

J.P. Morgan North American Virtual Credit Bootcamp
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CLO Primer

The \$1+ Trillion Market

Global CLO Research

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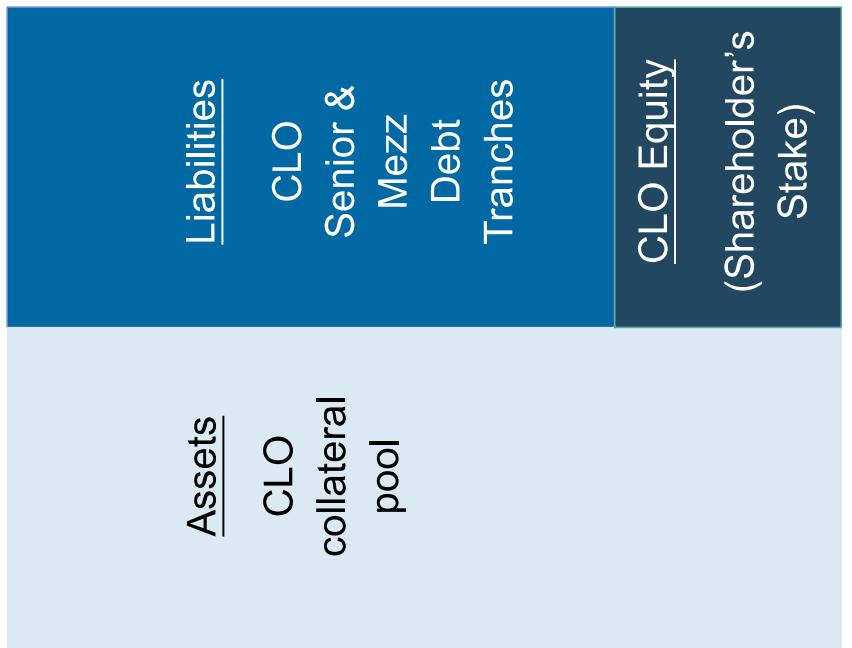
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What is a CLO?

Basic Accounting

- A CLO is comparable to a finance company
 - Borrows money (liabilities)
 - Invests in collateral (loan assets)
 - Has residual value (equity)
- General objective of a CLO: take advantage of the funding gap between loan spreads (assets) and tranche spreads (liabilities), otherwise known as '**arbitrage**'
- The assets are typically **managed** by a seasoned asset manager with a strong track record managing leveraged loans
- Repayment of liabilities relies on the performance of the underlying collateral pool and asset manager
- **Collateral quality tests** protect the portfolio from becoming too risky
- **Credit enhancement** and **tranches** create different rating levels, allowing involvement of a wide investor base
- The **equity** of a CLO represents an ownership stake in an entity and first loss position

CLO Balance Sheet

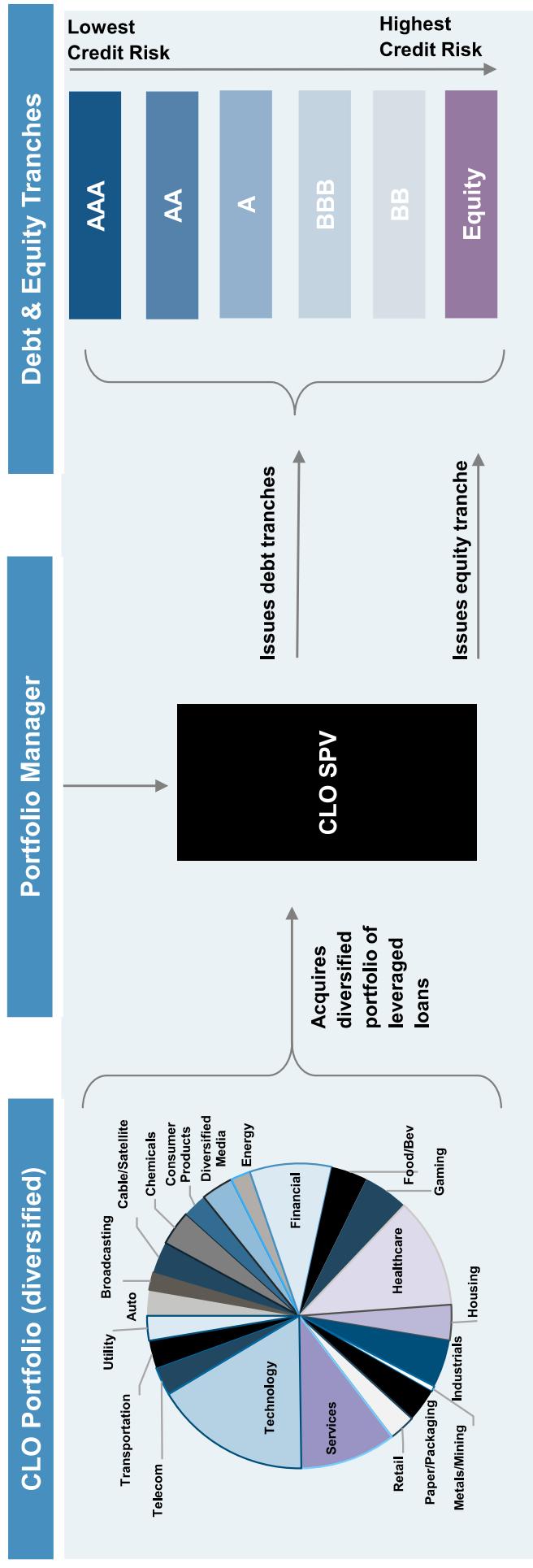


Source: J.P. Morgan

What is a CLO?

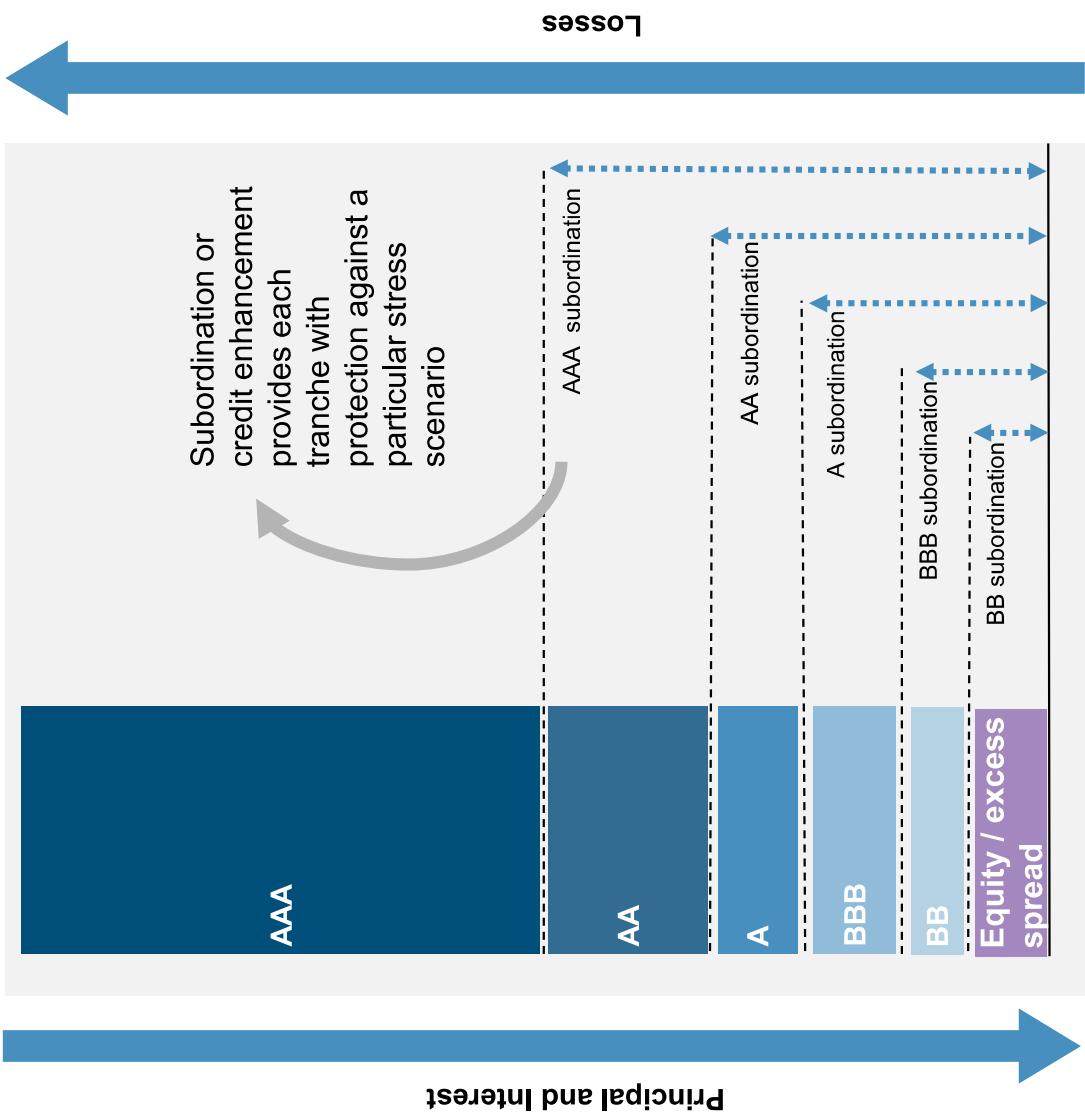
CLOs – an Overview

- In a CLO, a Special Purpose Vehicle (SPV) issues **debt** and **equity tranches** to fund the purchase of the **loan collateral**
 - Diversified CLO Portfolio: The portfolio/underlying collateral consists primarily of ~200-800 **leveraged loans** that are senior secured, first lien, floating-rate, below investment grade (avg. BB/B rating), and the CLO portfolio is **diversified** across ~21 sectors
- The SPV appoints a **collateral manager** to direct the purchase of the loan assets according to eligibility criteria
 - A CLO is **actively managed** and the manager performs the day-to-day management, surveillance and credit monitoring of the asset pool and is paid fees for its services



Source: J.P. Morgan

Pooled credit, trashed risk



- **What is the par subordination (otherwise known as credit enhancement) of a tranche?** It's how much the par value of the portfolio can decline before the tranche is impacted and incurs a principal loss.
- Senior debt obligations (AAA-BBB) have higher subordination
- Mezz debt obligations (BB-B) are riskier, given lower subordination
- Excess spread flows through a waterfall according to set priority of payments
- Losses reduce the collateral balance and excess spread amount, and possibly redirect cashflow towards senior classes

Source: J.P. Morgan

Sample CLO Portfolio Constraints

Portfolio Constraints

- In making investment decisions for the asset portfolio, the collateral manager is required to obey certain criteria to protect the structure (the “**Collateral Quality Tests**”) used in the rating of the CLO’s liabilities, including, without limitation:
 - Credit quality tests (governs credit quality of the assets using the assets’ rating agency assigned ratings)
 - Diversification tests (governs the diversification of the portfolio using industry and obligor concentrations)
 - Minimum weighted average spread test
 - Weighted average recovery rate test
 - Maximum weighted average life test
- The collateral manager is also required to adhere to certain rules governing concentration to protect the structure (the “**Concentration Limitations**”) including, without limitation:
 - Minimum % 1st lien senior secured loans
 - Maximum % single obligor
 - Maximum % CCC-rated
 - Maximum % covenant lite

CLO cash flow mechanics

Calculation of the over-collateralization (O/C) and interest coverage (I/C) tests

- CLOs benefit from structural protection (O/C, I/C tests) that are calculated monthly/quarterly
- In the event of defaults or losses from sales, par value and interest payments decline, triggering one or both of the O/C and I/C

Over-Collateralization test (O/C)

$$\text{Asset par} = \frac{\text{Asset par}}{\text{CLO tranche par}}$$

Asset par value includes

- Performing assets at par
- CCC or lower rated assets at pre-determined haircuts
- Defaulted assets at recovery rates or market value

CLO Tranche Par

- Current par amount of outstanding principal for the respective CLO tranche and all tranches above it in seniority
- Ensures the par value of the underlying collateral exceeds the par value of the CLO debt tranches. If the ratio declines below the OC test trigger value, cashflows are diverted to pay down senior debt tranche investors.

Source: J.P. Morgan

Interest Coverage test (I/C)

$$\text{Asset interest} = \frac{\text{Asset interest}}{\text{CLO tranche interest}}$$

Asset interest

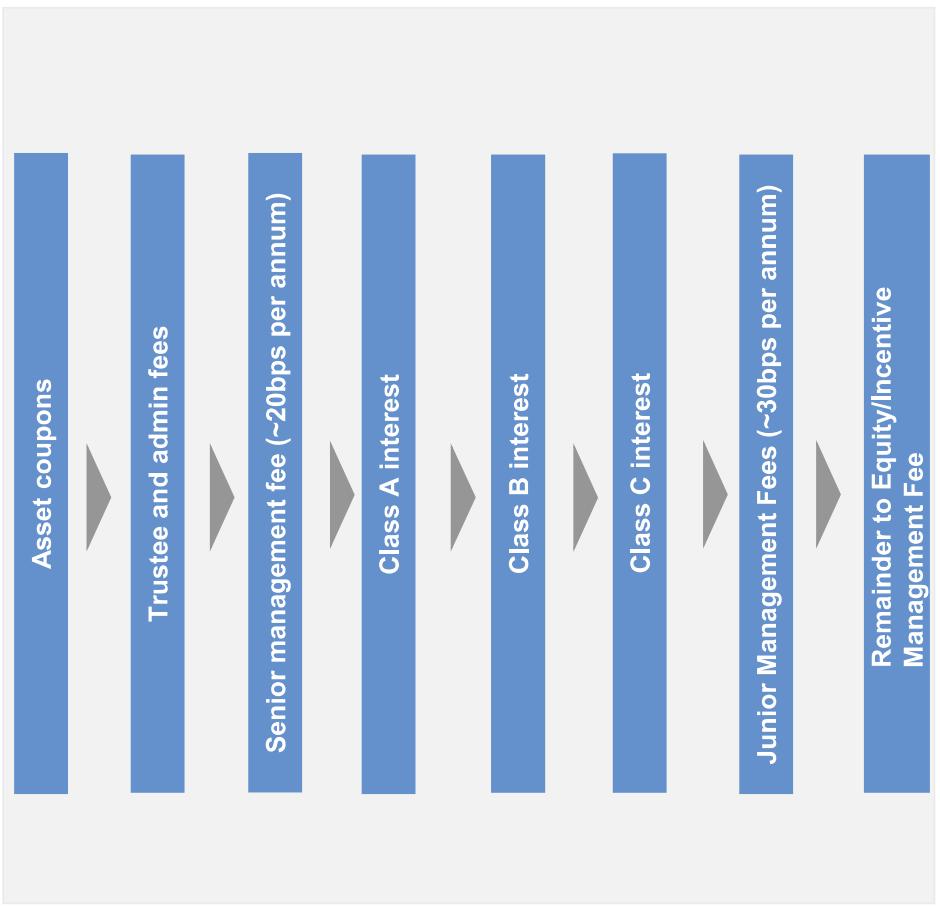
- Sum of interest payments received from the collateral portfolio
- **CLO tranche interest**

- Required interest payments due to the respective CLO tranche and all tranches above it in seniority
- Ensures the amount of cash collected from the underlying collateral can be used to pay CLO tranche interest. If collateral collections fall below the IC test trigger value, cashflows are diverted to pay down senior debt tranche investors.

CLO cash flow mechanics

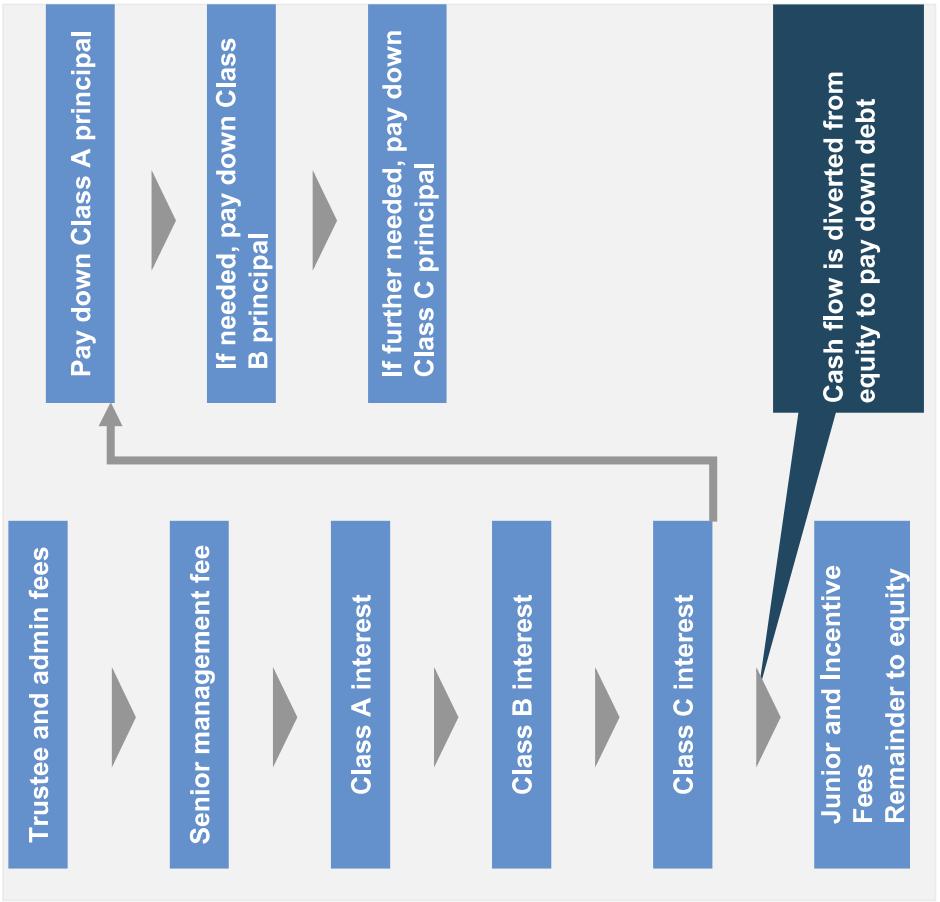
- O/C or I/C test fails: interest that would have flowed to subordinate or equity tranches is instead used to pay down principal of the AAA tranche, until test compliance is restored

Cashflow CLO in compliance



Source: J.P. Morgan

Cashflow CLO in non-compliance

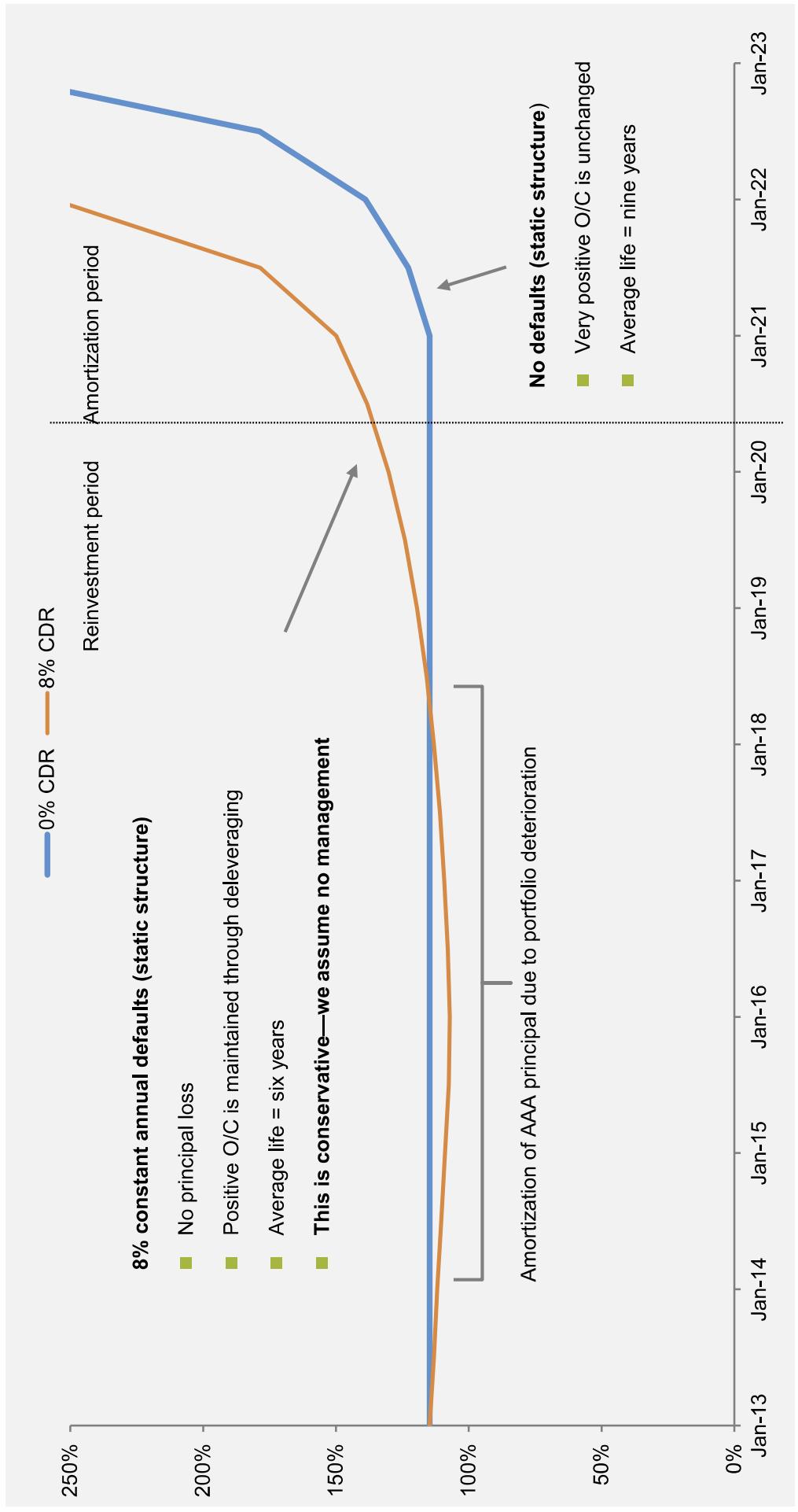


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Early amortization (“self correction”) protects debt tranches

CLO Example: Forecasted AAA tranche O/C ratio for 0% and 8% constant annual default rates



Source: J.P. Morgan, INTEX. Assumes 30% constant annual prepayment rate, 70% realized recovery upon default with 12 month lag

Measuring CLO Arbitrage: The Basics

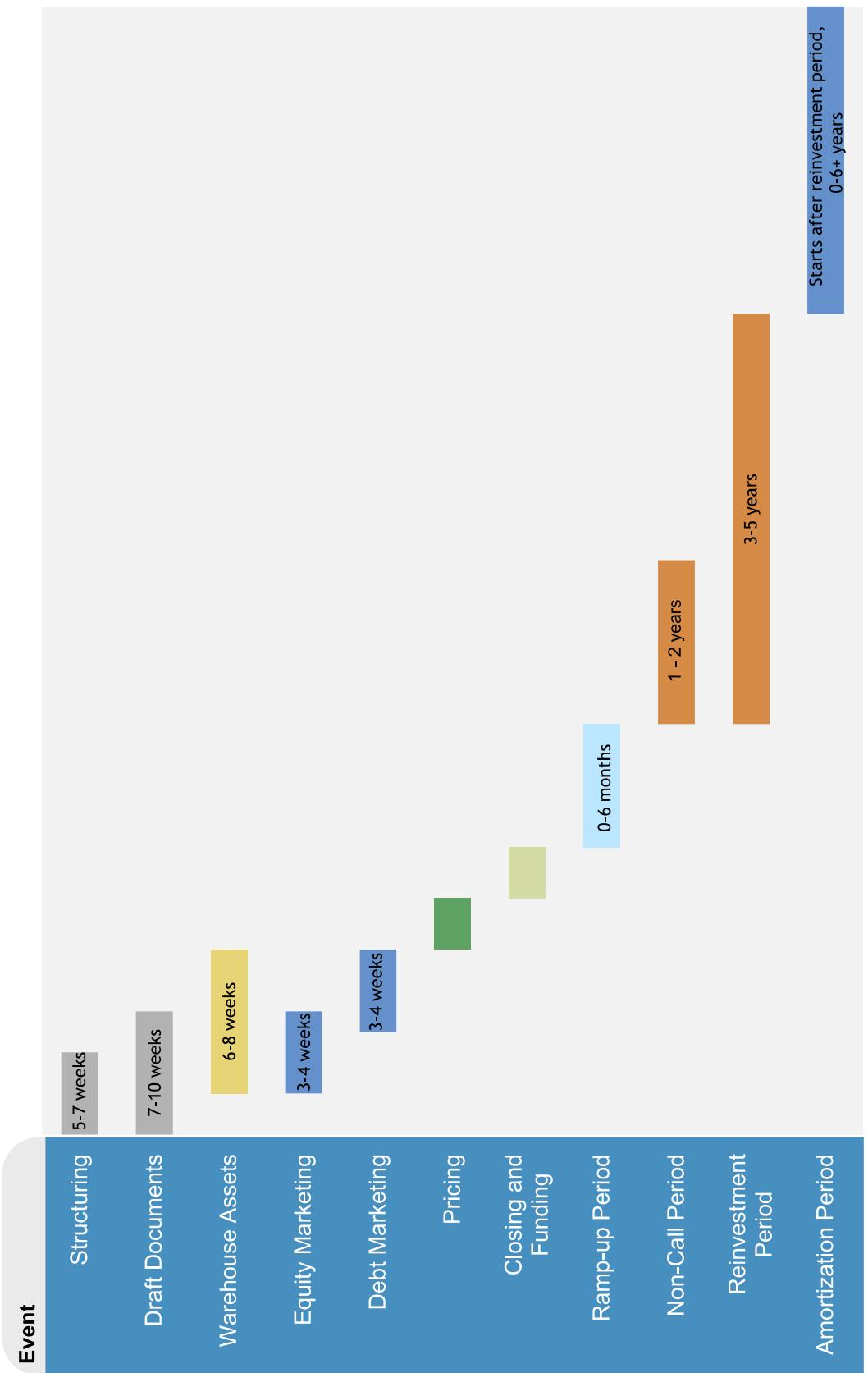
- Investors in different parts of the capital structure have different risk/return expectations
- For a generic US arbitrage High Yield Loan CLO, the equity return would be as follows:

Indicative CLO Equity Return Calculation	
Spread to SOFR	370 bps
Costs	
Credit Losses	(50 bps)
Fees and expenses	(45 bps)
Debt financing	(207 bps)
Total	302 bps
Excess Spread	68 bps
Leverage Factor:	10x
Expected Spread Return:	6.8%
SOFR return:	5.4%
Expected Equity Return:	12.2%

Source: J.P. Morgan

Indicative CLO Capital Structure	
	Tranche
Spread to 3m Term SOFR (bp)	
AAA	62%
AA	13%
A	7%
BBB	6%
BB	2%
Equity	10%
	100%
	230

CLO Timeline



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CLO Timeline (Continued)

CLO Lifecycle

- **Draft Documents:** Investors will generally receive a preliminary offering circular or memorandum (OC/OM) prior to deal pricing, with a summary of key terms.
 - **Offering Circular/Memorandum:** detailed summary of terms of the offering; provides summary for key terms of the Indenture and Management agreement, as well as an overview of the Portfolio Manager, Issuer and other factors/terms of the transaction. A traditional OC includes a summary of the collateral management agreement (CMA) whereas a short form OC presents the CMA separately.
 - **Indenture:** Legal document between the issuer and the trustee that governs the terms of notes (notional, maturity, coupon), priority of payments, collateral quality tests, concentration limitations, investment/reinvestment provisions, events of default (EODs) and remedies, rights/responsibilities of trustee.
 - **Warehousing Period:** CLO manager opens a warehouse (line of credit) with an arranger/underwriter to ramp up the CLO portfolio by acquiring assets in the primary and secondary loan markets.
 - **Pricing Date:** Date upon which the CLO debt and equity tranches are priced in the market.
 - **Closing Date:** Date upon which the CLO legally exists, interest on the notes begins to accrue, warehoused assets are transferred to an SPV.
 - **Ramp Up Period:** Following the Closing date, the remainder of the CLO portfolio is acquired by the manager using the CLO issuance proceeds. Once fully acquired, the CLO goes effective and enters the non-call/reinvestment period.
 - **Effective Date:** First date on which the collateral manager certifies that Target Initial par has been satisfied.
 - **Non-Call Period (~1-3 years):** The CLO cannot be redeemed by the equity holders until the end of the non-call period. Afterwards, the deal may be called either in full with repayment of the debt at par, by a full/partial refinance, a reset, or reissue.
 - **Reinvestment Period (~3-5 years):** During the reinvestment period, the manager may reinvest all principal proceeds received from asset sales, scheduled redemptions, and prepayments subject to compliance with investment guidelines and coverage tests. Throughout the reinvestment period, the manager has the right to execute credit risk and credit improved sales.
 - **Amortization/Post-Reinvestment Period (0-6+ years):** After the reinvestment period, principal is used to pay down debt in sequential priority. The amortization process is largely driven by prepayment rates. The transaction may pay down early (anytime after the non-call period) due to an equity call or via deleveraging in a poor performance environment.

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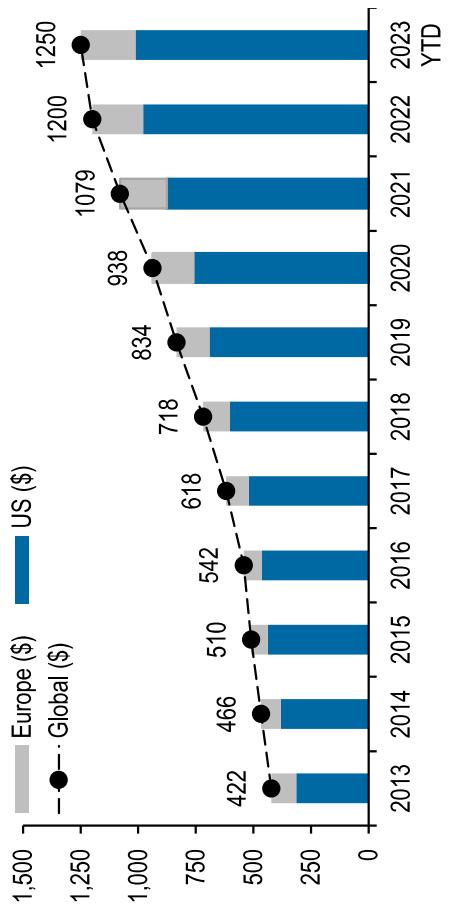
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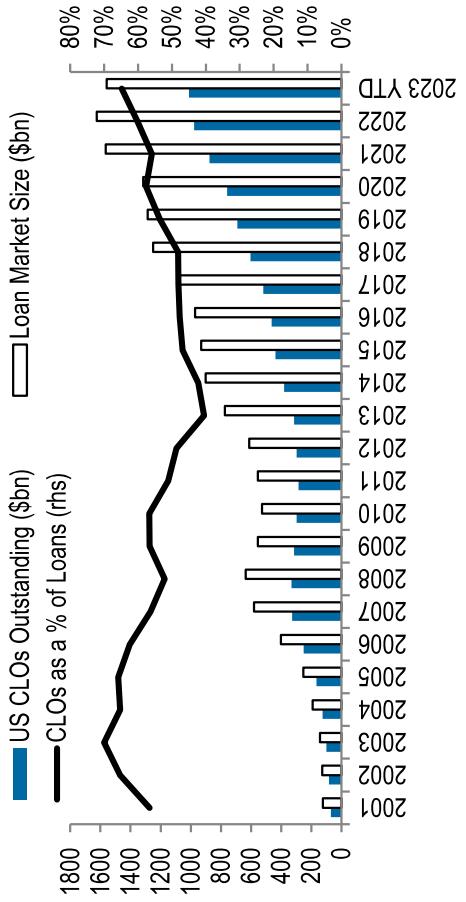
The \$1+ Trillion CLO Market

Global CLO market size reached \$1 trillion in July 2021



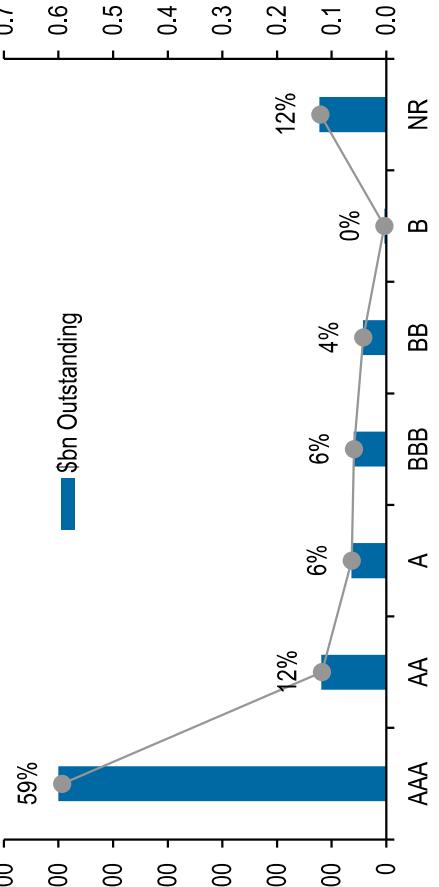
Source: J.P. Morgan, Bloomberg Finance, L.P. As of August 30th, 2023. Based on exchange rate on day of data update.

US CLO Market Size is ~66% of Leveraged Loan Market



Source: J.P. Morgan, Bloomberg Finance, L.P. As of August 30th, 2023.

US CLO Outstanding by Rating



Source: J.P. Morgan, Bloomberg Finance, L.P. As of August 30th, 2023.

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CLOs offer an efficient method of credit risk diversification

CLO portfolios are diversified across ~21 sectors

- CLOs invest in a pool of leveraged loans that are diversified across ~21 sectors, the largest being Technology, Healthcare, and Services. There is a diversity score test to ensure that the underlying collateral is diversified across holdings.

Industry	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2013-2023 Vintage
AUTOMOTIVE	2.4%	2.5%	2.5%	2.7%	2.4%	2.5%	2.9%	3.0%	2.9%	2.8%	2.9%	2.7%
BROADCASTING	2.6%	2.4%	2.1%	2.0%	2.4%	2.1%	1.9%	1.6%	1.4%	1.4%	1.4%	1.9%
CABLE AND SATELLITE	4.1%	4.1%	4.0%	3.7%	4.3%	3.5%	3.3%	3.3%	2.7%	2.6%	2.8%	3.3%
CHEMICALS	3.6%	3.5%	3.9%	3.8%	3.4%	3.6%	3.7%	3.7%	3.8%	4.0%	3.9%	3.7%
CONSUMER PRODUCTS	2.4%	2.7%	2.3%	2.6%	2.5%	2.5%	2.5%	2.6%	2.5%	2.5%	2.5%	2.5%
DIVERSIFIED MEDIA	3.4%	3.6%	3.2%	3.4%	3.2%	3.4%	3.4%	3.5%	3.4%	3.7%	3.4%	3.5%
ENERGY	2.1%	2.3%	2.2%	2.3%	1.9%	2.2%	2.2%	2.3%	2.0%	2.0%	2.1%	2.1%
FINANCIAL	9.8%	8.5%	8.7%	8.5%	8.9%	8.8%	8.6%	8.6%	8.6%	8.7%	8.9%	8.7%
FOOD AND BEVERAGES	3.7%	3.6%	3.8%	3.5%	3.7%	3.7%	3.8%	4.0%	3.8%	4.0%	4.3%	3.8%
GAMING LODGING AND LEISURE	4.4%	4.8%	4.5%	4.9%	4.9%	5.0%	5.1%	4.7%	4.6%	4.6%	4.9%	4.8%
HEALTHCARE	11.8%	11.5%	11.5%	11.3%	12.3%	11.6%	11.6%	11.8%	12.0%	11.7%	10.5%	11.7%
HOUSING	3.3%	3.5%	3.5%	3.5%	3.4%	3.7%	3.8%	3.9%	4.0%	4.1%	4.1%	3.8%
INDUSTRIALS	4.7%	4.9%	5.3%	5.2%	4.7%	4.9%	5.2%	5.1%	5.1%	5.1%	5.2%	5.1%
METALS AND MINING	0.6%	0.6%	0.7%	0.7%	0.5%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%
PAPER AND PACKAGING	3.1%	3.1%	3.3%	3.3%	3.1%	3.3%	3.4%	3.7%	3.7%	3.9%	3.9%	3.5%
RETAIL	2.9%	2.9%	2.8%	2.7%	2.9%	2.9%	2.7%	2.8%	2.8%	2.6%	2.8%	2.8%
SERVICES	9.9%	9.8%	9.7%	10.0%	9.7%	10.2%	10.2%	10.2%	10.6%	11.0%	11.2%	10.3%
TECHNOLOGY	15.7%	15.8%	16.3%	16.2%	16.1%	16.5%	16.3%	16.8%	17.4%	17.0%	16.3%	16.6%
TELECOMMUNICATIONS	3.5%	3.3%	3.5%	3.5%	3.3%	3.1%	2.9%	3.0%	2.7%	2.7%	2.6%	3.0%
TRANSPORTATION	2.9%	3.2%	3.0%	3.0%	2.9%	2.9%	2.9%	2.9%	2.7%	2.9%	3.1%	2.9%
UTILITY	3.3%	3.3%	3.1%	3.1%	3.3%	2.9%	2.9%	2.8%	2.4%	2.2%	2.1%	2.6%

Source: J.P. Morgan, INTEX. As of September 1st, 2023.

There is an active secondary market and liquidity in CLOs (continued)

US CLO BWIC volumes as a % of market size (\$bn)

Year	IG	Non-IG	EQ	Total	CLO Market Size (end of yr)	BWIC Volumes/Market size
2011	13.21	1.44	1.86	16.31	284	5.7%
2012	17.30	1.20	2.59	21.09	298	7.1%
2013	18.29	3.37	2.94	24.60	314	7.8%
2014	15.69	3.39	3.26	22.33	381	5.9%
2015	25.55	4.62	3.77	33.94	438	7.8%
2016	18.50	6.23	2.96	27.68	464	6.0%
2017	9.56	6.02	2.43	18.01	519	3.5%
2018	20.12	4.74	2.66	27.52	603	4.6%
2019	26.81	6.16	2.66	35.63	691	5.2%
2020	39.55	9.15	2.19	50.90	760	6.7%
2021	23.86	7.15	4.05	35.06	875	4.0%
2022	50.36	7.07	3.82	61.25	979	6.3%
2023	29.42	3.99	2.90	36.31	1011	3.6%

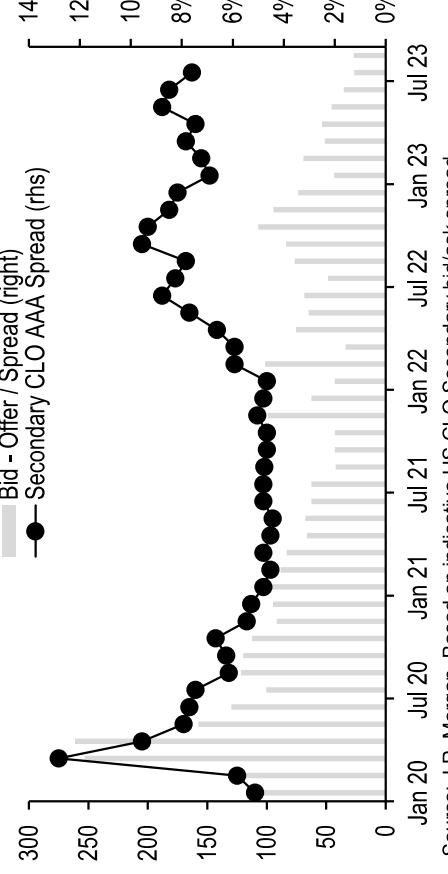
Source: J.P. Morgan. As of September 6th, 2023.

EUR CLO BWIC volumes as a % of market size (€bn)

Year	IG	Non-IG	EQ	Total	CLO Market size (€bn)	BWIC Volumes/Market size
2011						
2012						
2013						
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						

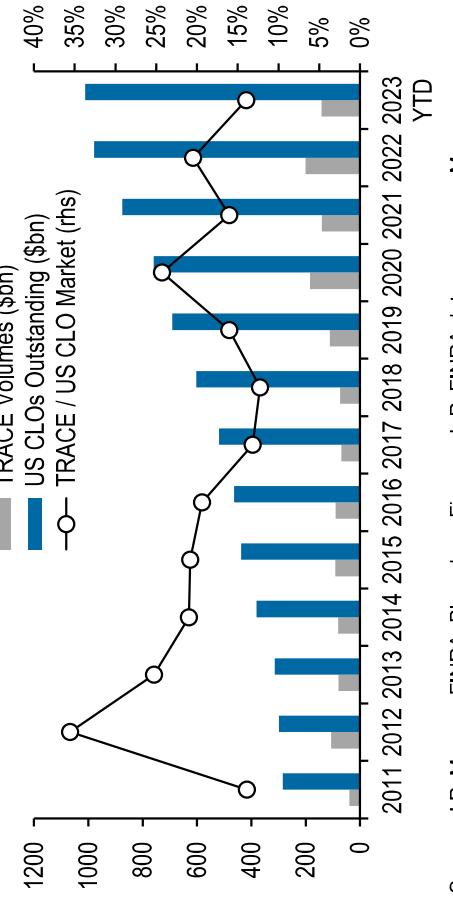
Source: J.P. Morgan. As of September 6th, 2023.

Monthly Historical US CLO AAA Bid/Ask Spread



Source: J.P. Morgan. Based on indicative US CLO Secondary bid/ask spread.

TRACE Trading Volumes as a % of market size



Source: J.P. Morgan, FINRA, Bloomberg Finance, L.P. FINRA data commence May 16th, 2011.

There is an active secondary market and liquidity in CLOs

Secondary Market

- **Secondary CLO market:** After pricing in the primary market, CLO tranches can be bought/sold by investors in the secondary market (generally through a BWIC process).
- **TRACE Volume:** captures all FINRA-reported US CDO activity (combining CBOs, CDOs, and CLOs) and the data is broken out by IG and non-IG, with data going back to May 16, 2011. As of August 2023, US CDO TRACE volume totals \$146bn compared to \$200bn in 2022FY.
- **BWIC:** Bid-Wanted-In-Competition, an auction process used to identify the best market price available. By rating, the majority of BWIC volumes are concentrated in CLO AAA (>50% of activity in 2023 YTD). Unlike TRACE data (actual trades), BWIC data represents bonds that were up for bid/did not necessarily all trade.
- **DNT:** Did-Not-Trade, a bond that was not able to trade in the secondary market

Assessing Liquidity

- The secondary market differs from the primary market in that CLO tranches are traded rather than created
- Assessing liquidity considers sale-ability, transaction costs, price impact, and the capacity of the market to observe risk
- What are the key differences between secondary and primary markets?
 - Investors can buy and sell in a shorter period of time, ensuring some flexibility to take advantage of loan price volatility and possibly make trading gains
 - Investors are not involved in the documentation process
 - Investors can access existing vintages or CLO managers if primary is slow/shut down or only offering select managers

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Collateral Performance Analytics

US CLO Manager Analytics

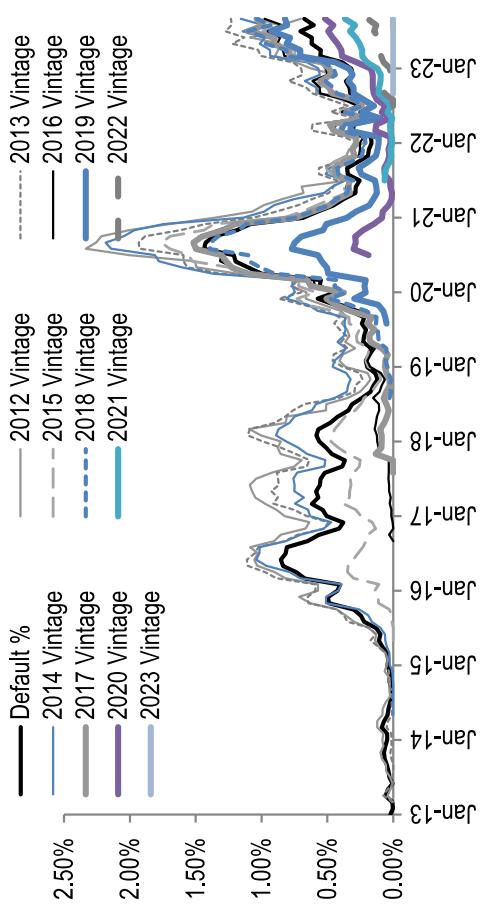
	Average by Original Deal Vintage												
	Average	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Moody's Caa1 or less (%)	4.14	4.55	4.91	5.22	4.77	5.20	5.27	5.18	4.50	3.94	3.82	2.66	0.96
S&P CCC+ or less (%)	5.95	6.93	6.69	6.83	7.21	6.99	7.24	6.92	6.55	5.72	5.69	4.48	2.03
Defaults	0.67%	0.70%	1.23%	1.16%	1.03%	0.98%	1.05%	1.04%	0.82%	0.51%	0.37%	0.19%	0.01%
WAS (%)	3.67	3.50	3.60	3.57	3.58	3.65	3.54	3.63	3.68	3.67	3.70	3.76	3.77
WARF	2849	2866	2948	2912	2920	2903	2885	2922	2842	2814	2824	2781	2693
Diversity Score	81.62	87.11	79.01	81.94	80.75	82.83	81.76	83.18	84.07	82.29	81.27	79.25	76.74
WAL	4.24	4.03	3.86	3.88	3.99	4.15	3.84	4.06	4.24	4.32	4.41	4.53	4.59
JR BB/B OC Cushion	3.60	1.59	1.58	1.20	2.05	2.48	2.21	1.93	3.67	4.83	4.88	4.91	5.24

Source: J.P. Morgan, INTEX. See J.P. Morgan US CLO Manager Analysis. As of September 15th, 2023.

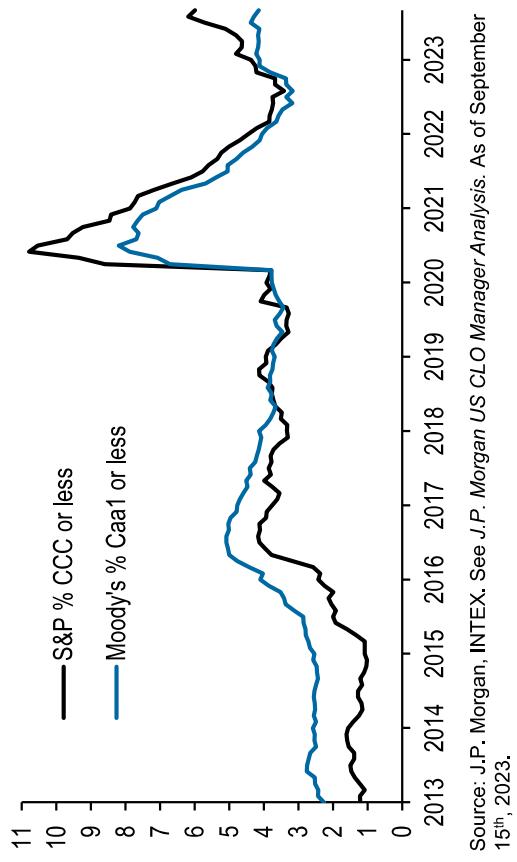
- **Moody's Caa1 or less/S&P CCC+ or less:** Measures exposure to Caa1 or CCC (or lower) rated loans (there are tests from both Moody's and S&P and some deals may report data for either one or both). The CCC test becomes important for overcollateralization tests that could trigger equity cashflow diversion as assets held in excess of the CCC limit (typically 7.5%) will be haircut at market value
- **Defaults:** Measures current exposure to defaulted assets in US CLO portfolios. Based on current collateral that is marked as defaulted
- **WAS (Weighted Average Spread):** Represents average spread of entire asset pool (par-weighted)
- **WARF (Weighted Average Rating Factor):** Credit rating of portfolio; a non linear scale from 1 (AAA) to 10,000 (Ca). It is a weighted average of the rating factor values of the portfolio
- **Diversity Score:** Measures sector and obligor diversification; higher number implies more diversity
- **WAL (Weighted Average Life):** Par-weighted average of the life of the assets in the CLO portfolio
- **Average Junior Most (BB or B) OC Cushion:** Difference between the actual OC level and OC test limit (based on most junior).
- Metrics such as these, among others, will have test limits. If a CLO is failing any collateral quality tests, a manager must maintain or improve in any further tests

Defaults and Downgrades

Average Default % Exposure by Vintage



Moody's and S&P average % exposure in 2.0 US CLOs



- Exposure to defaulted assets in US CLO portfolios was 0.67% as of September 2023 which compares to the peak of 1.44% in August 2020
- Moody's Caa1 or less exposure was 4.14% in September 2023 compared to the peak of 8.20% in July 2020
- S&P CCC+ or less exposure was 5.95% in September 2023 compared to the peak of 10.79% in June 2020

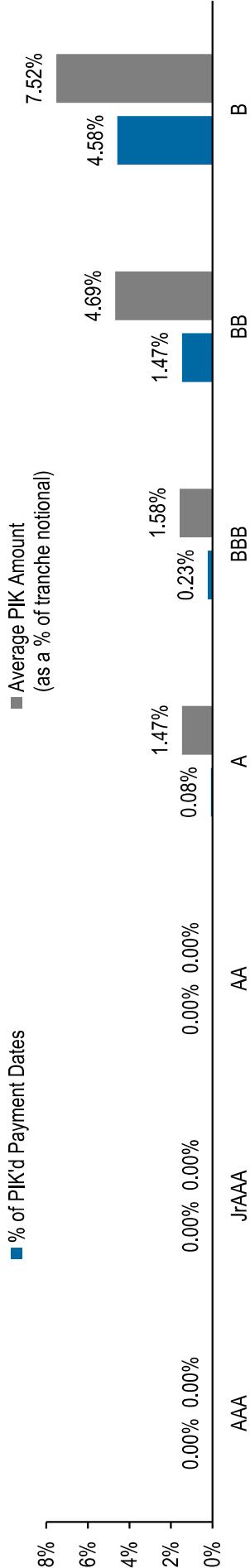
CLO PIK (Payment-in-Kind) Analysis

- PIK (Payment-in-Kind): This is a structural feature which allows an issuer to defer paying current interest due and instead issue additional par amounts, increasing the tranche principal balance. It occurs when cash flow is not available to pay current interest due.
- Not all CLO tranches have the option to PIK, but commonly Single-B, BB, BBB, and sometimes Single-A are able to.

Historical US CLO BSL 2.0 Debt Tranche PIK Summary

Original Rating	Cusip Count	PIK'd Cusip Count	% of PIK'd Cusips	Payment Date Count	% of PIK'd Payment Dates	Average PIK Amount (as a % of tranche notional)	Average PIK Length (Quarters)	Maximum PIK %
AAA	5,011	0	0.0%	45,022	0.00%	0.00%	NULL	0.00%
JrAAA	595	0	0.0%	6,100	0.00%	0.00%	NULL	0.00%
AA	4,111	0	0.0%	40,327	0.00%	0.00%	NULL	0.00%
A	3,481	12	0.3%	35,657	0.08%	1.47%	2.42	3.62%
BBB	3,209	35	1.1%	34,335	0.23%	1.58%	2.23	4.40%
BB	2,924	110	3.8%	34,107	1.47%	4.69%	4.55	29.81%
B	752	120	16.0%	11,163	4.58%	7.52%	4.26	35.83%
Total	20,083	277	1.4%	206,711	0.54%	5.68%	4.04	35.83%
A, BBB, BB, B	10,366	277	2.7%	115,262	0.97%	5.68%	4.04	35.83%

% of PIK'd payments since 2010 and Average PIK Amount



Source for all charts: J.P. Morgan, INTEX. Based on 24,709 CUSIPs from 2,257 US BSL CLOs that have made at least one payment in 2023 as of June 2023. PIK is determined if Accum Int Shortfall is >0.

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Certain Investor Considerations for CLO Investments

Combination of Qualitative and Quantitative Considerations

- The rationale to invest in CLOs includes spread or yield pick-up, call upside, access to a senior secured asset class, structural benefits and others including outsourcing management

■ Capital Structure and Basic Terms

- Equity: leverage, callability
- Debt: tranche ratings, subordination, fixed/floating
- Relative value

■ Collateral

- Quality and profile
- Default probability, correlation (diversity) and severity (recovery)

■ Manager

- Investment philosophy and strategy
- Past performance: defaults, workouts, and trading gains/losses
- Expertise relative to expected collateral and form (cash, synthetic)
- Credit analysts and process
- Asset sourcing capabilities
- Depth of staffing and key man risk
- Debt vs. equity focus
- Operations and technology infrastructure, accessibility

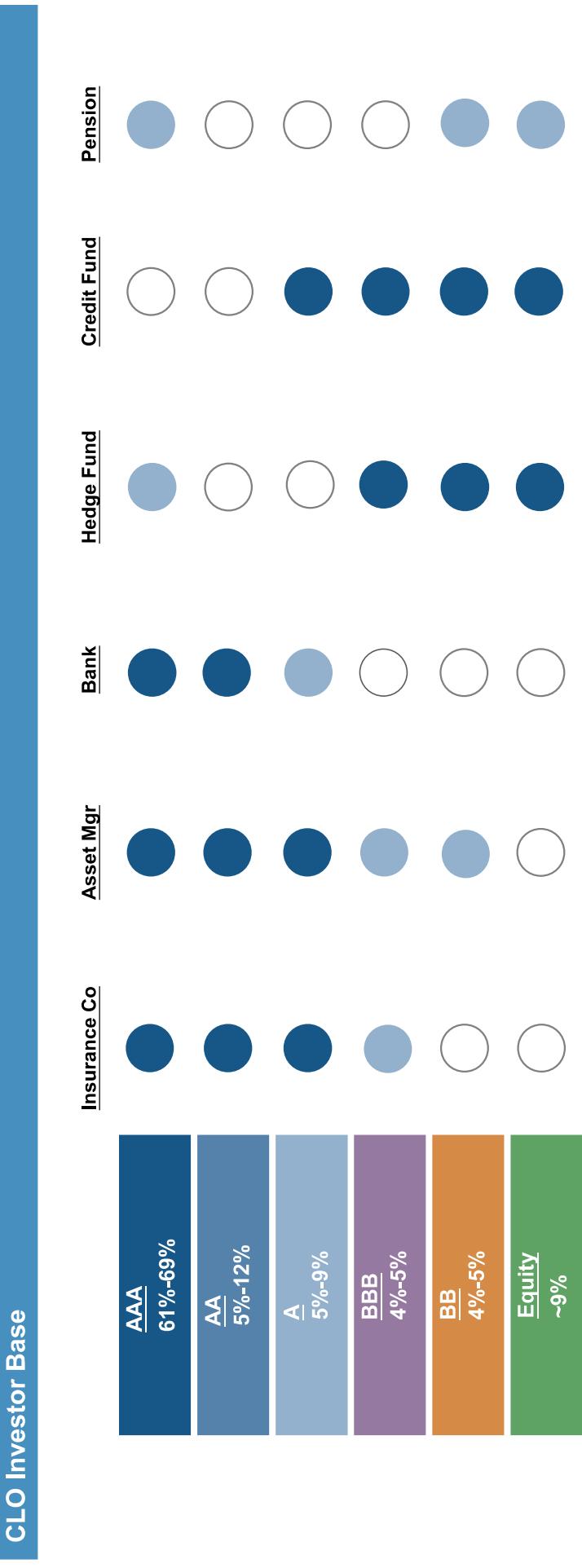
■ Analytics

- Equity IRRs stressing defaults (probability, timing and severity)
- Debt break-even
- Timing of cashflows
- Expected collateral spread performance

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Primary Focus – Types of Investors



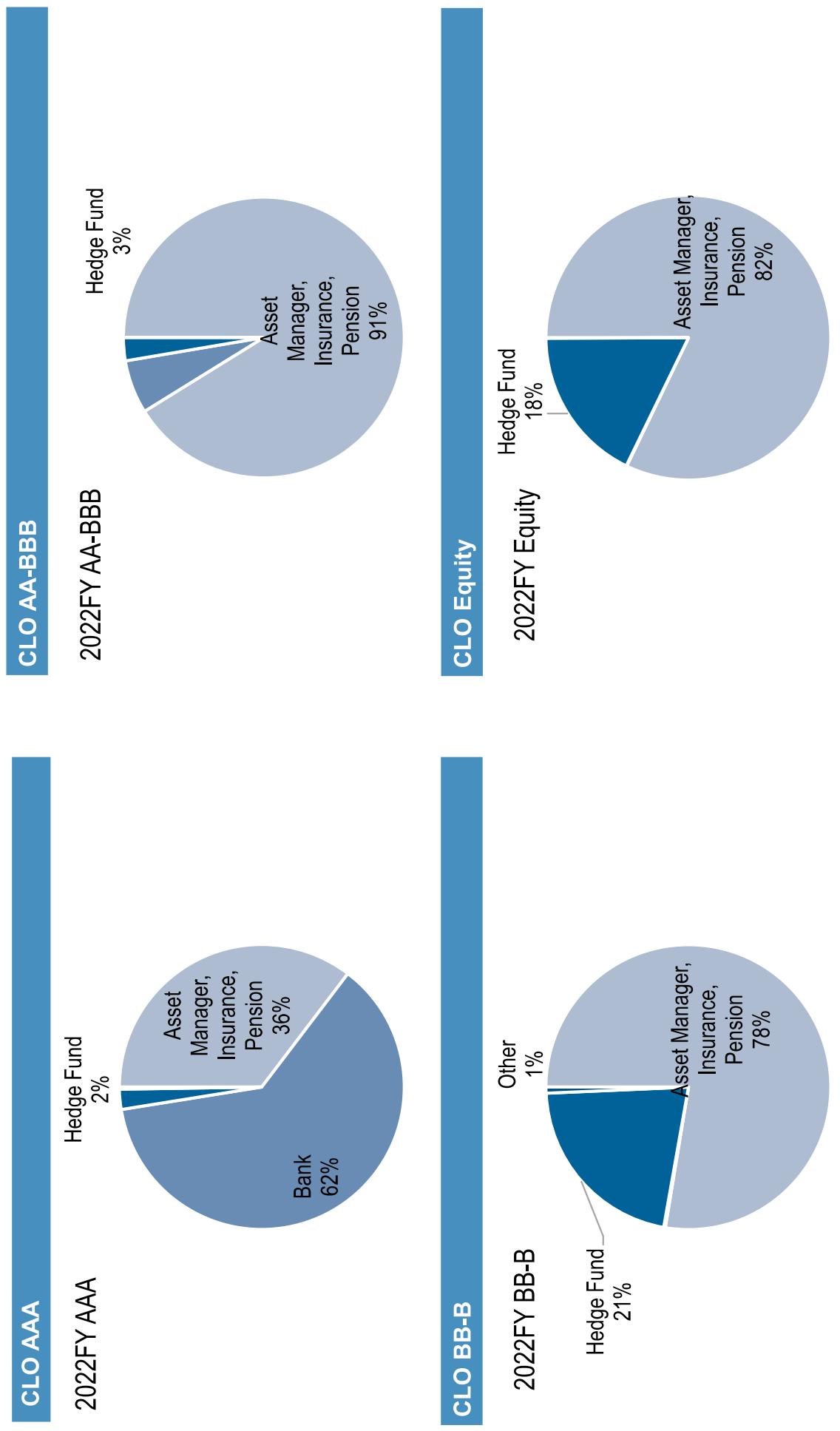
Source: J.P. Morgan

- Regulated buyers (banks & insurance companies) dominate the investor base for investment grade tranches of CLOs
- CLOs may offer an attractive return on capital for investors required to hold regulatory capital against their positions
- Junior mezzanine (BBB & BB) tranches typically attract money managers, credit funds and hedge funds who are attracted to wider absolute returns and price convexity
- CLO equity investors are typically total return investors, including hedge funds, pensions and family offices attracted to high returns in low-default scenarios

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The US CLO Investor Base



Source for all charts: J.P. Morgan. Based on 2022FY.

Rating methodology basics

- Most CLO tranches are rated by at least two, perhaps three, of Moody's, Standard & Poor's, and Fitch
- Rating agencies examine portfolio characteristics, structural parameters, legal documentation, and the CLO manager's track record and operational experience
- Rating process is to:
 - Model the portfolio
 - Generate default distributions
 - Run cashflow scenarios based off default assumptions and other factors (interest rates, default timing, etc.)
 - Quantify tranche risk

CLOs also offer portfolio diversification. Negative correlation to UST becomes more useful as rates start to rise

Cross asset class 3-year correlation

Index	5Y Tsy	10Y Tsy	JPM MBS Bond	JULI HG	JPM HY	S&P 500	JPM EMBI	Gold	US Inflation	JPM LevLoans	CLOIE AAA	CLOIE AA	CLOIE BBB	CLOIE BB	CLOIE B
5Y Tsy															
10Y Tsy	97%														
JPM MBS Bond	65%	68%													
JULI HG	63%	65%	93%												
JPM HY	36%	34%	72%	77%											
S&P 500	27%	28%	58%	67%	83%										
JPM EMBI	47%	49%	78%	89%	81%	78%									
Gold	48%	47%	37%	38%	19%	15%	35%								
US Inflation	-5%	-4%	-21%	-21%	-40%	-4%	-31%	-2%							
JPM LevLoans	34%	35%	47%	55%	72%	54%	63%	20%	-60%						
CLOIE AAA	40%	38%	51%	58%	55%	45%	66%	27%	-56%	84%					
CLOIE AA	37%	38%	39%	47%	41%	34%	54%	24%	-51%	84%	93%				
CLOIE A	41%	39%	44%	51%	45%	41%	57%	26%	-47%	82%	95%	96%			
CLOIE BBB	43%	43%	49%	55%	52%	44%	63%	31%	-52%	86%	91%	94%	94%		
CLOIE BB	40%	40%	45%	54%	51%	45%	59%	22%	-45%	85%	80%	87%	87%	93%	
CLOIE B	25%	26%	38%	40%	50%	41%	49%	20%	-41%	73%	61%	68%	70%	79%	79%

Source: J.P. Morgan, Bloomberg Finance L.P. As of August 31st, 2023. CLOs based on Post-Crisis CLOIE Index.

CLO debt offered attractive risk-adjusted returns versus other asset classes

- CLOs are floating-rate securities, offering income protection in a rising rate environment
- CLOs have been one of the least correlated instruments to 5yr and 10yr US Treasuries
- In the past three years the least correlated measured assets to 10yr UST were US Inflation (-4%), CLOIE single-B (26%), and S&P 500 (28%).

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The New Issue CLO Structure

Capital Structure and Certain Terms Comparison

2006-2007 Vintage	TODAY		TODAY	
	Deal Term/Feature	1.0 CLOs	2.0 CLOs	3.0 CLOs
AAA	AAA 61%-65%	AAA 4%-9%	Post-Volcker Rule	Transition to SOFR
AA	AA 5%-9%	After the onset of the GFC		
A	A 5%-9%			
BBB	BBB 3%-6%	20-25%	35-40%	35-40%
BB	BB 2%-5%	LIBOR + 22-25 bp	LIBOR + low-mid 100s bp	SOFR + mid-high 100s bp
BB	BB 2%-5%	LIBOR + 22-25 bp	LIBOR + low-mid 100s bp	SOFR + mid-high 100s bp
BB	BB 2%-5%	LIBOR + 22-25 bp	LIBOR + low-mid 100s bp	SOFR + mid-high 100s bp
BB	BB 2%-5%	LIBOR + 22-25 bp	LIBOR + low-mid 100s bp	SOFR + mid-high 100s bp
Equity	Equity 8%-13%			
Equity	Equity 7%-8%			
Reinvestment period	5-7 years	3-4 years	4-5 years	4-5 years
Non-call period	3 years	2 years	1-2 years	1-2 years
Min. 1 st lien assets	80-85%	90%+	90%+	90%+
Max non-1 st lien assets	10-20%	<10%	<10%	<10%
Caa/CCC assets	10-15%	<7.5%	<7.5%	<7.5%
High Yield Bonds	10-20%	0-10%	0% (Volcker Rule)	0-10%
Structured products	3-5%	0%	0%	0%

Note: The above hypothetical transaction is provided for discussion purposes only

Key changes between 1.0 and 2.0

- Leverage
 - 8-12x leverage vs 10-13x in 2006-2007 vintage transactions
 - Additional subordination to "AAA"
- Reinvestment Period
 - 3-5 years vs 5-7 years in 2006-2007 vintage transactions
- Portfolio Construction
 - Focus on liquid, broadly syndicated, first lien, senior secured loans
 - No structured product/HY Bond exposure, Post-Volcker

Source: J.P. Morgan. 2.0 represents deals after the onset of the GFC. 3.0 includes Post-Volcker vintages which was then relaxed in 2020. Today summarizes recent years and the transition to SOFR.

CLO Refinancings/Resets/Re-issues

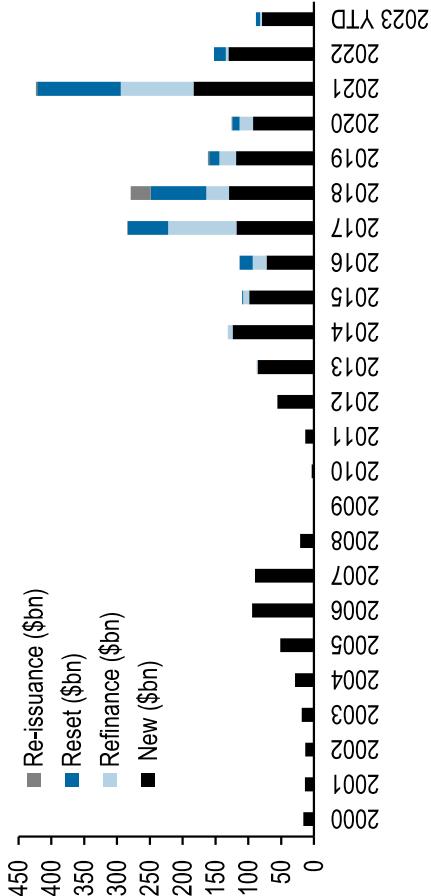
Refinance, Reset, and Reissues

- After the non-call period ends, a CLO may be redeemed through a refinancing, reset, or reissue. Investors have the option to roll or will be called out at par notional.
- **Refinancing:** Issuance of new CLO liabilities (typically at a lower coupon) to pay off existing notes. Refinancings are typically called by either a majority or supermajority of a CLO's equity holders. A refi can be part of the structure or the full capital structure, and any called tranche must be refinanced at par. The main motivation is to reduce the weighted average liability cost.
- **Reset:** Lengthening the deal by extending the reinvestment period and legal final maturity of the notes. A reset can be tougher to initiate, as it typically requires 100% of the equity holders. Many times a reset contains large-scaled documentation amendments.
- **Reissue:** Involves redeeming all the CLO liabilities and transferring that CLO's assets, along with the equity class, to a newly formed SPV. Similar to a refinancing or reset, the objective is to lower the cost of the liabilities.

What drives refinancing and reset activity?

- As CLO liability spreads (AAA through single-B) tighten, it becomes more favorable to refinance liabilities and improve equity economics
- Pickup in loan refinancings and repricings
- CLO documentation changes
- Extend the life of the deal (via a reset)

US CLO New Issue, Refi, Reset, and Reissue Supply



Source: J.P. Morgan. As of September 2023.

CLO Equity Fundamentals

CLO Equity: Term, Non-Mark-to-Market Leverage

- CLO equity offers an investor the opportunity to take levered exposure to a diversified portfolio of senior secured corporate loans
- CLO equity provides term and non-mark-to-market leverage
- **Term**
 - Unlike many vehicles that utilized short-term liabilities to fund the purchase of long-term assets, the liabilities of a CLO are maturity-matched to the assets, minimizing the risk that the vehicle will be unable to roll its liabilities
- **Non-Mark-to-Market**
 - When leveraged loan prices decline significantly, CLOs are not forced sellers of assets. Performing assets are held at par and haircuts are applied to excess CCC exposures, distressed assets purchases, and defaults.
 - CLOs seek to benefit from the manager's credit expertise, its ability to trade out of problem credits and its opportunity to take advantage of favorable market conditions
 - CLO managers generally have the discretion to sell distressed credits in order to avoid losses and have the ability to purchase assets in order to take advantage of relative value opportunities

Valuation Process

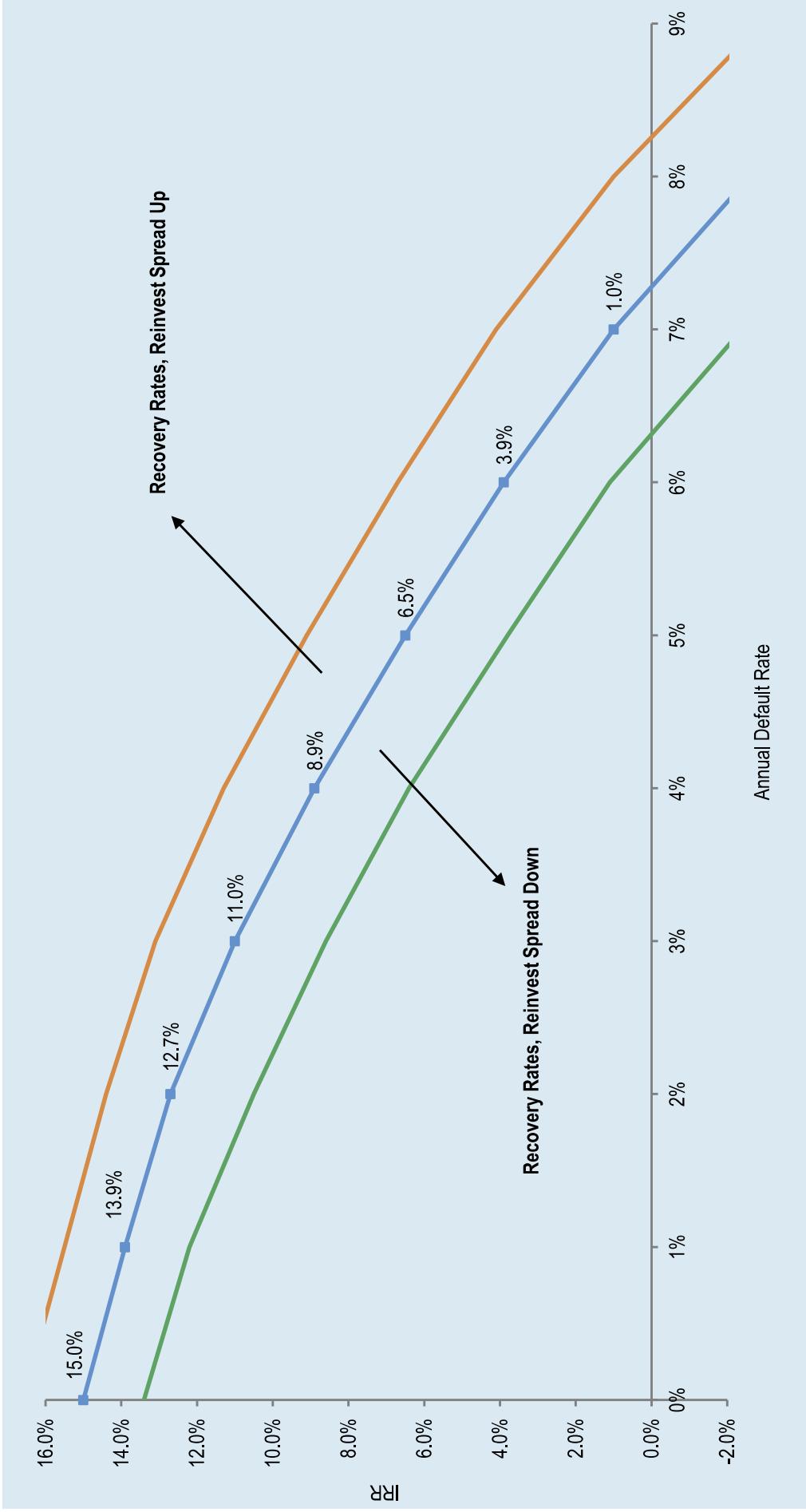
- A secondary market exists in CLO equity providing on-going price discovery
- Factors impacting CLO Equity valuations: length of reinvestment period, % of floors on the assets, flexibility regarding investments post re-investment, NAV, any call rights, reinvestment outlook, vintage, manager performance, funding costs, Libor/SOFR basis risk
- **Equity NAV (Net Asset Value):** (Collateral Market Value + Cash – Agg. notional of debt of debt tranches) / Equity balance
 - Percentage of the current equity balance that is covered by the collateral if it were to liquidate today at the existing market price

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Typical Equity Scenario Analysis

80% Recovery Rate (Leveraged Loan CLO)



Source: J.P. Morgan, INTEX.

US CLOs vs Euro CLOs

	US	Europe
Loan market size and population	\$1.56tn. CLOs ~65% with ~35% mostly retail funds, ETFs, other funds.	€283bn. CLOs ~70-80% with rest mostly SMAs (no ETFs, no retail funds due to UCITS regs)
CLO market origin & size	Late 1990s. ~\$1.01trn outstanding as of September 2023. CLOs hold more than half of US Loan Market.	2001. ~€219bn outstanding as of September 2023. CLOs hold more than half of the European Loan Market.
CLO manager population	About 177+ managers with at least 1 post-crisis deal.	About 63+ managers with at least 1 post-crisis deal.
CLO investor base	Large/small-cap Banks, Life Insurance, Asset Managers, Pension Funds, Hedge Funds, Endowments. Mix of domestic and foreigners.	Asset Managers, Pension Funds, Life Insurance, a few banks. Mostly EU-domiciled with some foreigners.
CLO Par Subordination	Average par sub is ~37% AAA, 25% AA, 19% single-A, 12% BBB, 8% BB, 5% single-B.	Average par sub is ~38% AAA, 29% AA, 23% single-A, 17% BBB, 11% BB, 8% single-B.
CLO equity leverage	Typically 10-12.5x at issue.	Typically 9.5-11x at issue.
CLO diversity (MDs)	Mid 60s to high 80s most common (Avg. 81.6 in 2.0 deals)	Mid 40s to high 60s most common (Avg. 57.15 in 2.0 deals)
Cov-lite loans	Prior peak was 28% in 2007. Has been in the 60-90% range since 2015.	30-40% range since late 2013, up from 29% in 14Q1 to ~80% in 18Q3
Collateral default rates	Loan par-weighted default rate excluding distressed exchanges is 2.24% (versus long-term average of 2.3% since 2010). Cycle peak was 14% in November 2009.	Dollar-weighted/issuer-weighted cycle peak was 10.54%/15.85% in November 2009.
Collateral recovery rates	Loan recovery rate for first-lien loans over the last 12 months is a record low at 39.7% compared to the 25-yr annual average of 64.3%.	Less information (largely private). Fitch disclosed 63% for first-lien in 2010 and for restructurings (loan amount rolled over) a lower average of 50%.
CLO ramp/loan spreads	JPM Loan Index Spread fwd-to-3yr at 529bp currently. Single-B loans (majority of CLO pools) are currently 502bp in the index with split BB/B (also in CLO pools) at 434bp.	JPM Euro Loan Index spread fwd-to-3yr at 535bp currently and the split BB/B index is at 352bp.

Source: J.P. Morgan, S&P LCD, Fitch. September 2023.

Regulation

- **SOFR/Libor Transition:** The ARRC announced a formal recommendation of Term SOFR for market participants to transition away from Libor by June 30th, 2023.
- **Volcker Rule:** On June 25th, 2020, US regulators announced the adoption of amendments to Section 13 of the Bank Holding Company Act (the “Volcker Rule”) that restricted banks from investing in covered funds. Specifically for CLOs, the amendment to the loan securitization exclusion began allowing up to 5% debt securities in portfolios starting October 1st, 2020.
- **Risk Retention Rule:** Requires a CLO manager to purchase and hold a minimum 5% of the credit risk of their managed CLOs. A 5% interest can be satisfied through retaining a vertical strip, a horizontal strip, or a combination. The rule has been eliminated in the US, but it remains a feature in European CLOs and for US CLO deals that are targeted for European investors.
- On February 9th, 2018, the U.S. Court of Appeals for the District of Columbia unanimously reversed a lower court decision and ruled in favor of the LSTA in its lawsuit, determining that CLO managers are not required to retain Dodd-Frank risk retention for Open Market Arbitrage CLOs.

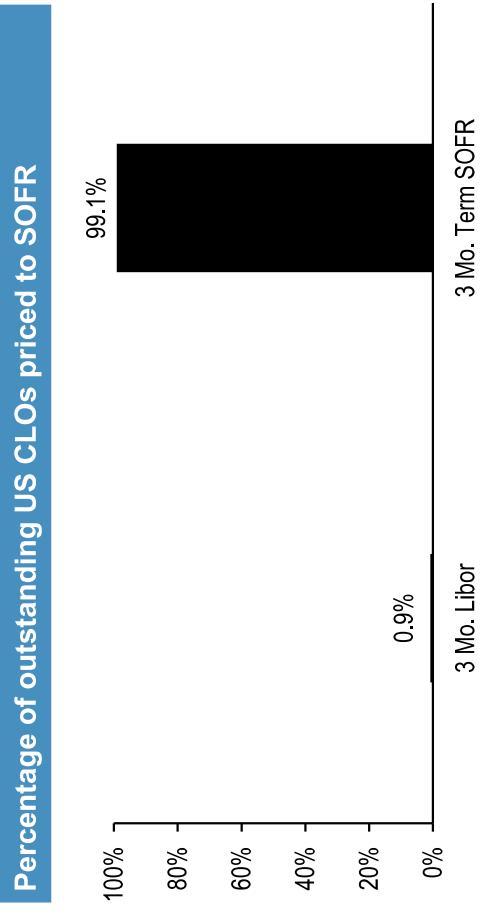
US New Issue Supply Risk Retention Stats

Year	Dual-Compliant	EUR-Compliant	US-Compliant	None
2010	0.00%	0.00%	0.00%	100.00%
2011	0.00%	0.00%	0.00%	100.00%
2012	0.00%	0.00%	0.00%	100.00%
2013	0.41%	1.36%	0.00%	98.23%
2014	0.60%	1.59%	0.60%	97.20%
2015	5.71%	10.61%	11.34%	72.34%
2016	11.47%	9.74%	22.13%	56.66%
2017	40.86%	0.00%	58.75%	0.39%
2018	9.21%	10.33%	17.78%	62.68%
2019	3.33%	16.45%	0.61%	79.61%
2020	3.77%	21.33%	0.73%	74.17%
2021	2.68%	13.68%	0.00%	83.64%
2022	7.09%	16.36%	1.42%	75.13%
2023	13.58%	20.73%	1.63%	64.07%

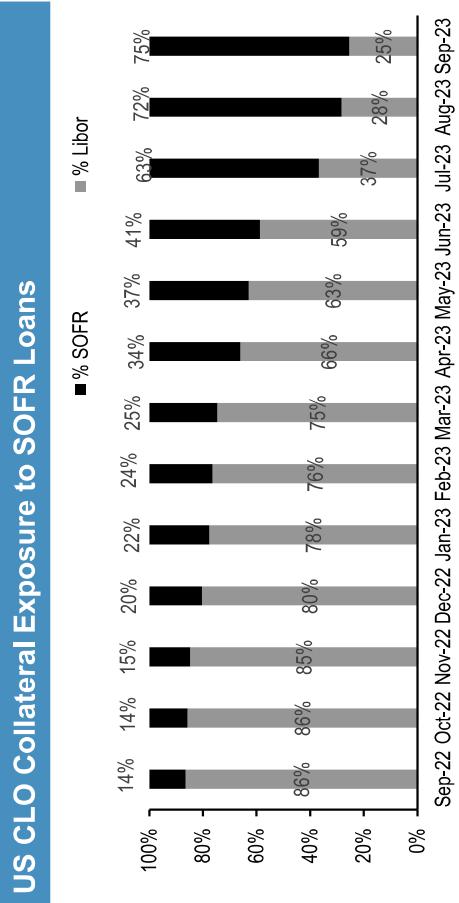
Source: J.P. Morgan. As of September 2023. Does not include resets, reissues, and refinancings.

SOFR/LIBOR benchmark transition

- At its most basic, SOFR (Secured Overnight Financing Rate) is an overnight rate based on transactions in the Treasury repo market.
- Most CLOs followed the ARRCC recommended guideline which stipulates a +26bps adjustment for 3m tenures switching from Libor.
- As of August-end 2023, 99.1% of the floating-rate US CLO debt market (now \$863bn) is priced to 3m Term SOFR, which is a +6.6% increase from July 2023, and follows the ARRCC deadline in end June. In CLO portfolios, 74.5% of loan exposures are priced to SOFR, which is +2.9% above July 2023, and this compares to 76.3% of the J.P. Morgan Leveraged Loan Index.



Source: J.P. Morgan, Bloomberg Finance, L.P. Based on Post-Crisis, floating-rate US CLOs excluding Paid Down CLOs and Not Rated tranches. By notional amount outstanding. As of August 31st, 2023.



Source: J.P. Morgan, INTEX. Based on loan benchmark tracking in the JPMorgan Loan Index. Excludes Enhanced, static, PC/MM, Large CCC Bucket, Paid Down CLOs. Excludes CLOs out of reinvestment period (by 9/1/2023). CLOs that have not made a first payment (as of 9/1/2023), and CLOs with <80% deal factor. As of 9/1/2023.

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BSL CLOs vs Private Credit/MM CLOs

High Level Comparison of BSL CLOs vs PC/MM CLOs

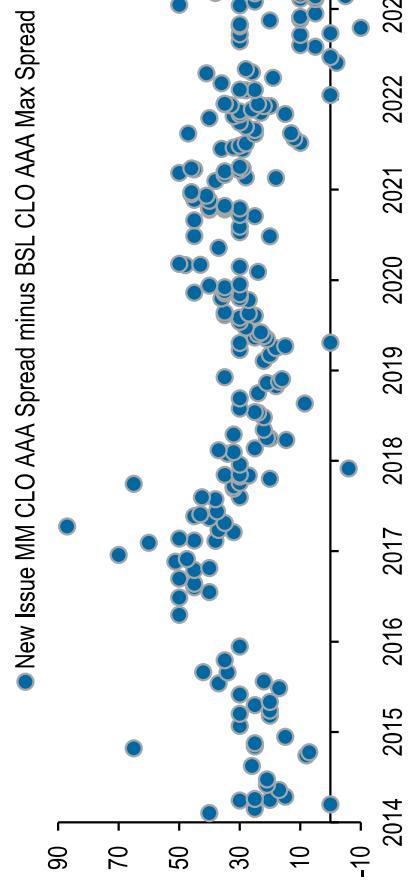
High Level	US CLO (BSL)	US CLO (Private Credit/Middle Market)
Market Size	\$899bn	\$115bn
Par Subordination	AAA 36-39%, BB 8-12%	AAA 43-45%, BB 12-14%
Income Generation	3m Term SOFR + Spread	3m Term SOFR + Spread
Callability	~1-2 years	~1-2 years
Reinvestment Profile	Actively Managed 3-5 years, or static (3% outstanding)	Actively Managed 3-5 years, or static (5% outstanding)
Final Maturity	~12-13 years	~10-12 years
Ratings	All Debt Tranches Rated by 1 or 2 rating agencies	All Debt Tranches Rated by 1 or 2 rating agencies
Deal Leverage	10-11x	6-7x
Managers	154	44
Risk Retention	No Longer Required	5% of Deal Notional Required
Collateral		
Number of Underlying Credits	Varies (200-800)	Varies (100-400)
Minimum Obligor Indebtedness	Usually, > \$250mn with allowance for smaller (5-10% ~\$150-250mn)	Usually, > \$5mn
CCC Buckets	7.50%	17.5-20%
Active Management	During Reinvestment Period, some post-reinvestment allowances	During Reinvestment Period
Collateral Quality Tests	If Failing, Maintain or Improve	If Failing, Maintain or Improve
Haircuts	The lower of rating agency recovery rate and market value	The lower of rating agency recovery rate and market value

Source: J.P. Morgan.

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Growth opportunity in Private Credit/Middle Market

Basis between BSL AAA Wides and PC/MM AAA Spreads



Source: J.P. Morgan. Based on the largest AAA tranche in new issue Private Credit/Middle market CLO transactions vs the wide end of our on the run weekly primary BSL CLO spread series.

BSL vs. PC/MM Par Subordination

Private Credit CLO Composite Rating	2022 Vintage or Later	
	Average Spread to SOFR	Average of Orig Par Subordination
AAA	241	43.52%
AAA-Junior	212	39.67%
AA	314	34.47%
A	401	26.29%
BBB	564	19.59%
BB	915	13.56%
BSL CLO Composite Rating	2022 Vintage or Later	
AAA	181	37.34%
AAA-Junior	223	35.18%
AA	258	24.50%
A	332	18.60%
BBB	473	12.74%
BB	778	8.94%

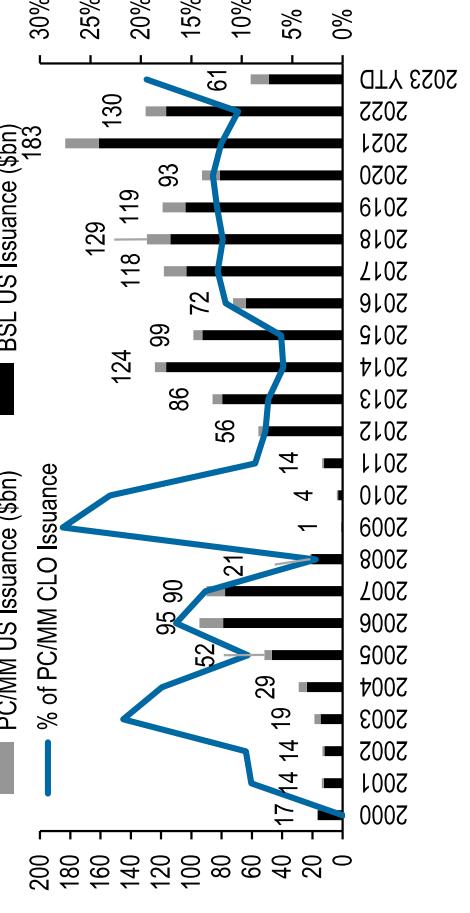
Source: J.P. Morgan, INTEX.

BWIC Volumes as % of Market Size

	US CLO BWIC Volumes (\$mn)			% of Market Size		
	PC/MM CLO	BSL CLO	PC/MM CLO	BSL CLO	CLO	
2018	506	27,024	0.93%	4.48%		
2019	526	35,107	0.81%	5.08%		
2020	626	50,276	0.83%	6.62%		
2021	739	34,328	0.79%	3.92%		
2022	2,034	59,210	1.91%	6.05%		
2023 YTD	409	24,268	0.36%	2.39%		
Total/Avg.	4,839	230,213	0.91%	4.76%		

Source: J.P. Morgan. As of June 2023.

PC/MM Issuance is ~19% of YTD US CLO New Supply



Source: J.P. Morgan.

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Introducing the market's first CLO index – CLOIE

- The J.P. Morgan Collateralized Loan Obligation Index (CLOIE) is the first rules-based benchmark for broadly-syndicated, arbitrage USD-denominated CLO debt. Launched in July 2014, the CLOIE has an estimated \$85bn in assets tracked to the indices, including 8 actively managed ETFs. The total size of the index stands at \$779 billion as of August 2023.
- **The CLOIE family contains 2,000+ sub-indices** categorized by original rating (AA to B), manager bands by CLOIE debt size (Small AUM, Medium AUM, Large AUM), reinvestment periods (Static, Post-Reinvestment, <1yr, 1-2yr, 2-3yr, 3-4yr, ≥5yr, etc.), and original vintages from 2004 to current.
- The Euro CLOIE will offer comprehensive coverage of European CLO debt, tracking ~96% of the €194bn debt stock (as of May 31st, 2023).

Criterion	CLOIE
Inception Date	30-Dec-11
Launch Date	31-Jul-14
Instrument Type	Includes: Floating-r-rate CLO debt (including Hybrid CBOs) from pre-crisis and post-crisis*, broadly-syndicated, arbitrage US CLOs, Junior AAA, and static deals Excludes: equity tranches, x-tranches, infrastructure / project finance CLOs, middle market CLOs, opportunistic credit, revolvers, delayed draw, combo, fixed-rate, and step-up tranches
Currency Denomination	USD
Tranche Size	No minimum tranche size
Minimum Maturity	None
Issue Date	Closing date on or after Jan 2004
Rating Classification	Lowest of three (Moody's, S&P, Fitch)
Issuers	CLO collateral managers
Instrument Registration	SEC-registration required
Reinvestment of Cash Flows	Immediate reinvestment into the respective tranche's daily return
Price Quote Side / Timing	Bid (as of US Bond Market Close)
Settlement Convention	T+2
Rebalance Date	Last US business day of the month
Holiday Calendar	US Bond Market Calendar
Price Source	Third-party pricing from PricingDirect

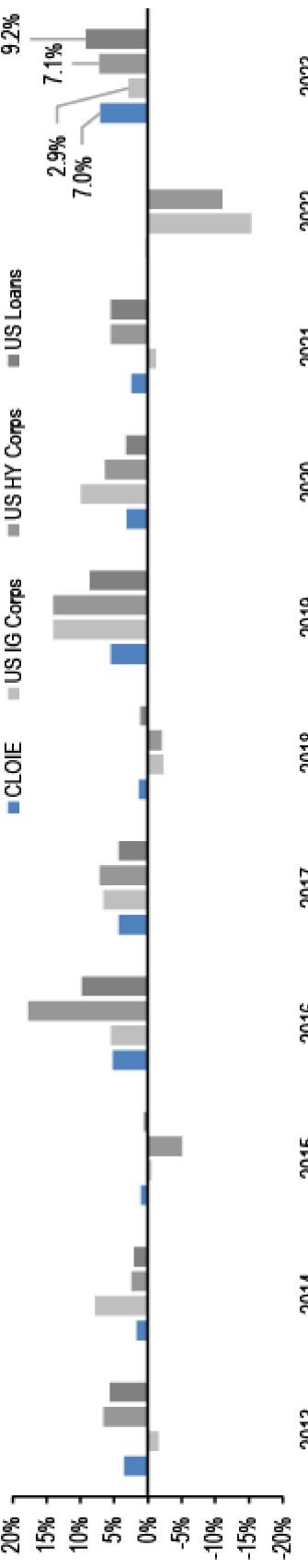
Source: J.P. Morgan.*The index offers distinction by origination period such as Pre-crisis which are available from inception to May 5th, 2021 when the final outstanding pre-crisis CLO tranche were paid down. Product guide [here](#).

Introducing the market's first CLO index – CLOIE Statistics

Profile of \$-CLOIE

Indices	Balance (\$bn)	Mkt Value (\$bn)	Coupon (%)	Margin (bps)	Price	DM (bps)	Yield (%)	Duration (yrs)	WAL (yrs)
\$-CLOIE	779.4	773.9	7.3	202	98.4	243	6.9	2.9	3.4
By Original Rating									
AAA	531.7	533.2	6.8	148	99.4	168	6.3	2.4	2.7
AA	102.1	101.6	7.3	201	98.6	235	6.6	3.7	4.4
A	52.2	51.7	7.9	253	98	295	7.2	4	4.9
BBB	52.5	50.9	9	373	96.9	461	8.9	4.1	5.4
BB	37.7	34.2	12.1	681	89.2	941	13.8	4	6.1
B	3.1	2.3	13.5	816	70.8	1,524	19.8	3.7	6.3
By Reinvestment Period									
Amortizing	233.2	229.8	7.2	190	97.7	260	7.3	1.9	2.2
≤ 3yrs	320.3	318.3	7.3	201	98.5	239	6.8	3	3.7
> 3yrs	212.5	212.3	7.5	216	98.9	231	6.6	3.7	4.6
Static	13.4	13.5	7.6	232	99.5	228	7.3	1.3	1.5
By Manager Band									
Large	589.4	586	7.3	199	98.5	235	6.8	2.9	3.5
Medium	154	152.4	7.4	209	98.1	269	7.1	2.8	3.4
Small	36	35.5	7.7	237	97.5	291	7.6	2.5	3
US IG Corps	6,515.10	5,911.50	2	-	90.9	131	5.6	7	10.8
US HY Corps	1,183.70	1,080.20	3	-	91.3	381	8.1	3.9	4.9
US Loans	1,445.70	1,384.20	9.2	374	95.8	517	10.7	3.3	4.3

Cross-Sector Annual returns of J.P. Morgan US Credit Indices



Source for top chart: J.P. Morgan, as of August 31st, 2023. US IG Corps and US HY Corps is represented by the J.P. Morgan Global Corporate Index ("GCI") (see methodology here). For Corps/Loans we use years to maturity instead of WAL. Discount Margin ("DM") above is calculated using discounting to forward SOFFR curve. Aggregate index discount margins and yields shown above are weighted by market capitalization (called "Simple Avg."). All analytics shown are calculated to-worst.

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Source for bottom chart: J.P. Morgan, as of August 31st, 2023. US IG Corps and US HY Corps is represented by the J.P. Morgan Global Corporate Index ("GCI").

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CLO Manager Analysis: Equity

- **Equity Cashflow Returns:** cashflow payments in a given year divided by equity notional which will be adjusted if a deal is reset (upsized or downsized)

US CLO Equity Cashflow Returns (Top 20)

US Manager	Deal Count	Average of 2023 Return	Average of Annualized Cashflow Return	Average of Vintage
Fortress	13	18.82%	19.67%	2019.6
GoldenTree	20	18.65%	22.13%	2018.7
AGL	22	14.39%	17.36%	2020.8
Angelo, Gordon & Co	5	13.66%	17.55%	2018.6
Pacific	5	13.47%	16.62%	2019.4
CSAM	42	13.39%	20.22%	2018.4
New Mountain	3	13.33%	14.98%	2020.7
GSAM	2	13.12%	12.10%	2020.5
Ballyrock	11	13.11%	15.96%	2020.6
Brigade	15	13.07%	17.18%	2019.3
AllianceBernstein	3	13.05%	20.90%	2020.7
Sycamore Tree	2	13.04%	16.48%	2022.0
Birch Grove	3	12.98%	16.15%	2021.3
Generate Advisors	10	12.93%	17.02%	2018.0
Oaktree	10	12.77%	16.34%	2020.0
Gulf Stream	6	12.72%	16.47%	2021.0
Diameter	4	12.72%	21.91%	2021.5
Palmer Square	15	12.70%	14.82%	2019.7
KKR	34	12.62%	16.68%	2018.9
Allstate	12	12.50%	15.95%	2019.5

Source: J.P. Morgan, Intex. Based on 1,610 US BSL CLOs and 162 US PC/MM CLOs with a cashflow payment in 3Q 2023 (and available in Intex) as of August 2nd, 2023. Based on managers with deal count > 1. Vintage data only reflects BSL CLOs. Only considers CLOs with debt currently outstanding and deal leverage <25x. Excludes static and revolver CLOs. Cashflow return calculated as the cashflow payments in a given year divided by equity notional which will be adjusted if a deal is reset (upsized or downsized). Avg. Annualized cashflow return is based on cumulative cashflows since inception divided by time from the closing date to last cashflow date.

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Intex

Cashflow modeling

- Intex is the most common tool used to project CLO cashflows. Within 1–4 months after issuance, Intex models the structure and cashflow rules of the majority of CLOs.
- Collateral data and cash balances are usually updated monthly, beginning with the first trustee report.

Scenarios (Custom)		1-way As Shown		View model-specific variable details									
	Assumption Item	Units		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5					
<input checked="" type="checkbox"/> Scenario Name													
<input type="checkbox"/> Toggle Scenarios													
<input type="checkbox"/> Scenario Weights													
<input checked="" type="checkbox"/> Rate Update													
<input type="checkbox"/> LIBOR (1mo)	(Delayed)	Percent	Update	0	0	0	0	0	0	0	0	0	0
<input type="checkbox"/> LIBOR (2mo)	(Delayed)	Percent		1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...	1.77417441682...
<input type="checkbox"/> LIBOR (3mo)	(Delayed)	Percent		1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...	1.89119061846...
<input type="checkbox"/> LIBOR (6mo)	(Delayed)	Percent		1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...	1.90218991825...
<input type="checkbox"/> Interest on Cash	Per Model			0	10	20	30	40					
<input checked="" type="checkbox"/> CPR	Per Model				2	2	2	2	2	2	2	2	2
<input type="checkbox"/> Units By Scenario	Per Model												
<input type="checkbox"/> CDR	Per Model												
<input type="checkbox"/> Recovery	Percent			60	60	60	60	60	60	60	60	60	60
<input type="checkbox"/> Recovery Lag	Months			12	12	12	12	12	12	12	12	12	12
<input type="checkbox"/> Floor Floating-Rate Assets at their current rate	Manual	Per Model	Per Model										
<input type="checkbox"/> Optional Redemption	Per Closing	Per Model	Per Model										
<input checked="" type="checkbox"/> Reinvestment Profile	Pct of Mkt	Per Model	Per Model										
<input type="checkbox"/> Market Price Adjustment	+ details	100	100	100	100	100	100	100	100	100	100	100	100
<input type="checkbox"/> Deal RefiReset	Never	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit	View/Edit
<input type="checkbox"/> RefiReset Event	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<input type="checkbox"/> Align event to next deal distribution date													
<input type="checkbox"/> RefiReset X Spread/Coupon													
<input type="checkbox"/> RefiReset X Pmt Sched													
<input type="checkbox"/> A Spread/Coupon	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
<input type="checkbox"/> B Spread/Coupon	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
<input type="checkbox"/> C Spread/Coupon	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45
<input type="checkbox"/> D Spread/Coupon	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
<input type="checkbox"/> E Spread/Coupon	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
<input type="checkbox"/> Deal Termination Extension	0	0	0	0	0	0	0	0	0	0	0	0	0
<input type="checkbox"/> Collateral Liquidation Price Units	Value	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price	Liquidation Price
<input type="checkbox"/> Collateral Liquidation Price	Value	100	100	100	100	100	100	100	100	100	100	100	100
<input type="checkbox"/> Add Accrued Int to Liquidation Proceeds													
<input type="checkbox"/> Caal/CCC % of Perf Bal	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
<input type="checkbox"/> Caal/CCC Market Price	100	100	100	100	100	100	100	100	100	100	100	100	100
<input type="checkbox"/> Asset Level	None	None	None	None	None	None	None	None	None	None	None	None	None
<input type="checkbox"/> Global Asset Level	None	None	None	None	None	None	None	None	None	None	None	None	None
<input type="checkbox"/> Solver Target:	+ details	WAL	0	0	0	0	0	0	0	0	0	0	0
<input checked="" type="checkbox"/> PIY Analytics	Calc	Tranches	0	0	0	0	0	0	0	0	0	0	0
	Subord	Price	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: J.P. Morgan, Intex.

CLO Manager Analysis: Par Build

- Par Build:** Calculated as the change in collateral balance plus cash (principal collection account) between two observation dates. Par build, after initial ramping of the portfolio, measures a manager's ability to continue to reinvest assets and/or discretionary trade in a way that increases the par value of the portfolio. Managers can trade to build par by buying discounted assets and selling appreciating assets. Losing par over time is typical as portfolios season and managers trade risky assets through periods of weakness to avoid future credit loss.
- Can be affected by transactional features (cost of refinancings, par flush). For example, in a scenario where a manager builds par but then flushes the proceeds to the equity in between observed dates, it is possible the par build could be negative despite building par.

US CLO Par Build (Top 20)

Manager (Deal Count)	Avg. 2H2022 Par Build/Burn	Avg. of B3 or Lower Exposure
Zais (7)	0.89%	17.9%
MJX (19)	0.52%	18.5%
CSAM (26)	0.48%	17.0%
Fortress (9)	0.41%	26.6%
Ares (28)	0.40%	18.9%
WAMCO (3)	0.40%	15.5%
Greywolf (5)	0.38%	15.9%
CBAM (12)	0.38%	17.8%
Elmwood AM (13)	0.38%	12.3%
Generate Advisors (7)	0.36%	18.6%
Oaktree (8)	0.35%	16.6%
Alcentra (7)	0.35%	14.8%
First Eagle (21)	0.34%	16.5%
AllianceBernstein (3)	0.33%	14.5%
Aegon (11)	0.33%	17.8%
AGL (15)	0.32%	16.6%
Marble Point Credit (13)	0.31%	16.2%
Guardian Life (7)	0.28%	14.6%
Birch Grove (2)	0.28%	21.4%
HalseyPoint (3)	0.26%	11.8%

Euro CLO Par Build (Top 20)

Manager (Deal Count)	Avg 2H2022 Par Build/Burn	Average WARF
Brigade (4)	0.62%	2823
Napier Park (5)	0.56%	2894
PGIM (14)	0.51%	3025
Carlyle (11)	0.50%	3022
Sculptor (6)	0.44%	2865
Sankaty / Bain (6)	0.42%	2879
Hayfin Emerald (7)	0.40%	2883
Tikehau (4)	0.39%	2864
Segovia (2)	0.39%	3009
Fidelity (1)	0.37%	2872
CSAM (8)	0.31%	2893
PineBridge (4)	0.30%	2921
CBAM (3)	0.28%	2882
Fair Oaks (3)	0.27%	2862
ICG (8)	0.26%	3039
Ares (6)	0.25%	2984
Blue Bay (1)	0.24%	2903
BNP Paribas (2)	0.24%	2964
King Street (3)	0.23%	2830
Investcorp (9)	0.23%	2986

Source: J.P. Morgan, INTEX. Based on 1,165 US BSL Managed CLOs from 108 managers. We exclude static, Middle Market, Paid Down CLOs. We also exclude CLOs out of reinvestment period (12/31/2022), CLOs that have not yet made a first payment (06/30/2022), and CLOs with <95% Deal Factor.

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Source: J.P. Morgan, INTEX. Based on 296 European CLOs from 58 managers. We exclude static, Paid Down CLOs. We also exclude CLOs out of reinvestment period (12/31/2022), CLOs that have not yet made a first payment (06/30/2022), and CLOs with <95% Deal Factor.

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