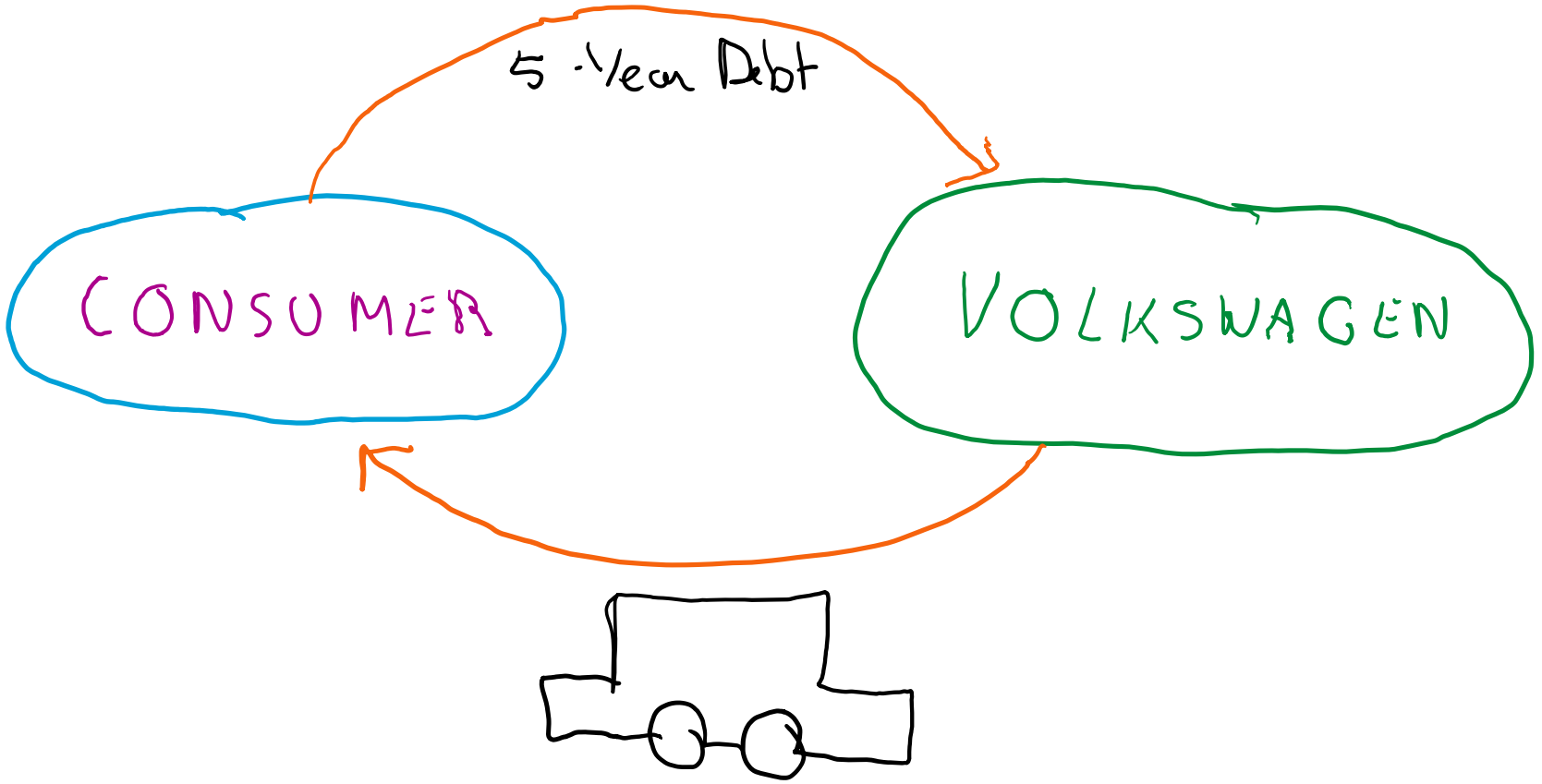


BBB → 5%

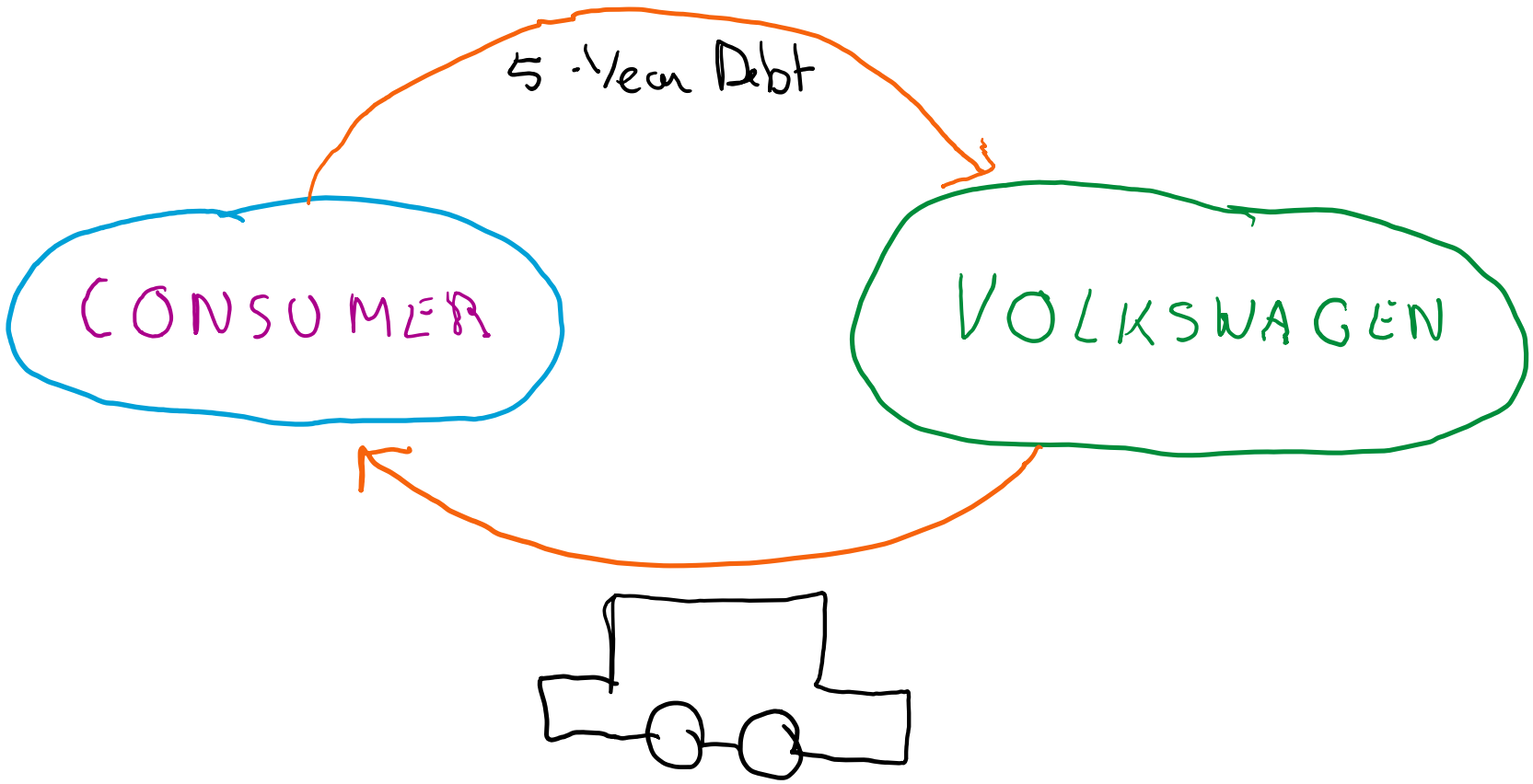
INTRO SECURITIZATION. CASH TRANSACTION



INTRO SECURITIZATION . CREDIT TRANSACTION



INTRO SECURITIZATION



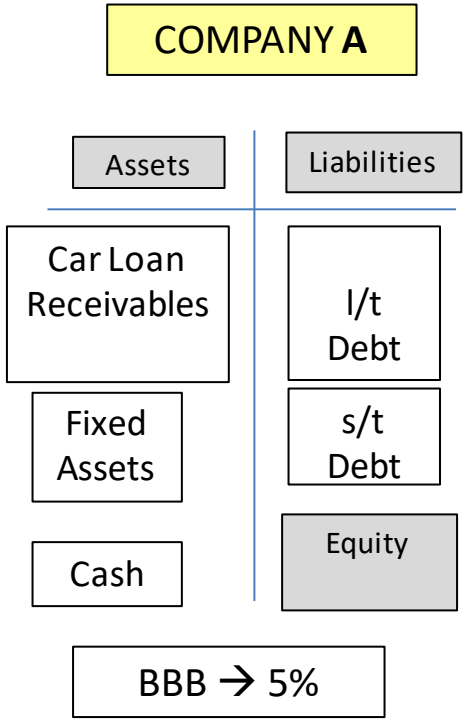
COMPANY **A**

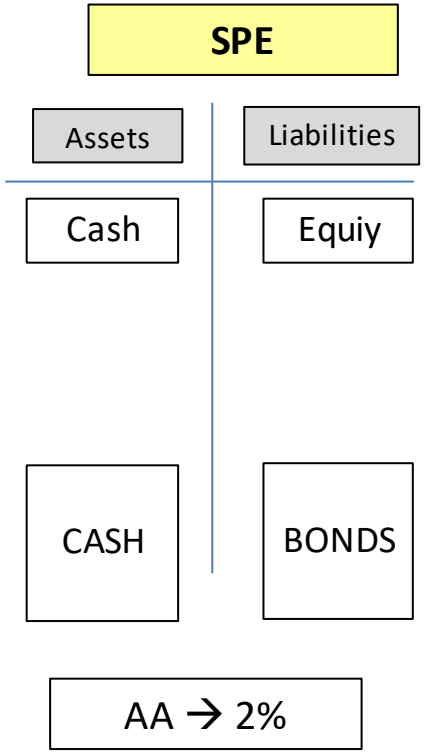
FÁBRICA
SOFTWARE
A.R Préstamos Coches
EFECTIVO

EQUITY
L/t Debt
s/t Debt

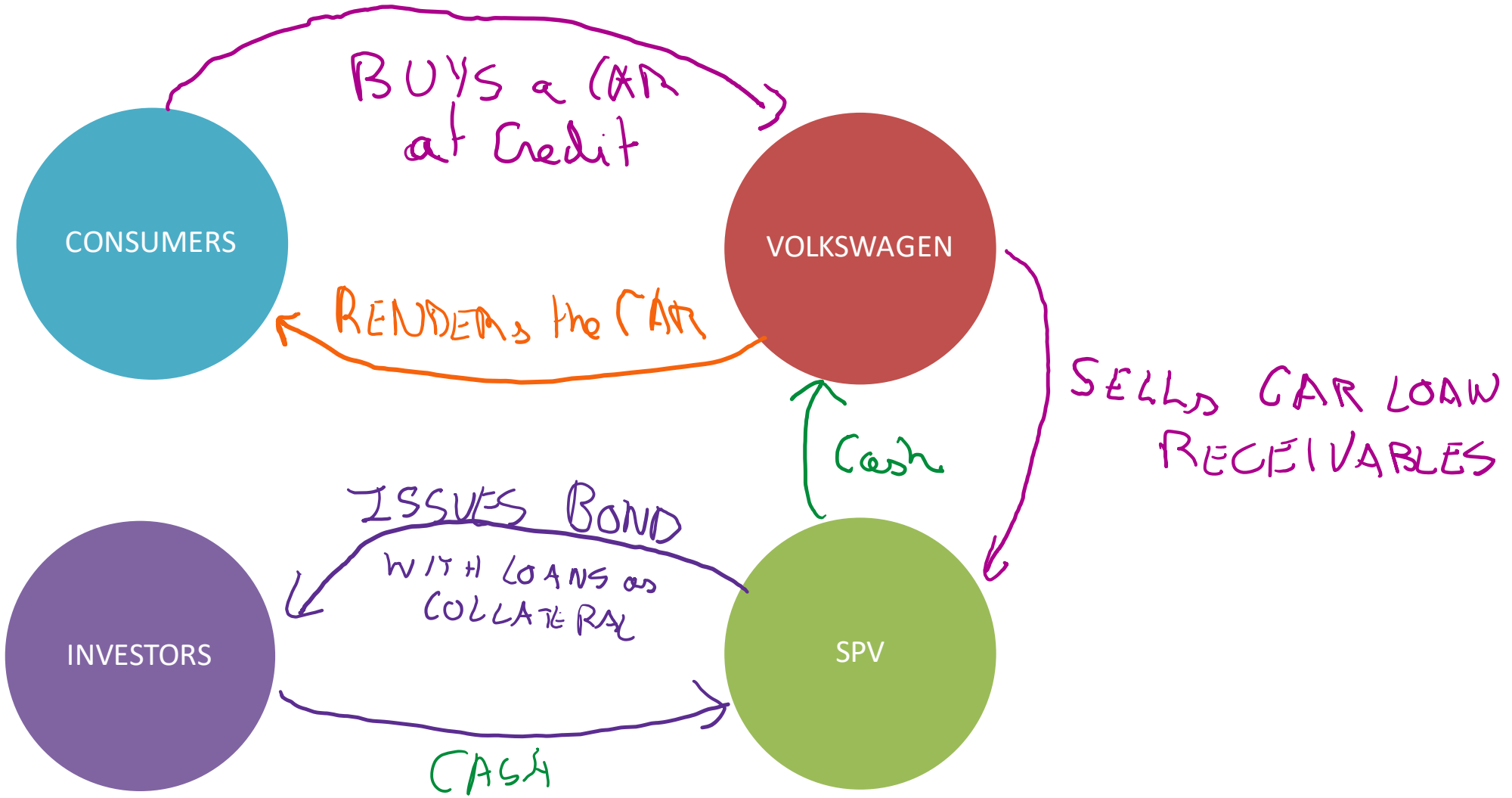
BBB → 5%

Describe securitization, including the parties involved in the process and the roles they play;

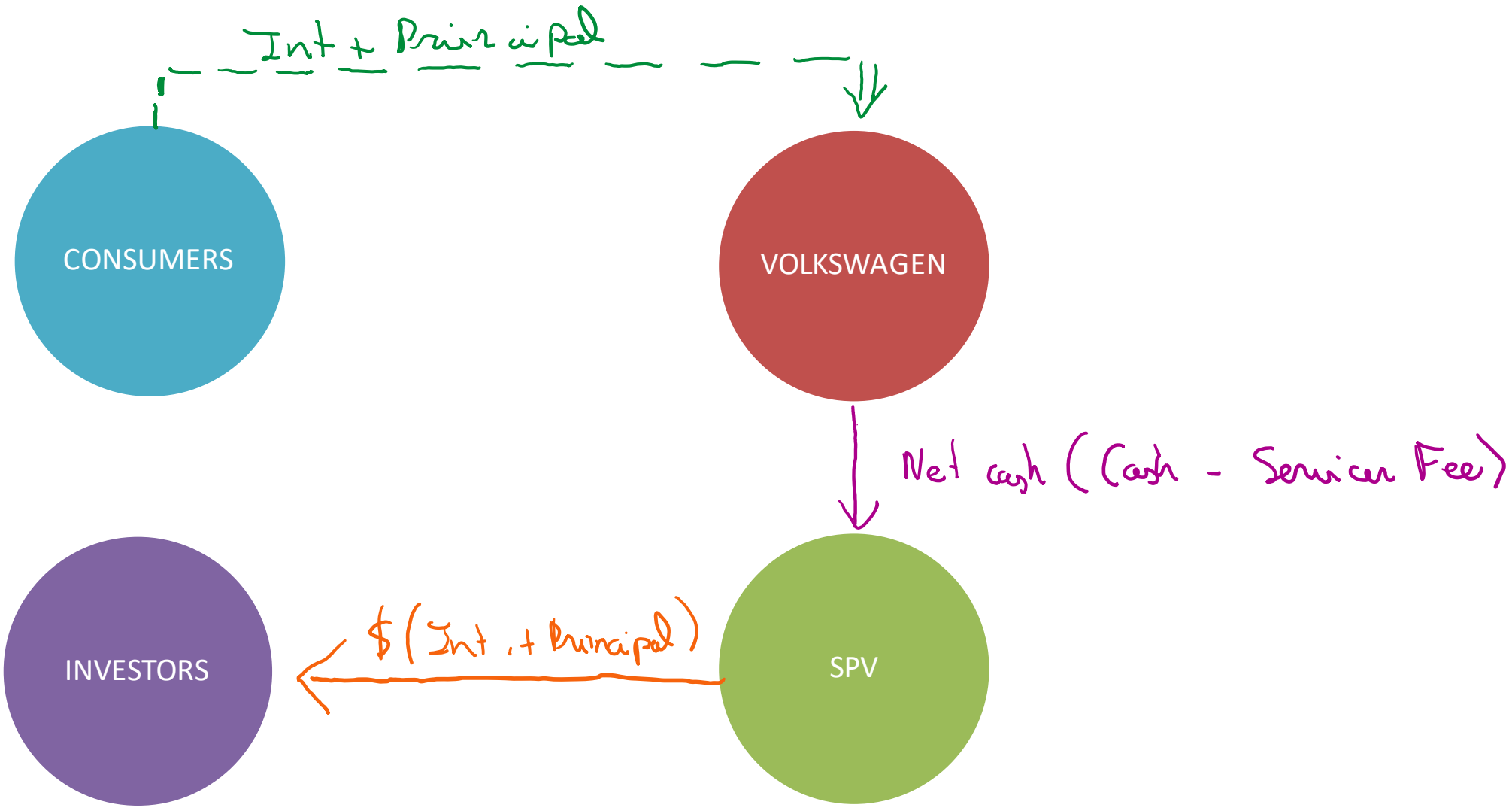




INTRO SECURITIZATION

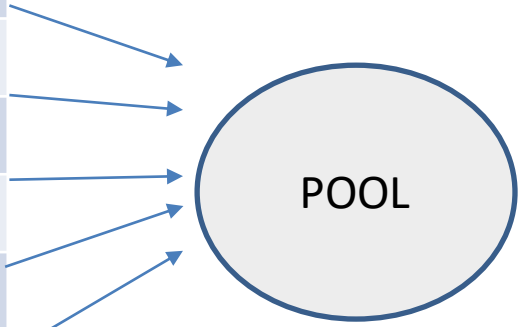


INTRO SECURITIZATION



INTRO SECURITIZATION. CREDIT TRANCHING

LOAN	PRINCIPAL	INTEREST
1	20,000	Euribor + 500 bps
2	20,000	Euribor + 500 bps
3	20,000	Euribor + 500 bps
4	20,000	Euribor + 500 bps
5	20,000	Euribor + 500 bps
6	20,000	Euribor + 500 bps
7	20,000	Euribor + 500 bps
8	20,000	Euribor + 500 bps
9	20,000	Euribor + 500 bps
10	20,000	Euribor + 500 bps
Total	**200,000**	



Tranche	Principal (%)	Principal (€)	Credit Quality	Interest
SENIOR	60%	120,000	AAA	EURIBOR + 50 bps
MEZZANINE	30%	60,000	B	EURIBOR + 300 bps
EQUITY	10%	20,000	C	EURIBOR + 1000 bps

INTRO SECURITIZATION. CREDIT TRANCHING

SCENARIO 1. NO DEFAULTS. EURIBOR= 2%

LOAN	PRINCIPAL	COLLECTED
1	20,000	20,000
2	20,000	20,000
3	20,000	20,000
4	20,000	20,000
5	20,000	20,000
6	20,000	20,000
7	20,000	20,000
8	20,000	20,000
9	20,000	20,000
10	20,000	20,000
Total	**200,000**	

Tranche	Principal (%)	Principal (€)	Credit Quality	Interest	Collected	Yiedl
SENIOR	60%	120,000	AAA	EURIBOR + 50 bps	120,000 + 3,000	2.5%
MEZZANINE	30%	60,000	B	EURIBOR + 300 bps	60,000 + 3,000	5.0%
EQUITY	10%	20,000	C	EURIBOR + 1000 bps	20,000 + 2,400	12%

INTRO SECURITIZATION. CREDIT TRANCHING

SCENARIO 2. €20K in defaults. EURIBOR= 2%

LOAN	PRINCIPAL	COLLECTED
1	20,000	20,000
2	20,000	20,000
3	20,000	20,000
4	20,000	20,000
5	20,000	20,000
6	20,000	20,000
7	20,000	20,000
8	20,000	20,000
9	20,000	20,000
10	20,000	-
Total	**200,000**	

Tranche	Principal (%)	Principal (€)	Credit Quality	Interest	Collected	Yiedl
SENIOR	60%	120,000	AAA	EURIBOR + 50 bps	120,000 + 3,000	2.5%
MEZZANINE	30%	60,000	B	EURIBOR + 300 bps	60,000 + 3,000	5.0%
EQUITY	10%	20,000	C	EURIBOR + 1000 bps	0	

INTRO SECURITIZATION. TRANCHING

SCENARIO 2. €40K in defaults. EURIBOR= 2%

LOAN	PRINCIPAL	COLLECTED
1	20,000	20,000
2	20,000	20,000
3	20,000	20,000
4	20,000	20,000
5	20,000	20,000
6	20,000	20,000
7	20,000	20,000
8	20,000	20,000
9	20,000	-
10	20,000	-
Total	**200,000**	

Tranche	Principal (%)	Principal (€)	Credit Quality	Interest	Collected	Yiedl
SENIOR	60%	120,000	AAA	EURIBOR + 50 bps	120,000 + 3,000	2.5%
MEZZANINE	30%	60,000	B	EURIBOR + 300 bps	40,000 + 2,000	3.3%
EQUITY	10%	20,000	C	EURIBOR + 1000 bps	0	

BENEFITS OF SECURITIZATION

① Reduces Funding costs

② Increases liquidity of the underlying financial assets

③ Provides investors with the opportunity to gain **exposure to new asset classes with the possibility of :**

- higher risk-adjusted returns
- risk reduction compared to purchasing individual loans due to diversification
- Possibility to invest in securities that are more suited to their circumstances (risk, maturity and return).
- Stronger legal claim to assets

④ Banks can increase the credit they provide (the securitized loan is converted to cash that can be used to give more loans)

① **Seller** → Originates the car loans and sells them to the issuer

② **Issuer/ SPV** → Buys the assets, and sells the bonds that are backed by the loans (Asset Backed Securities)

③ **Investors** → Buy the securities (bonds) and receive the cash flows

④ **Servicer** → Collects the payments of the assets transferred. It is often the seller itself

ASSET SECURITIZATION PROCESS

① The SPV is bankruptcy remote from the seller

② The Asset Backed Securities issued by the SPV may have better credit rating than if the bonds were issued by the seller

③ Therefore the cost of the funds issued by the SPV may be lower than the costs if the funds were issued by the seller

NOMENCLATURA FOR DUMMIES

ABS — ASSET — BACKED — SECURITIES

REMEMBER SECURITIZATION

COMPANY A

Assets	Liabilities
Car Loan Receivables	l/t Debt
Fixed Assets	s/t Debt
Cash	Equity

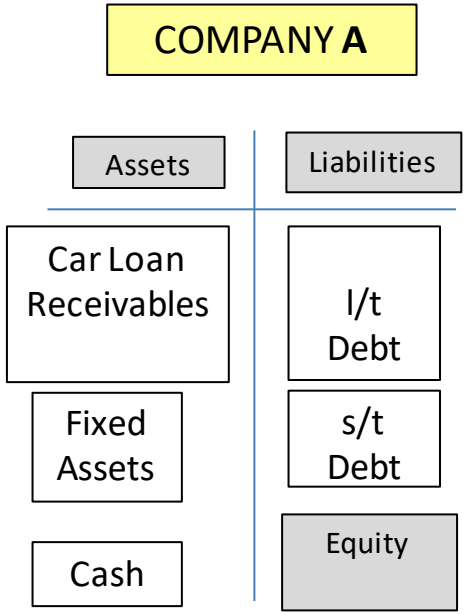
SPE

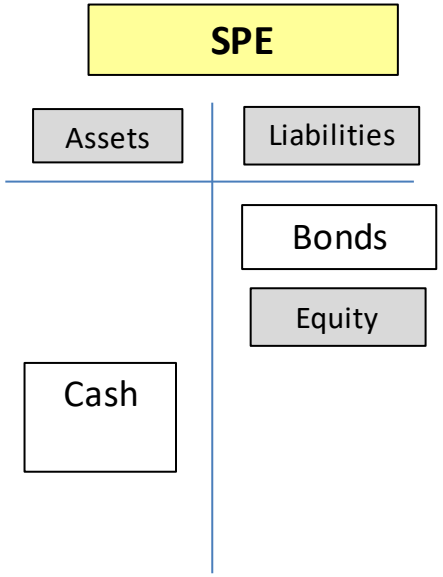
Assets	Liabilities
	Bonds
	Equity
Cash	

ABS → DEPENDING ON THE TYPE OF THE ASSET

RESIDENTIAL MORTGAGES	RMBS
NON- RESIDENTIAL MORTGAGES	~~R~~MBS
CAR LOANS OR CREDIT CARD RECEIVABLES	ABS

Describe securitization, including the parties involved in the process and the roles they play;





DONE.

DONE.

PENDIENTE TIME TRANCHING

Explain benefits of securitization for economies and financial markets;

CMO

Assets	Liabilities
Mortages	Security
Cash	Equity

Security → TRANCHES

Security:
- SENIOR
- MEZZANINE
- EQUITY

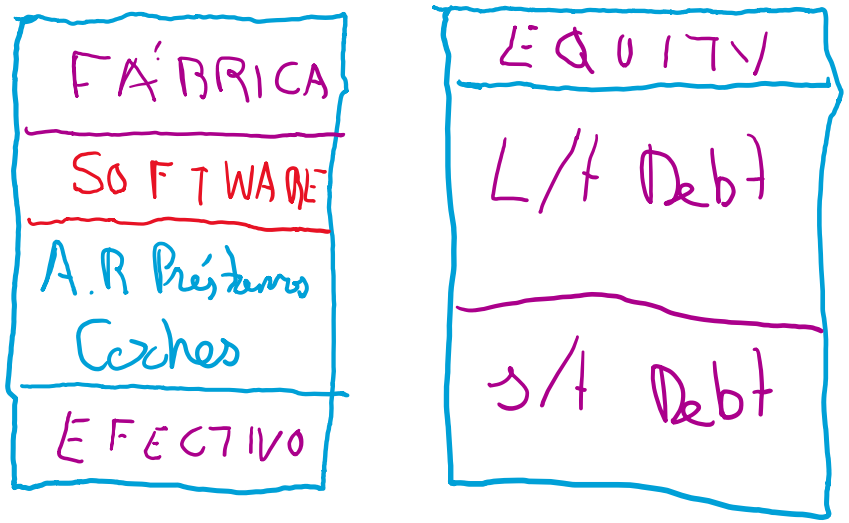
BEGINNING LOSs:

- "explain benefits of securitization for economies and financial markets;"
- "describe securitization, including the parties involved in the process and the roles they play;"
- "describe typical structures of securitizations, including credit tranching and time tranching;"

SUBSEQUENT LOSs:

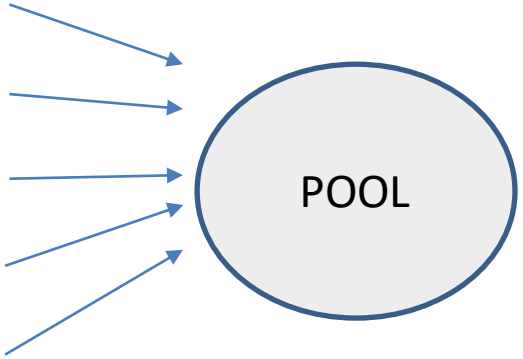
- "describe types and characteristics of **residential mortgage** loans that are typically securitized"
- "describe types and characteristics of **residential mortgage-backed securities**, including mortgage pass-through securities and collateralized mortgage obligations, and explain the cash flows and risks for each type;"
- "define prepayment risk and describe the prepayment risk of mortgage-backed securities;"

COMPANY **A**



BBB → 5%

LOAN	PRINCIPAL	INTEREST
1	20,000	Euribor + 500 bps
2	20,000	Euribor + 500 bps
3	20,000	Euribor + 500 bps
4	20,000	Euribor + 500 bps
5	20,000	Euribor + 500 bps
6	20,000	Euribor + 500 bps
7	20,000	Euribor + 500 bps
8	20,000	Euribor + 500 bps
9	20,000	Euribor + 500 bps
10	20,000	Euribor + 500 bps
Total	**200,000**	



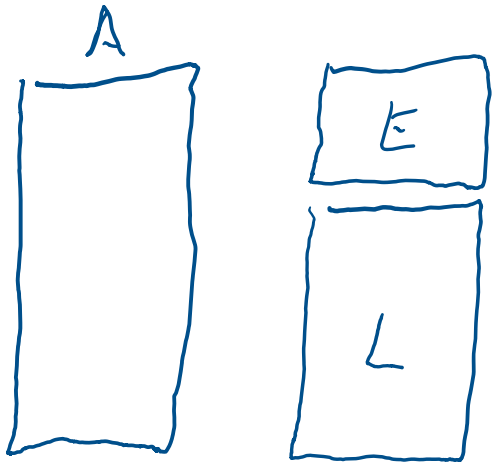
Tranche	Principal (%)	Principal (€)	Credit Quality	Interest
SENIOR	60%	120,000	AAA	EURIBOR + 50 bps
MEZZANINE	30%	60,000	B	EURIBOR + 300 bps
EQUITY	10%	20,000	C	EURIBOR + 1000 bps

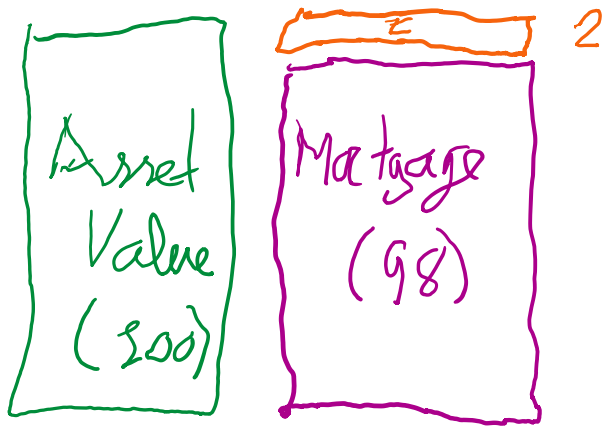
There are loans with residential real estate as collateral

Loan-to-Value ratio → Percentage of the collateral value that is borrowed

$$LTV = \frac{Mortgage\ Value}{Asset\ Value}$$

The lower the **LTV** → The lower the probability of default





$$LTV = \frac{98}{100} = 98\%$$

$$LTV = \frac{70}{100} = 70\%$$

Mortgage Characteristics

① **Maturity**

Varies among countries. Typically:

- US → 15 to 30 years
- Europe → 20 to 40 years
- Japan → Up to 100 years

② **Interest Rate**

- Fixed rate mortgage
- Adjustable rate mortgage → EURIBOR + 100 bps
- Convertible mortgage → can be changed from Fixed to Variable (and viceversa) at the option of the borrower

③ **Amortization**

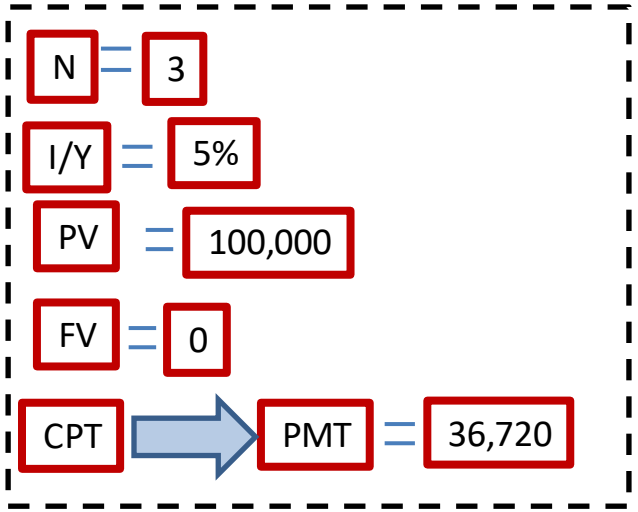
- Full amortization
- Partial amortization

Interest Only

AMORTIZATION. Term (3 years). Int (5%). Nominal (100,000$)

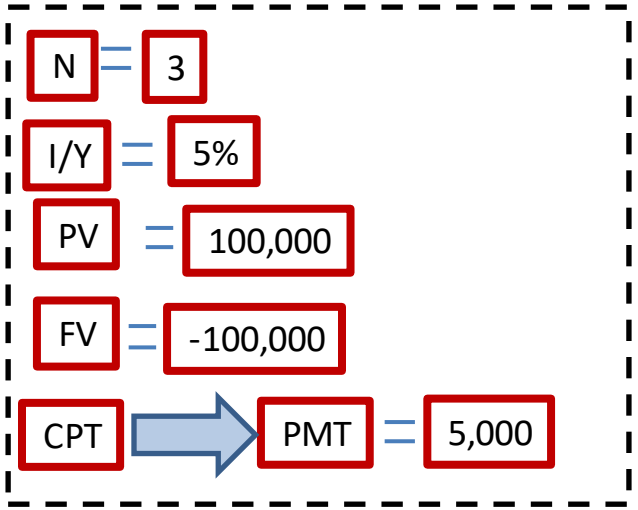
Full amortization

Year	Beg. Debt	Payment	Principal	Interest	Ending Debt
1	100,000	36,720.86	31,720.86	5.000	68.279
2	68,279	36,720.86	33,306.90	3.414	34.972
3	34,972	36,720.86	34,972.24	1.749	-



Interest Only

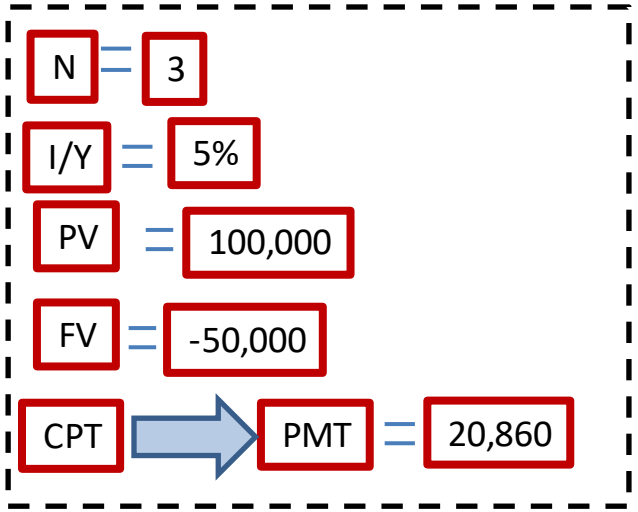
Year	Beg. Debt	Payment	Principal	Interest	Ending Debt
1	100,000	5,000	-	5,000	100,000
2	100,000	5,000	-	5,000	100,000
3	100,000	5,000	-	5,000	100,000
Bullet Payment			**100,000**		-



AMORTIZATION. Term (3 years). Int (5%). Nominal (100,000$)

Partial amortization.

Year	Beg. Debt	Payment	Principal	Interest	Ending Debt
1	100.000	20.860,43	15.860	5.000	84.140
2	84.140	20.860,43	16.653	4.207	67.486
3	67.486	20.860,43	17.486	3.374	50.000
Balloon Payment			**50,000**		-



Mortgage Characteristics

④ **Prepayment provisions**

- May entail a penalty with prepayments
- Refinance of the mortgage in declining interest rates, via prepayments

⑤ **Recourse or nonrecourse** loans

- Recourse against the underlying borrower
  - Recourse loan → If someone does not pay:
    1. I can kick him out of the home and sell it.
    2. If proceeds are not enough I have recourse against other assets of the borrower
  - Nonrecourse loan → If someone does not pay:
    1. I can kick him out of the home and sell it.
    2. If proceeds are not enough I **don't have recourse against other assets of the borrower**

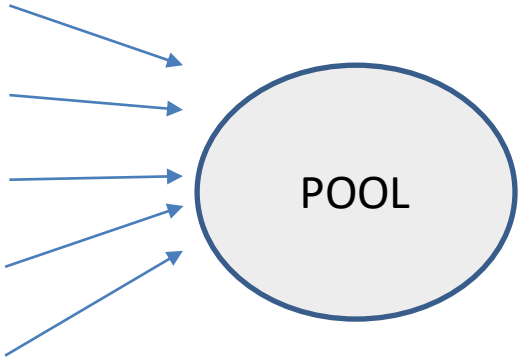
BEGINNING LOSs:

- "describe typical structures of securitizations, including credit tranching and time tranching;"

SUBSEQUENT LOSs:

- **"describe types and characteristics of residential mortgage loans that are typically securitized"**
- "describe types and characteristics of **residential mortgage-backed securities**, including mortgage pass-through securities and collateralized mortgage obligations, and explain the cash flows and risks for each type;"
- "define prepayment risk and describe the prepayment risk of mortgage-backed securities;"

LOAN	PRINCIPAL	INTEREST
1	20,000	Euribor + 500 bps
2	20,000	Euribor + 500 bps
3	20,000	Euribor + 500 bps
4	20,000	Euribor + 500 bps
5	20,000	Euribor + 500 bps
6	20,000	Euribor + 500 bps
7	20,000	Euribor + 500 bps
8	20,000	Euribor + 500 bps
9	20,000	Euribor + 500 bps
10	20,000	Euribor + 500 bps
Total	**200,000**	



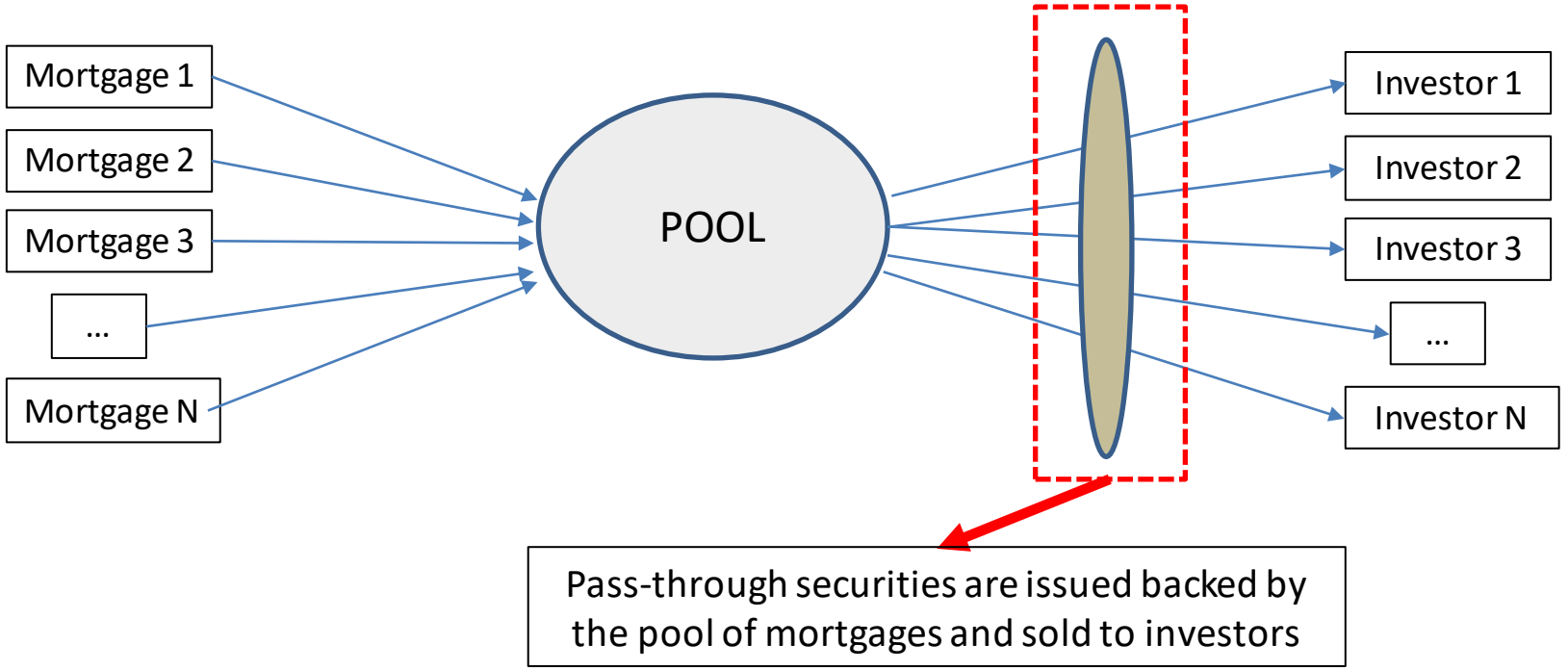
Tranche	Principal (%)	Principal (€)	Credit Quality	Interest
SENIOR	60%	120,000	AAA	EURIBOR + 50 bps
MEZZANINE	30%	60,000	B	EURIBOR + 300 bps
EQUITY	10%	20,000	C	EURIBOR + 1000 bps

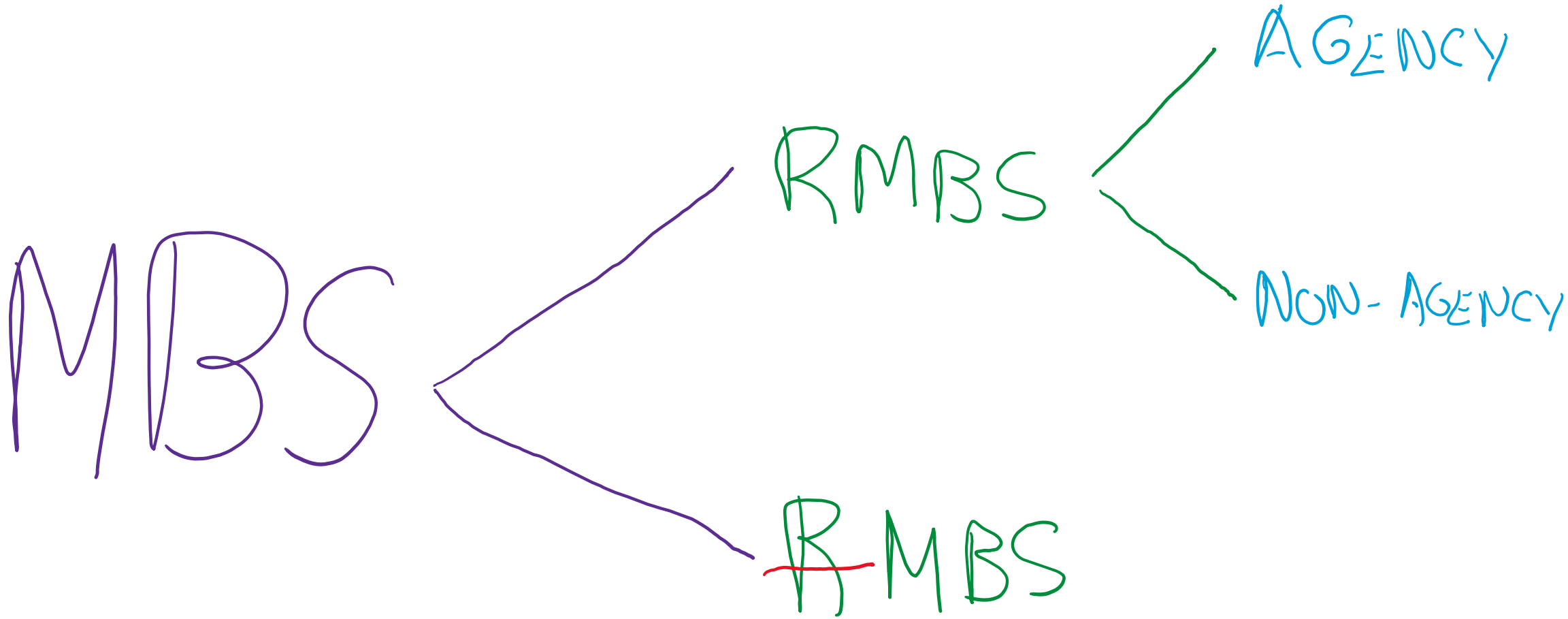
AGENCY RESIDENTIAL MORTGAGE-BACKED SECURITIES

Mortgage Pass-through Securities

Securitization → Pool of mortgages to diversify risk

Investors receive a portion (pro rata) of all cash flows




MBS
RMBS
AGENCY
NON-AGENCY
RMBS

AGENCY RESIDENTIAL MORTGAGE-BACKED SECURITIES

① **Agency RMBS** → Issued by a government agency (Ginny Mae) or by a enterprise that is sponsored by the government (Fannie Mae and Freddie Mac)

They Buy Mortgages → They sell the Mortgages to SPE → The SPE issues ABS

Only conforming loans (loans of quality in terms of LTV)

② **Nonagency RMBS** → Issued by private entities (banks), and therefore the underlying loans are not backed by the government

Nonagency RMBS have higher credit risk → Credit enhancement methods used

AGENCY RMBS

AGENCY RESIDENTIAL MORTGAGE-BACKED SECURITIES

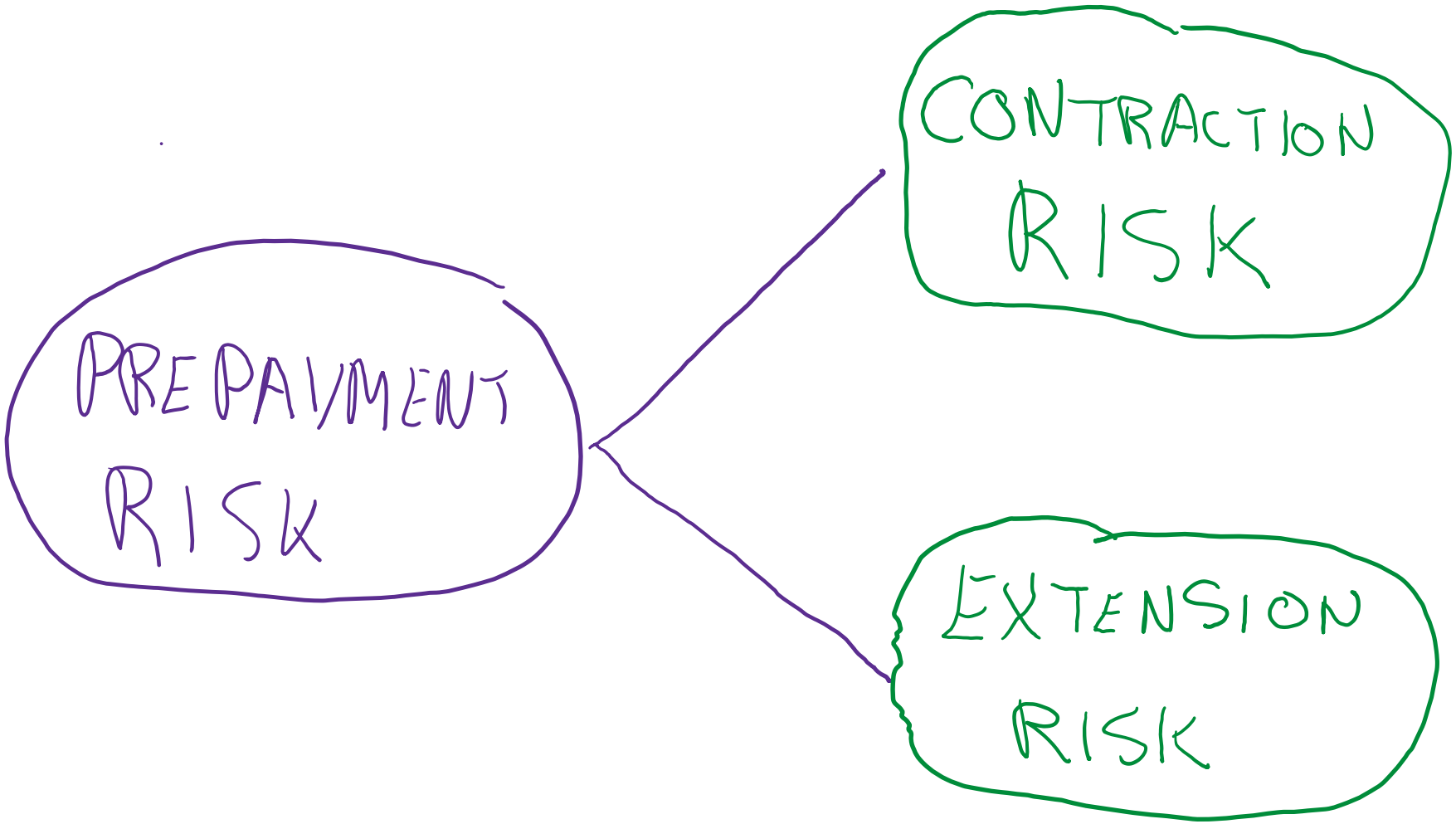
Mortgage	Balance	Weight	Rate	Time left (months)	WAC	WAM
1	200,000	50.0%	5.0%	200	2,50%	100
2	100,000	25.0%	2.0%	250	0,50%	63
3	50,000	12.5%	3.0%	300	0,38%	38
4	50,000	12.5%	4.0%	300	0,50%	38
	400,000		3.5%	263	3,88%	238

Only conforming loans:

- LTVs less than x
- Size less than x
- Complies with minimum documentation required
- Insurance had to be purchased by owner

NO CREDIT RISK. ONLY **PREPAYMENT RISK**

PREPAYMENT RISK

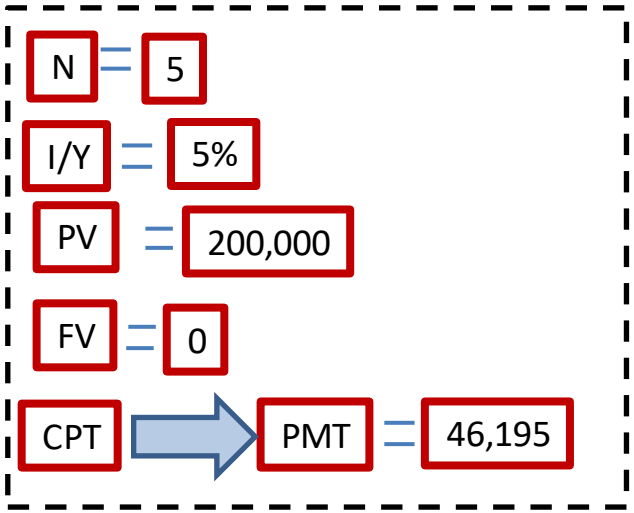


PREPAYMENT RISK

WHAT THE FUCK?

NO PREPAYMENTS. MORTAGE FULL AMORTIZATION

Year	Beg.Debt	Principal	Interest	Total Sched. Payment	Prepayment	Total Payment	Ending Debt
1	200,000	36,195	10,000	46,195		46,195	163,805
2	163,805	38,005	8,190	46,195		46,195	125,800
3	125,800	39,905	6,290	46,195		46,195	85,895
4	85,895	41,900	4,295	46,195		46,195	43,995
5	43,995	43,995	2,200	46,195		46,195	- 0



PREPAYMENT RISK?- WHAT THE FUCK

PSA (Speed)	0	50	100	150	200	250	300
Average Life	20	14	12	9	8	6	5

- PENSION PLAN. TIME HORIZON→ 10 years
- HEDGE FUND. TIME HORIZON→ 6 years

PSA FOR DUMMIES

- BASED UPON HISTORICAL OBSERVATIONS.

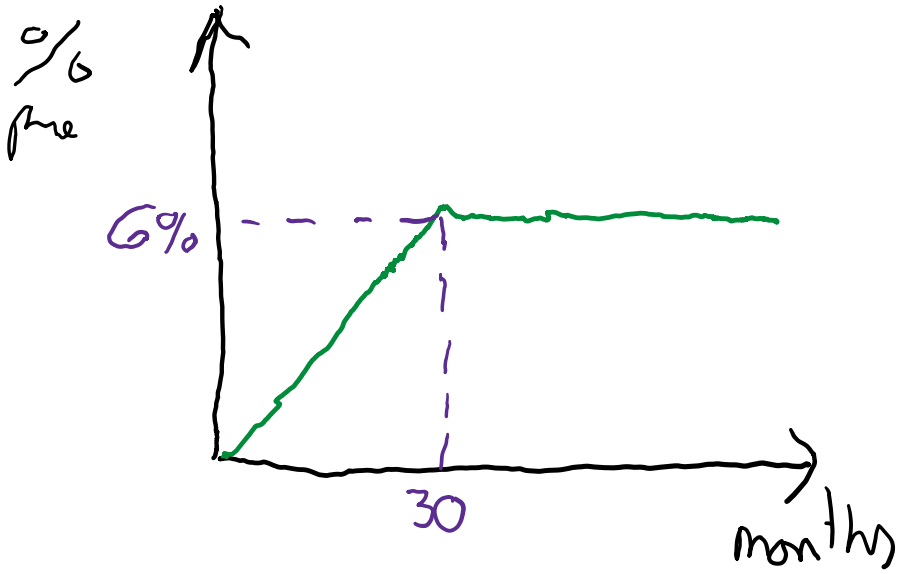
- BENCHMARK

- 0 PSA→ NO PREPAYMENTS
- 100 PSA→ PREPAYMENTS 100% As EXPECTED
- 150 PSA→ PREPAYMENTS As EXPECTED x 1.5

- MONTHLY FIGURES
  - Very low first months of mortgage
  - Grows as time passes
  - Affected by interest rate paths

PSA FOR DUMMIES

- 100 PSA
- 0.2% first month and +0.2% per month till 6% (month 30)



PREPAYMENT RISK

The characteristics of the pool of mortgages can change due to **prepayments**

The level of prepayments depend mainly on the evolution of interest rates

① **Contraction risk** → Derived from the increase in prepayments, normally as a consequence of a decrease in interest rates

Lower interest rates lead to more refinancing

An increase in refinancing reduces the average MBS life

② **Extension risk** → Derived from a decrease in prepayments, due to an increase in interest rates.

A decrease in prepayments increase the average MBS life

PREPAYMENT RISK (cont.)

① **Contraction risk** → Derived from the increase in prepayments, normally as a consequence of a decrease in interest rates

② **Extension risk** → Derived from a decrease in prepayments, due to an increase in interest rates.

Mortgage Pass-through Securities

① **Single Monthly Mortality Rate** (SMM) → % by which prepayments reduce principal balance (month-end) compared to what it would have been if only principal was paid (no repayments)

② **Conditional Prepayment Rate** (CPR) → Annualized measure of prepayment rates. It depends on the weighted average coupon rate on the loan pool, on current interest rates and prior principal prepayments

③ **Weighted Average Life** → Is lower than the Weighted Average Maturity due to prepayments

PSA. BASED ON SMM AND CPR

$$SMM_t = \frac{PREPAYMENT\ IN\ MONTH_t}{BEGINNING\ BALANCE_t - SCHEDULED\ PAYMENT}$$

⇒ MONTHLY

$$CPR = 1 - (1 - SMM)^{12}$$

⇒ ANNUALIZED

PREPAYMENT RISK (cont.)

Public Securities Association (**PSA**) prepayment benchmark

Monthly series of annual prepayment rate, assuming that prepayment rates will increase as the loans in the pool age

100 PSA → 100% of PSA. Increase in prepayments of 0.2% up until month 30 (6% achieved) , and then level off

200 PSA → 200% of PSA. Increase in prepayments of 0.4% up until month 30 (12% achieved) , and continue at 12% onwards

300 PSA → 300% of PSA. Increase in prepayments of 0.6% up until month 30 (18% achieved) , and continue at 18% onwards

COLLATERALIZED MORTGAGE OBLIGATIONS (CMO)

CMO → Are created from pass-through MBS for investors with different risk needs

Cash flows are reallocated to different tranches, each tranche with different risk profile (different contraction and extension risk)

Risks are reallocated, but not eliminated

The two most common structures are:

1. Sequential Pay structure
2. PAC/ support structure

PAC = Planned Amortization Class

COLLATERALIZED MORTGAGE OBLIGATIONS (CMO)

① Sequential Pay CMO

All tranches receive interest payments

Shortest tranche receives all principal (both scheduled and prepayments) until it is paid off

The sequential pay of the CMO paid to each tranche has both contraction and extension risk

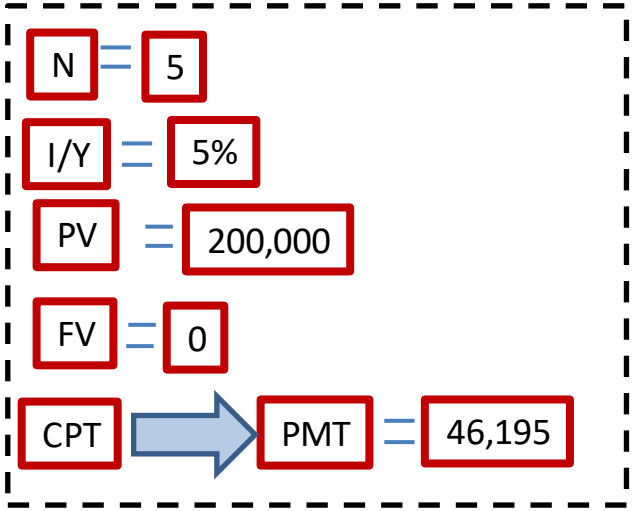
SEQUENTIAL PAY CMO

Tranche	Contraction Risk	Extension Risk
A (Sequential Pay)	**High**	**Low**
B (Sequential Pay)		
C (Sequential Pay)	**Low**	**High**

SEQUENTIAL TRANCHING

NO PREPAYMENTS. MORTAGE FULL AMORTIZATION

Year	Beg.Debt	Principal	Interest	Total Sched. Payment	Prepayment	Total Payment	Ending Debt
1	200,000	36,195	10,000	46,195		46,195	163,805
2	163,805	38,005	8,190	46,195		46,195	125,800
3	125,800	39,905	6,290	46,195		46,195	85,895
4	85,895	41,900	4,295	46,195		46,195	43,995
5	43,995	43,995	2,200	46,195		46,195	- 0
Total		200,000	30,975	230,975	-	230,975	



NO PREPAYMENTS. MORTAGE FULL AMORTIZATION

Year	Beg.Debt	Principal	Interest	Total Sched. Payment	Prepayment	Total Payment	Ending Debt
1	200,000	36,195	10,000	46,195		46,195	163,805
2	163,805	38,005	8,190	46,195		46,195	125,800
3	125,800	39,905	6,290	46,195		46,195	85,895
4	85,895	41,900	4,295	46,195		46,195	43,995
5	43,995	43,995	2,200	46,195		46,195	- 0
Total		200,000	30,975	230,975	-	230,975	

TRANCHE	PRINCIPAL	INTEREST
B	100,000	3.5%
A	100,000	6.5%

NO PREPAYMENTS. MORTAGE FULL AMORTIZATION

SEQUENTIAL TRANCHES

NO PREPAYMENTS

	TOTAL					TRANCHE A			TRANCHE B		
Year	BoP Debt	Principal	Int.	Prepayments	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	Interest	BoP Debt	TOTAL PRINCIPAL	Interest
1	200.000	36.195	10.000	-	36.195	100.000	-	3.500	100.000	36.195	6.500
2	163.805	38.005	8.190	-	38.005	100.000	-	3.500	63.805	38.005	4.147
3	125.800	39.905	6.290	-	39.905	100.000	14.105	3.500	25.800	25.800	1.677
4	85.895	41.900	4.295	-	41.900	85.895	41.900	3.006	-		-
5	43.995	43.995	2.200	-	43.995	43.995	43.995	1.540	-		-

SEQUENTIAL TRANCHES

PSA 100

	TOTAL					TRANCHE A			TRANCHE B		
Year	BoP Debt	Principal	Int.	Prepayments	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	Interest	BoP Debt	TOTAL PRINCIPAL	Interest
1	200.000	36.195	10.000	2.400	38.595	100.000	-	3.500	100.000	38.595	6.500
2	161.405	38.125	8.070	5.811	43.935	100.000	-	3.500	61.405	43.935	3.991
3	117.470	40.321	5.873	7.048	47.370	100.000	29.900	3.500	17.470	17.470	1.136
4	70.100	42.690	3.505	4.206	46.896	70.100	46.896	2.454	-		-
5	-	23.204	1.160	-	-	-	-	-	-		-

SEQUENTIAL TRANCHES

PSA 200

	TOTAL					TRANCHE A			TRANCHE B		
Year	BoP Debt	Principal	Int.	Prepayments	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	Interest	BoP Debt	TOTAL PRINCIPAL	Interest
1	200.000	36.195	10.000	4.800	40.995	100.000	-	3.500	100.000	40.995	6.500
2	159.005	38.245	7.950	11.621	49.866	100.000	-	3.500	59.005	49.866	3.835
3	109.139	40.738	5.457	14.096	54.834	100.000	45.695	3.500	9.139	9.139	594
4	54.305	43.480	2.715	10.825	54.305	54.305	54.305	1.901	-		-
5	-	-	-	-	-	-	-	-	-		-

CONTRACTION	PREPAYMENT RISK	EXTENSION
FALLING INT. RATES	MAIN SOURCE	RISING INT. RATES
SHORTER AVERAGE LIFE	CONSEQUENCE	LONGER AVERAGE LIFE
↓ REINVESMTENT RATE	PROBLEM	↓ CASH FLOW

ORIGINAL POOL OF ASSETS	
PSA 100	WAM→ 15 YEARS
TRANCHED CMO PSA 100	
A	4
B	8
C	20
D	25

COLLATERALIZED MORTGAGE OBLIGATIONS (CMO)

② PAC CMO Structure

PAC TRANCHE

Structured to make predictable payments irrespective of the actual payments of the underlying MBS

If actual prepayments are faster than expected, the support tranche receives the principal excess prepayment.

If actual prepayments are slower than expected, principal prepayments to the support tranche are reduced, to support the payments to the PAC tranche.

SUPPORT TRANCHE

Provides prepayment and contraction protection to PAC tranches

PSA SPEED	PAC I TRANCHE	SUPPORT TRANCHE
50	9 YEARS	20 YEARS
100	6 YEARS	15 YEARS
200	6 YEARS	10 YEARS
300	6 YEARS	3 YEARS
400	5 YEARS	2 YEARS
500	4 YEARS	1 YEARS

Effective Collar 100 to 300 PSA

PAC-SUPPORT TRANCHING

PSA SPEED	PAC I TRANCHE	SUPPORT TRANCHE
50	9 YEARS	20 YEARS
100	6 YEARS	15 YEARS
200	6 YEARS	10 YEARS
300	6 YEARS	3 YEARS
400	5 YEARS	2 YEARS
500	4 YEARS	1 YEARS

Effective Collar 100 to 300 PSA

PAC-SUPPORT SUMMARY (130 PSA DESIRED. 100-200 COLLAR)

	NO PREPAYMENTS						PSA 100						PSA 200					
	TOTAL		PAC		SUPPORT		TOTAL		PAC		SUPPORT		TOTAL		PAC		SUPPORT	
Year	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL	BoP Debt	TOTAL PRINCIPAL
1	200.000	6.049	100.000	4.584	100.000	1.464	200.000	8.449	100.000	4.584	100.000	3.864	200.000	10.849	100.000	4.584	100.000	6.264
2	193.951	6.351	95.416	7.736	98.536	1.385	191.551	13.367	95.416	7.736	96.136	5.631	189.151	20.383	95.416	7.736	93.736	12.647
3	187.601	6.668	87.680	10.589	99.921	3.921	178.185	17.830	87.680	10.589	90.505	7.241	168.769	28.992	87.680	10.589	81.089	18.403
4	180.932	7.002	77.090	10.424	103.842	3.422	160.354	17.652	77.090	10.424	83.264	7.229	139.777	28.302	77.090	10.424	62.686	17.879
5	173.930	7.352	66.667	10.256	107.263	2.904	142.702	17.476	66.667	10.256	76.035	7.219	111.474	27.599	66.667	10.256	44.807	17.343
6	166.578	7.720	56.411	10.088	110.167	2.368	125.227	17.301	56.411	10.088	68.816	7.213	83.875	26.882	56.411	10.088	27.465	16.794
7	158.858	8.106	46.323	9.917	112.535	1.812	107.926	17.128	46.323	9.917	61.603	7.211	56.993	26.150	46.323	9.917	10.670	10.670
8	150.753	8.511	36.406	9.745	114.347	1.234	90.798	16.957	36.406	9.745	54.392	7.211	30.843	25.402	36.406	9.745	-	-
9	142.242	8.936	26.661	9.571	115.581	635	73.842	16.787	26.661	9.571	47.181	7.216	5.441	5.441	26.661	9.571	-	-
10	133.306	9.383	17.090	9.395	116.216	12	57.055	16.619	17.090	9.395	39.965	7.224	-	-	17.090	9.395		
11	123.922	9.852	7.695	7.695	116.228	2.157	40.436	16.453	7.695	7.695	32.741	8.758	-	-	7.695	7.695		
12	114.070	10.345	-	-	114.070	10.345	23.983	16.288	-		23.983	16.288	-	-	-	-		
13	103.725	10.862	-	-	103.725	10.862	7.694	7.694	-		7.695	7.694	-	-	-	-		
14	92.863	11.405	-	-	92.863	11.405	-	-	-		-	-	-	-	-	-		
15	81.457	11.976	-	-	81.457	11.976	-	-	-		-	-	-	-	-	-		
16	69.482	12.574	-	-	69.482	12.574	-	-	-		-	-	-	-	-	-		
17	56.907	13.203	-	-	56.907	13.203	-	-	-		-	-	-	-	-	-		
18	43.704	13.863	-	-	43.704	13.863	-	-	-		-	-	-	-	-	-		
19	29.841	14.556	-	-	29.841	14.556	-	-	-		-	-	-	-	-	-		
20	15.284	15.284	-	-	15.284	15.284	-	-	-		-	-	-	-	-	-		
21	-	0	-		-		-		-		-	0	-		-	0		

Nonagency RMBS

External Credit Enhancements

1. Corporate Guarantee by the seller
2. A letter of credit provided by a BANK
3. Bond insurance

Nonagency RMBS

Internal Credit Enhancements

① Reserve Funds

- Cash Reserve Funds
- Excess servicing spread funds

② Overcollateralization

- Face Value of the RMBS is lower than the underlying collateral value. The excess is used to absorb losses

③ Senior/subordinate structure

- Subordinated tranches absorb losses first
- Prepayment protection can also be provided via subordinated tranching

DONE

PREVIOUS LOSs:

- "describe types and characteristics of **residential mortgage** loans that are typically securitized"
- "describe types and characteristics of **residential mortgage-backed securities**, including mortgage pass-through securities and collateralized mortgage obligations, and explain the cash flows and risks for each type;"
- "define prepayment risk and describe the prepayment risk of mortgage-backed securities;"

SUBSEQUENT LOSs:

- "describe characteristics and risks of **commercial** mortgage-backed securities;"
- "describe types and characteristics of non-mortgage asset-backed securities, including the cash flows and risks of each type;"
- "describe collateralized debt obligations, including their cash flows and risks."

- “describe characteristics and risks of **commercial** mortgage-backed securities;

Commercial MBS (**CMBS**) → Backed by income producing Real Estate Assets:

1. Shopping centers
2. Warehouses
3. Apartments
4. Office buildings
5. Hotels and resorts
6. Health care facilities
7. Senior housing

CMBS → Non recourse Loans

Therefore, the analysis should focus on the risk of the property:

1. Debt service coverage ratio

$$\text{DSCR} = \frac{NOI}{debt\ service}$$

2. Loan-to-Value ratio

$$\text{LTV} = \frac{Mortgage}{Appraised\ Value\ of\ Collateral}$$

CMBS Call Protection

① Protection at a **Loan-level**

- A lockout period for prepayments
- **Defeasance**→ Use the repayment to purchase a portfolio of government securities
- Prepayment Penalty Points
- Yield maintenance charges

The borrower is charged by the amount of interest lost due to the prepayment

② **CMBS Structure**

- Credit Tranching
- Balloon Maturity Provisions

AUTO LOAN ABS

Typically issued by:

- Financing arm of manufacturing firms
- Commercial Banks
- Independent Finance Companies

① Amortizing Loans

② The prepayment trends mainly depend upon:

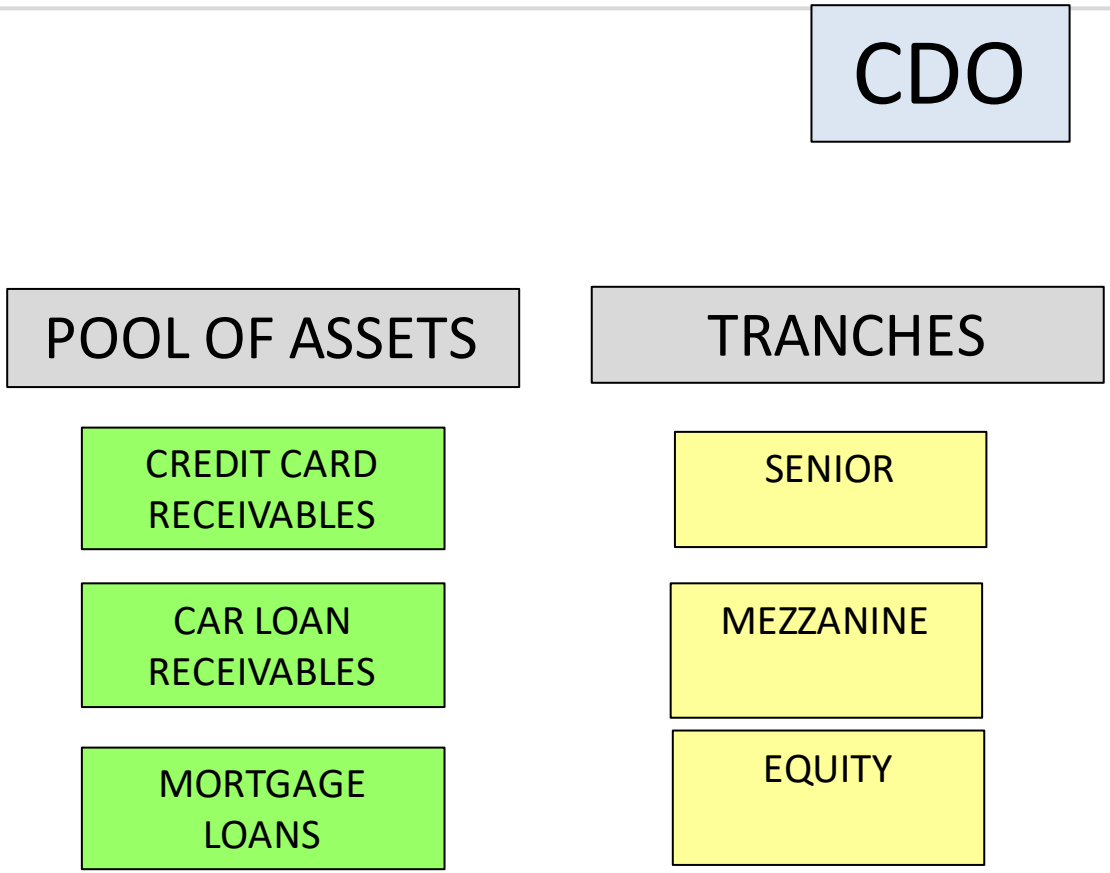
- If the car is sold
- If the car is traded in
- If the car is stolen
- If the car is crashed (loan prepaid by the insurance proceeds)

③ This kind of ABS need credit enhancement

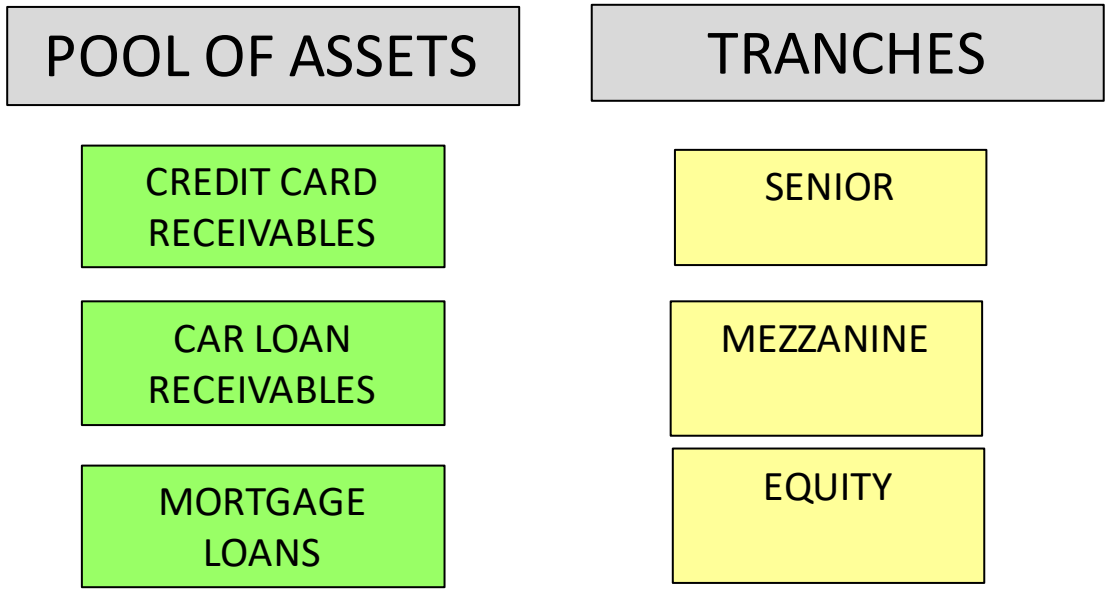
CREDIT CARD ABS

1. ABS backed by a pool of credit card receivables
   - Nonamortizing loans
2. **Lockout period**
   - No principal repaid
   - Principal payments by card holders are used to purchase more receivables
3. Early amortization provisions are included to improve credit quality

CDO


CDO
POOL OF ASSETS
TRANCHES
CREDIT CARD RECEIVABLES
CAR LOAN RECEIVABLES
MORTGAGE LOANS
SENIOR
MEZZANINE
EQUITY

CDO


POOL OF ASSETS
TRANCHES
CREDIT CARD RECEIVABLES
CAR LOAN RECEIVABLES
MORTGAGE LOANS
SENIOR
MEZZANINE
EQUITY

Describe collateralized debt obligations, including their cash flows and risks.

CDO

Collateralized Debt Obligations (**CDOs**)

① The collateral is a pool of different debt obligations

- Loans
- Bonds
- Credit card receivables
- MBS
- ABS

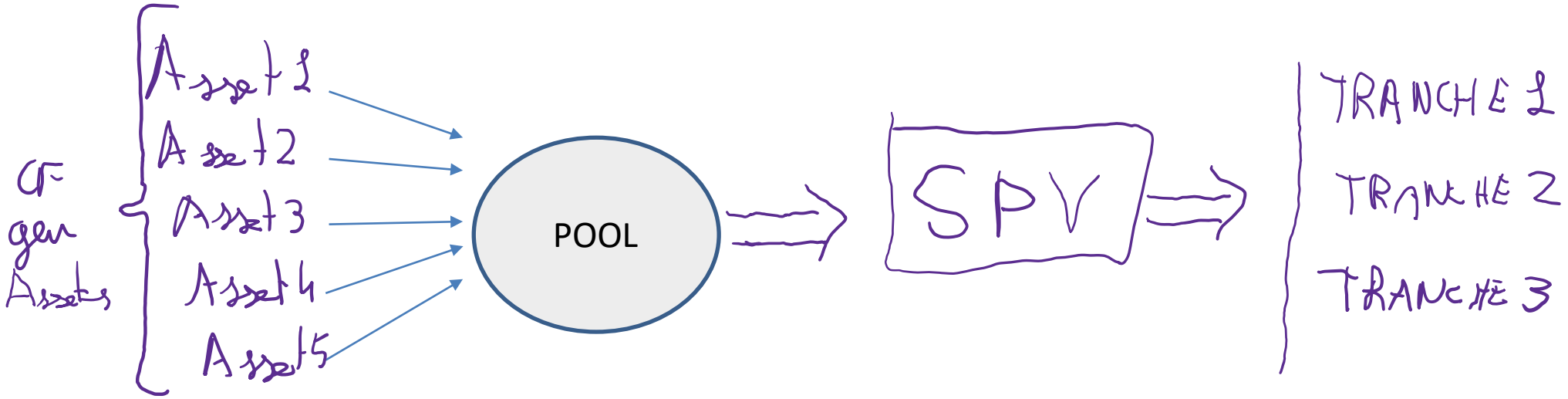
② The collateral pool is managed with the intent to generate cash flows to make the promised payments

③ CDOs are not considered to be a type of ABS

CDO Structure

CDO investors are divided in tranches

1. Senior tranches → Account for the majority of the investors (70-80%)
   - Floating rate
2. Mezzanine tranches → Fixed coupon
3. Equity tranche → Provides credit protection (and prepayment protection)


Asset 1
Asset 2
Asset 3
Asset 4
Asset 5
POOL
SPV
TRANCHE 1
TRANCHE 2
TRANCHE 3

SAME, but

DIFFERENCES

1. MIX OF ASSETS
2. TIMING
3. CASH FLOWS
4. USE OF DERIVATIVES

MIX OF ASSETS

POOL OF ASSETS

- HIGH YIELD CORP. BONDS
- ABS (Car loans , Credit card AR)
- MBS
- BANK LOANS
- DISTRESSED DEBT

TRANCHES

- SENIOR
- MEZZANINE
- EQUITY

CBO vs CLO

TIMING

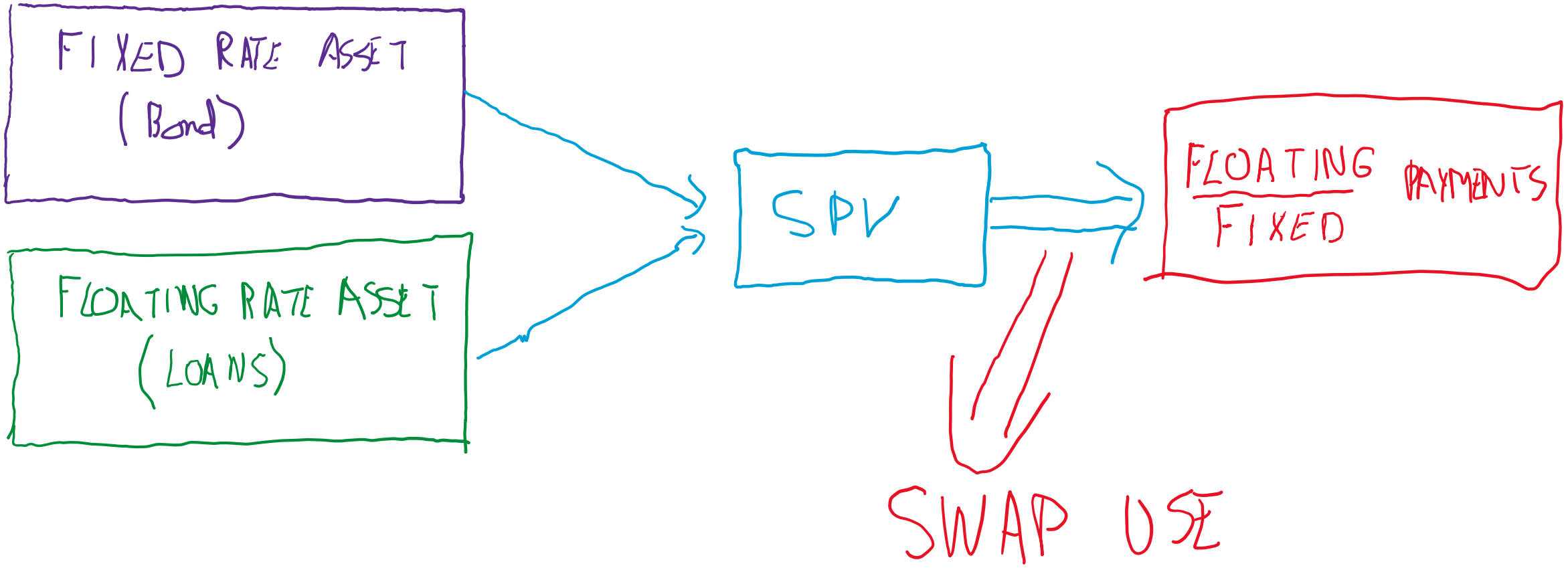
0
ISSUANCE
1
RAMP-UP
Assets Acquired
2
REINVESMENT
Proceeds Reinvested
3
MATURITY
Proceeds Reinvested

3 CASH FLOWS

1. INTEREST
2. PRINCIPAL
3. SALE OF ASSETS

ASSET MANAGERs EXISTENCE

USE OF DERIVATIVES



CDO Structure

① Synthetic CDOs → form of collateralized debt obligation (CDO) that invests in credit default swaps (CDSs) or other non-cash assets to gain exposure to a portfolio of fixed income assets.

② Arbitrage CDOs → Generate a return obtained from the spread between the collateral return and the funding costs