

# The Ending of Reinvestment Periods for US and Euro CLOs

1

Overview of Analysis

# Overview

- » Many CLOs have ended or are ending their reinvestment period this year.
  - 41% of US CLOs and 36% of Euro CLOs.
- » This is occurring due to:
  - Short reinvestment periods over the last couple of years with managers assuming they could reset the CLOs,
  - Widening of spreads precluding economic resets, and
  - Lower forecast new issuance for 2023.
- » Some managers are more affected than others and could see a decline in their CLO assets.
- » If CLO liability spreads stay wide, a limited number of CLOs will be able to economically reset their reinvestment period.
  - Those CLOs with the tightest spreads are unlikely to reset but will enjoy the largest excess spread.

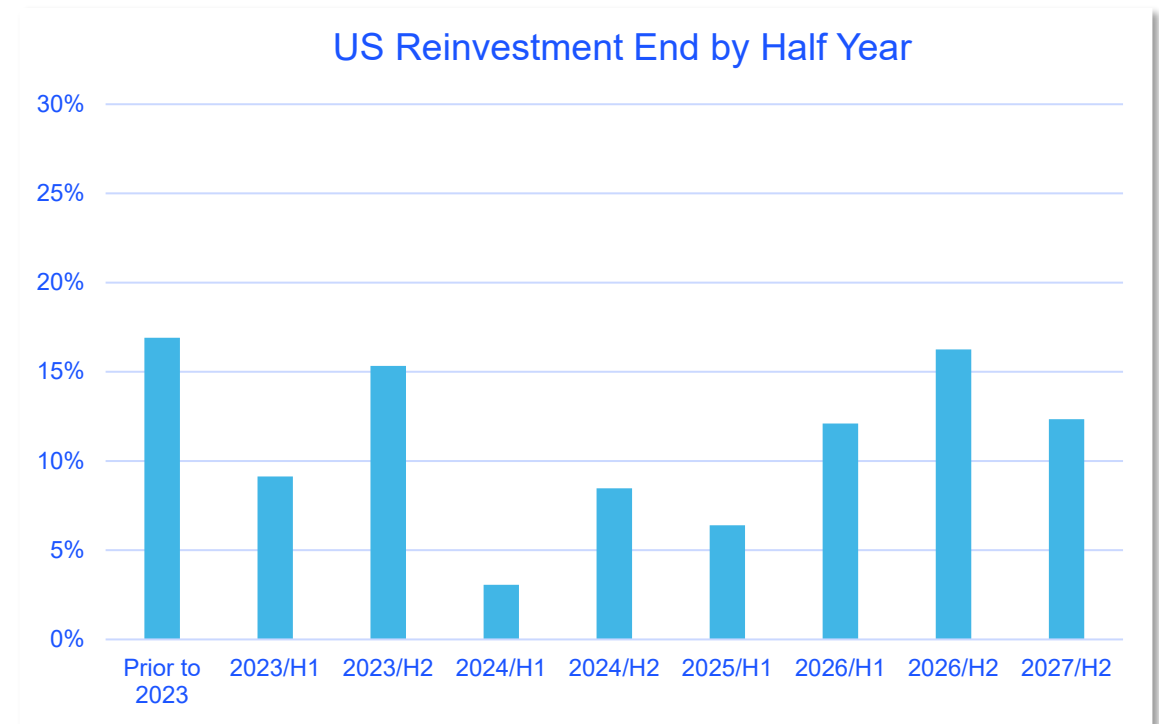
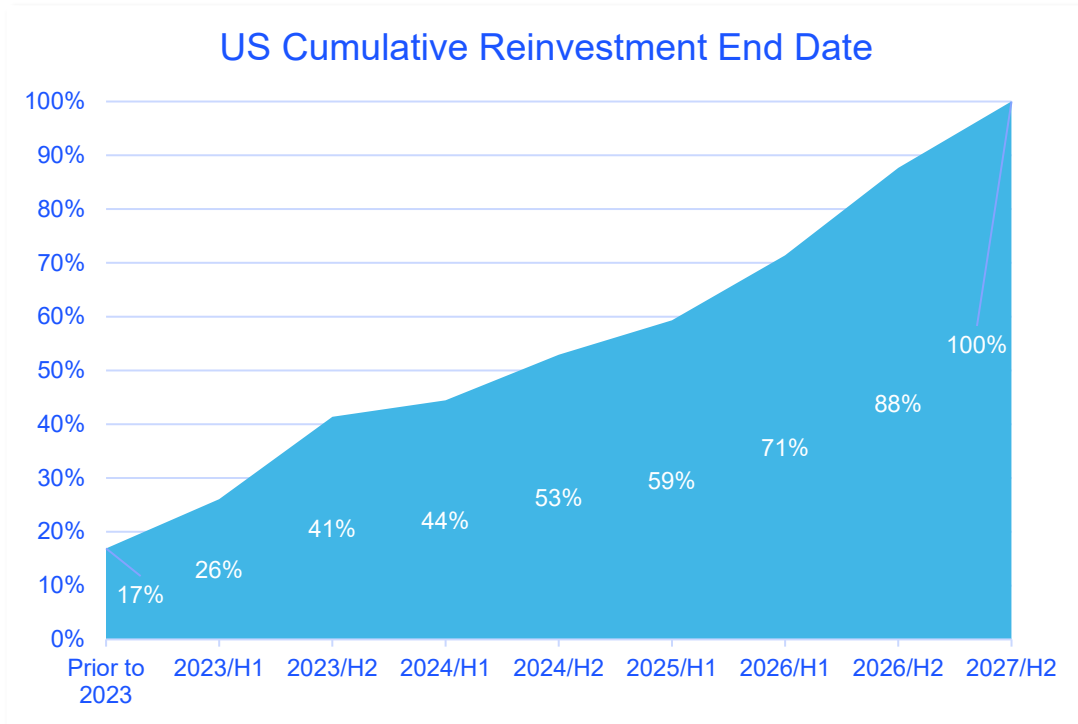
# Overview

- » However, the decline may be slower than feared given lower CLO collateral prepayments and CLO redemptions.
- » Additionally, most CLOs allow for a declining amount of post reinvestment period reinvestment.
  - Limitations include the average life and maturity tests, among others.
- » Thus, there is likely to be limited issues in the short-term other than having to reinvest in shorter loans which may afford less choice and lower collateral yields.
- » However, if liability spreads stay wide and the arb is challenging, the CLO market could shrink for the first time in a while.

2

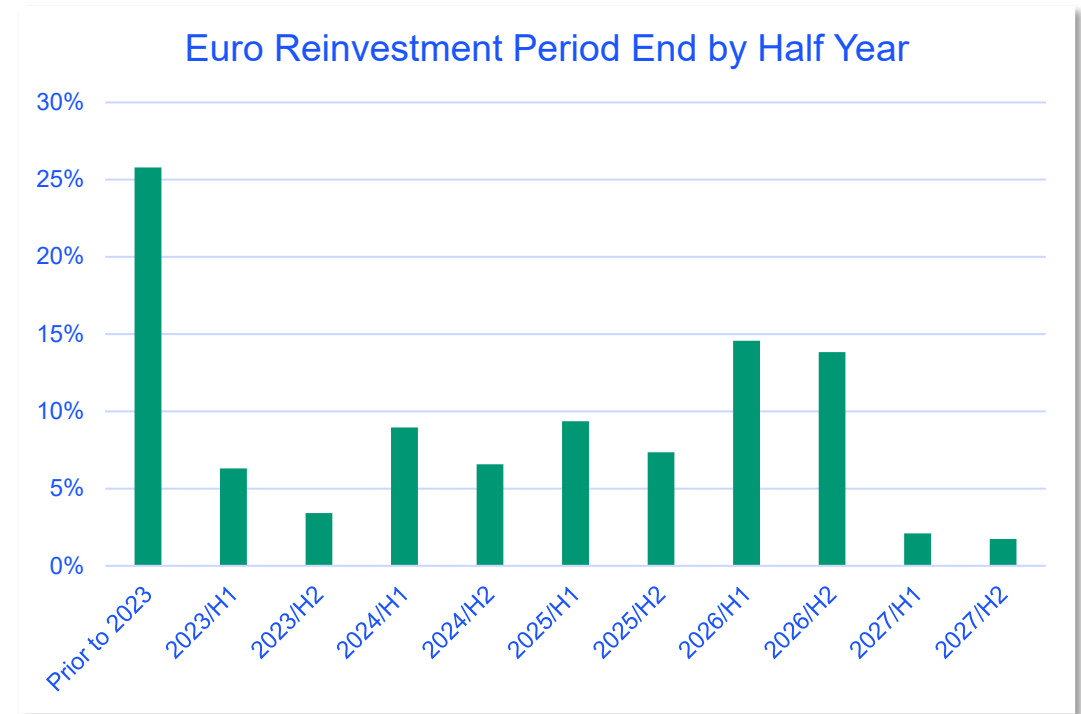
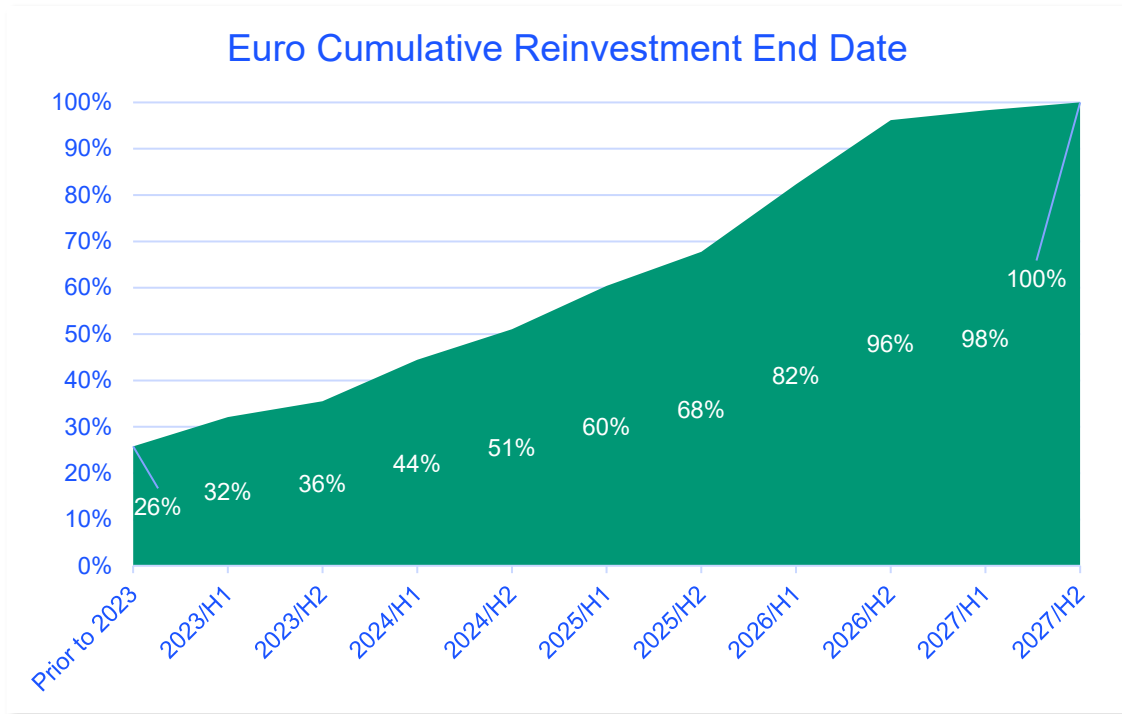
Reinvestment Periods Ending

# US CLO Reinvestment End Dates



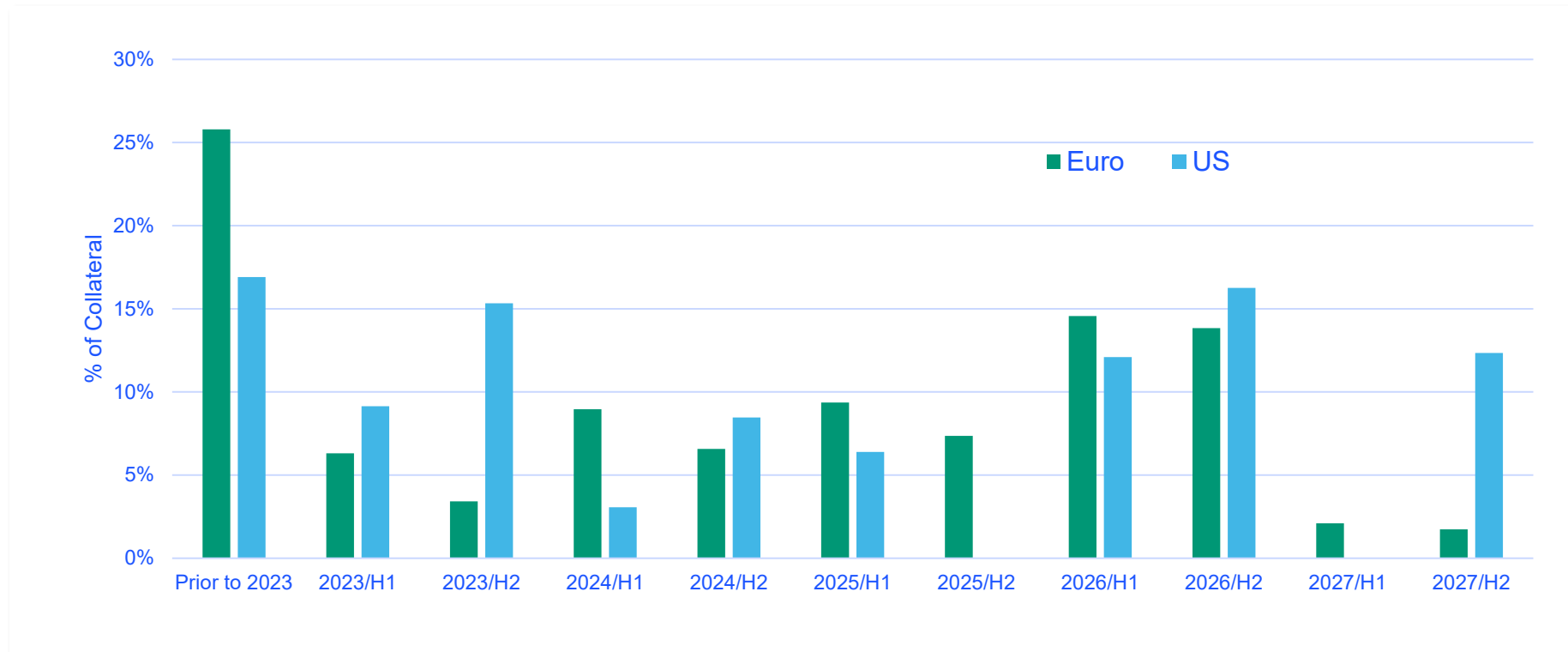
- » 17% of US CLOs have already hit their reinvestment end date.
- » 41% will end their reinvestment period by the end of 2023.
- » Subsequently the growth in CLOs hitting their end date slows until 2026.

# Euro CLO Reinvestment End Dates



- » 26% of Euro CLOs have already hit their reinvestment end date, greater than for the US.
- » 36% have or will end their reinvestment period by the end of 2023 which is less than for the US.
- » Subsequently the growth in CLOs hitting their end date also slows until 2026.

# US vs Euro CLO Reinvestment End Dates



- » Clearly shows more Euro CLOs have ended their reinvestment period.
- » However, the rate is similar by the end of 2023.
- » The US has a greater tail as seen by the blue column in 2027/H2.



# CLO Reinvestment

US CLOs	1718
\$ Collateral	\$824,595,140,139
Reinvestment Period Ended	\$139,459,116,174
\$ Reinvestment Ends by Dec 31, 2023	\$201,750,839,130
Spread $\geq$ 1.75 & Reinvestment End date by Dec 31, 2023	\$6,141,160,050

- » \$139 billion of CLOs are post reinvestment period.
- » \$202 billion will end by 2024 for a total of \$341 billion.
- » Only \$6.6 billion of US CLOs whose reinvestment period ends have Aaa spreads greater than 175bps. Higher spread CLOs are more economically reset which would allow for an extension of the reinvestment period.

# Euro CLO Reinvestment

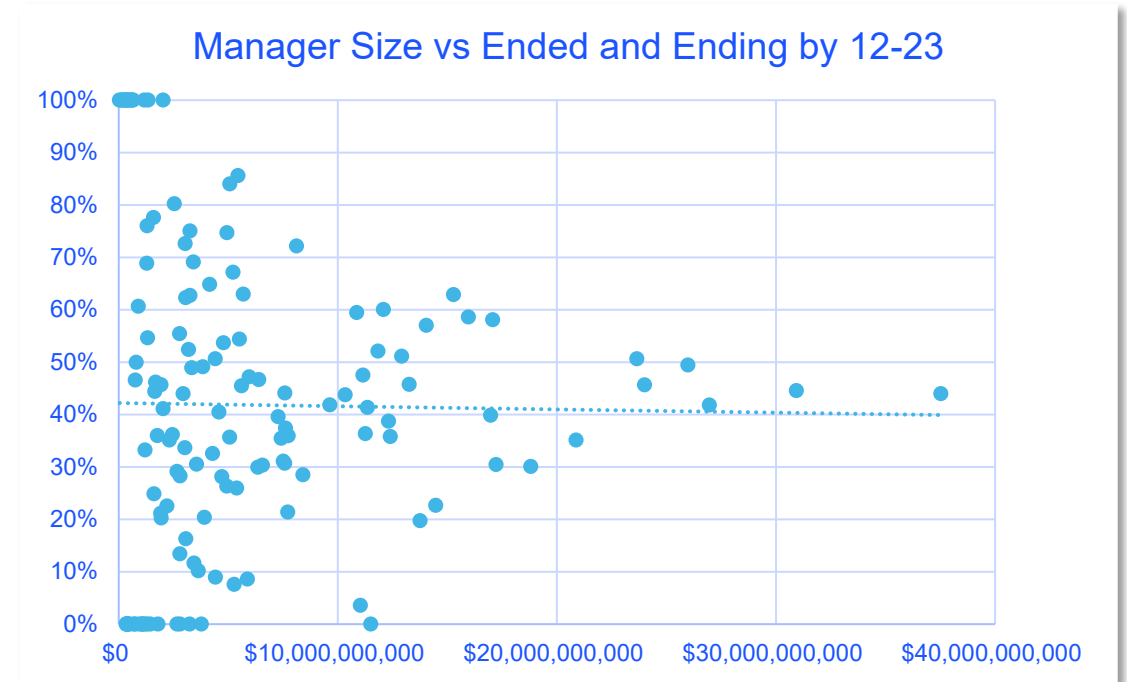
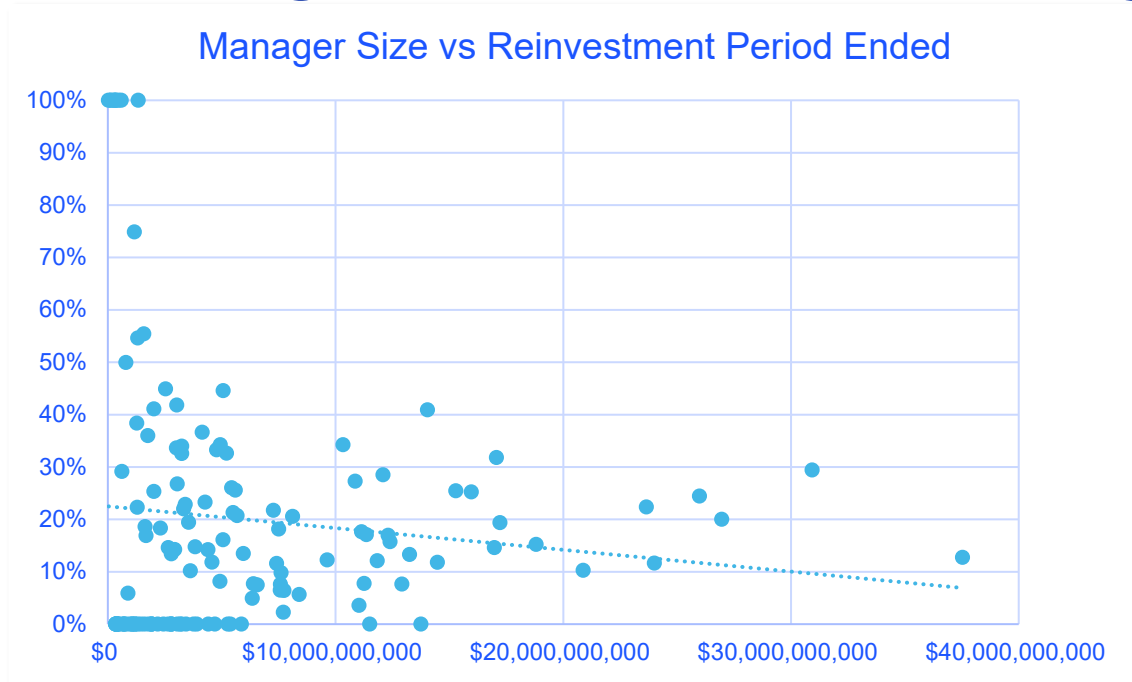
Euro CLOs	488
Collateral USD Equivalent	\$210,446,546,811
Reinvestment Period Ended	\$54,267,741,919
Reinvestment Ends by Dec 31, 2023	\$20,472,242,779
Spread $\geq$ 1.60 & Reinvestment End date by Dec 31, 2023	\$431,988,686

- » \$54 billion (USD Equivalent) of Euro CLOs are post their reinvestment period.
- » \$20 billion will end by 2024 for a total of \$74 billion.
- » Only \$0.4 billion of CLOs whose reinvestment period will end have Aaa spreads greater than 160bps which is a very small percentage of the total ending their reinvestment period.

3

US Manager Analysis

# Managers' CLOs Ending Reinvestment vs Size



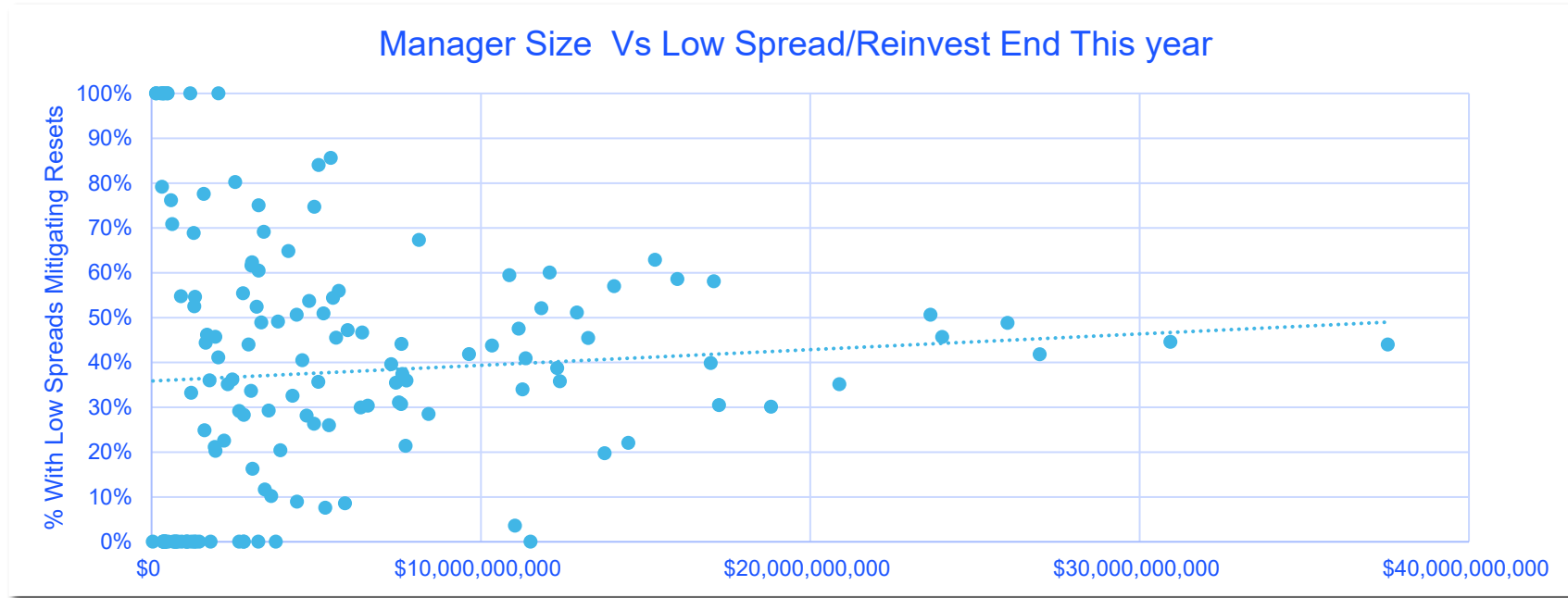
- » There are many managers with greater than 60% of their CLOs ending their reinvestment by year end.
- » Smaller managers have a greater percent of their CLOs past their reinvestment period.
- » However, when those ending in 2023 are also included, there is little correlation to manager size.

# Managers' CLOs Ending Reinvestment Histograms



- » Most managers have less than 30% of their CLOs already post reinvestment period, but a few have at least 80%.
- » 21% of managers have at least 70% of their CLOs stopping most reinvestment by the end of 2023.

# Can CLOs Reset Their Reinvestment Period?



- » Reinvestment Periods can be extended during a reset. However, investors typically require the spreads to also be reset to market rates.
- » This will be expensive for CLOs with low spreads and may preclude a reset.
- » The chart shows the percent of CLOs whose reinvestment ends this year and have low spreads.
- » For many managers, greater than 40% of their CLOs will stop reinvesting and will not be able to reset unless spreads tighten.

# Reinvestment Ended & Ability to Reset

- » The following tables look at reinvestment end dates by US manager:
  - Collateral that is past its CLO reinvestment end date,
  - Collateral which ends its reinvestment by the end of 2023.
- » CLOs are assumed to be able to be reset during 2023 if their senior spread is greater than 175.
  - LIBOR spreads are assumed to be increased by 23bps to SOFR when applicable.
  - Some managers may have wide enough spreads, but their typical pricing or CLO characteristic may result in an even wider spread being required.
  - Such CLO features may include riskier collateral (lower rated or priced).

# 20 Largest US Managers

Manager	CLOs	Collateral	Reinvestment Ended	% Reinvestment Ended	Reinvestment End by Dec 31, 2023	% Reinvest Ending	% Ended & Ending	Reset Ability
Carlyle Investment Management LLC	63	\$37,534,858,021	\$4,785,173,865	13%	\$11,718,736,367	31%	44%	0.0%
Blackstone Inc.	47	\$26,967,107,260	\$5,396,157,523	20%	\$5,879,778,283	22%	42%	0.0%
CIFC Asset Management LLC	47	\$25,989,361,626	\$6,351,619,777	24%	\$6,493,465,149	25%	49%	0.0%
<b>PGIM</b>	<b>46</b>	<b>\$23,653,815,073</b>	<b>\$5,292,033,661</b>	<b>22%</b>	<b>\$6,684,392,671</b>	<b>28%</b>	<b>51%</b>	<b>0.0%</b>
Credit Suisse Asset Management	45	\$30,936,227,681	\$9,101,515,973	29%	\$4,686,353,357	15%	45%	0.0%
Octagon Credit Investors, LLC	44	\$24,008,506,645	\$2,793,930,107	12%	\$8,169,603,727	34%	46%	0.0%
Anchorage Capital Group LLC	38	\$17,230,173,321	\$3,339,415,187	19%	\$1,909,298,272	11%	30%	0.0%
Ares Management, LLC	37	\$20,882,644,244	\$2,146,507,415	10%	\$5,186,069,462	25%	35%	0.0%
Neuberger Berman Fixed Income LLC	36	\$18,811,589,283	\$2,863,468,665	15%	\$2,797,634,301	15%	30%	0.0%
KKR Financial Advisors LLC	35	\$16,978,648,894	\$2,478,544,284	15%	\$4,287,135,801	25%	40%	0.0%
<b>MJX Asset Management LLC</b>	<b>32</b>	<b>\$17,072,223,224</b>	<b>\$5,429,726,986</b>	<b>32%</b>	<b>\$4,487,193,233</b>	<b>26%</b>	<b>58%</b>	<b>0.0%</b>
<b>Voya Alternative Asset Management</b>	<b>31</b>	<b>\$15,287,524,403</b>	<b>\$3,891,358,975</b>	<b>25%</b>	<b>\$5,719,303,132</b>	<b>37%</b>	<b>63%</b>	<b>0.0%</b>
Bain Capital Credit	30	\$14,478,071,989	\$1,708,162,904	12%	\$1,573,689,090	11%	23%	2.7%
<b>Sound Point Capital Management LP</b>	<b>29</b>	<b>\$15,967,955,829</b>	<b>\$4,027,716,057</b>	<b>25%</b>	<b>\$5,328,013,300</b>	<b>33%</b>	<b>59%</b>	<b>0.0%</b>
First Eagle Investment Management	29	\$13,258,838,368	\$1,761,239,846	13%	\$4,302,992,694	32%	46%	0.7%
<b>LCM Asset Management LLC</b>	<b>28</b>	<b>\$12,089,770,988</b>	<b>\$3,447,856,871</b>	<b>29%</b>	<b>\$3,809,370,858</b>	<b>32%</b>	<b>60%</b>	<b>0.0%</b>
Barings LLC	27	\$11,359,319,269	\$1,941,903,618	17%	\$2,754,644,797	24%	41%	1.0%
<b>Palmer Square Capital Management LLC</b>	<b>26</b>	<b>\$14,044,138,271</b>	<b>\$5,746,127,030</b>	<b>41%</b>	<b>\$2,259,662,649</b>	<b>16%</b>	<b>57%</b>	<b>0.0%</b>
Oak Hill Advisors LP	25	\$13,758,349,278	\$0	0%	\$2,716,165,420	20%	20%	0.0%
Benefit Street Partners LLC	25	\$12,398,489,757	\$1,949,993,911	16%	\$2,487,102,179	20%	36%	0.0%

» For six managers, greater than 50% of their CLOs will end their reinvestment period by the end of 2023.



# Greater than 70% of CLOs Ending Reinvestment

Manager	CLOs	Collateral	Reinvestment Ended	% Reinvestment Ended	Reinvestment End by Dec 31, 2023	% Reinvest Ending	% Ended & Ending	Reset Ability
40/86 Advisors Inc.	4	\$1,175,718,688	\$880,177,921	75%	\$295,540,767	25%	100%	0%
H.I.G. WhiteHorse Capital LLC	4	\$626,265,306	\$182,621,582	29%	\$443,643,724	71%	100%	29%
Telos Asset Management LLC	4	\$593,594,245	\$593,594,245	100%	\$0	0%	100%	24%
Ellington CLO Management LLC	4	\$1,343,524,419	\$1,343,524,419	100%	\$0	0%	100%	100%
Crestline Denali Capital LP	6	\$2,030,342,525	\$514,391,647	25%	\$1,515,950,878	75%	100%	0%
PineBridge Investments LLC	12	\$5,443,320,794	\$1,417,613,481	26%	\$3,241,425,779	60%	86%	0%
American Money Management Corporation	14	\$5,073,158,973	\$2,261,139,832	45%	\$2,001,193,482	39%	84%	0%
TCI Capital Management LLC	5	\$2,542,570,282	\$1,141,513,388	45%	\$898,407,885	35%	80%	0%
Canaras Capital Management, LLC	5	\$1,588,740,612	\$880,312,317	55%	\$352,229,825	22%	78%	0%
OFS Capital Management	4	\$1,300,981,495	\$290,103,996	22%	\$698,510,457	54%	76%	31%
MidOcean Credit Fund Management LP	8	\$3,253,161,042	\$1,059,174,851	33%	\$1,381,982,305	42%	75%	0%
Alcentra Inc.	11	\$4,945,546,100	\$1,693,936,299	34%	\$1,999,723,105	40%	75%	0%
Bardin Hill Loan Management LLC	15	\$3,034,998,613	\$1,269,163,331	42%	\$934,452,783	31%	73%	15%
HPS Investment Partners, LLC	17	\$8,119,497,825	\$1,669,659,649	21%	\$4,190,064,817	52%	72%	7%

- » Only Ellington has more than 50% of its reinvestment ending CLOs with spreads wider than 175 (reset ability) implying they are able to be reset.
- » However, Ellington typically trades wide of the market given their structure and collateral mitigating the ability to reset at typical market spreads.

# At Least 10% Could be Reset

US Manager	CLOs	Collateral	Reinvestment Ended	% Reinvest. Ended	Reinvestment End by Dec 31, 2023	% Reinvest. Ending	% Ended and Ending	Sprd >=1.75 & End date by Dec 31, 2023	Reset Ability
Ellington CLO Management LLC	4	\$1,343,524,419	\$1,343,524,419	100%	\$0	0%	100%	\$1,343,524,419	100%
HalseyPoint Asset Management, LLC	6	\$2,795,852,372	\$375,146,247	13%	\$0	0%	13%	\$375,146,247	100%
OFS Capital Management	4	\$1,300,981,495	\$290,103,996	22%	\$698,510,457	54%	76%	\$305,754,215	31%
H.I.G. WhiteHorse Capital LLC	4	\$626,265,306	\$182,621,582	29%	\$443,643,724	71%	100%	\$182,621,582	29%
Marathon Asset Management LP	14	\$5,222,382,830	\$1,704,138,387	33%	\$1,802,094,068	35%	67%	\$847,717,593	24%
Telos Asset Management LLC	4	\$593,594,245	\$593,594,245	100%	\$0	0%	100%	\$141,463,509	24%
Bardin Hill Loan Management LLC	15	\$3,034,998,613	\$1,269,163,331	42%	\$934,452,783	31%	73%	\$334,968,760	15%
Crescent Capital Group LP	14	\$5,686,904,436	\$1,177,713,806	21%	\$2,402,847,399	42%	63%	\$400,058,880	11%

- » Again, Ellington is on this list which may only be numerically correct as previously stated. Others also typically manage CLOs which trade at wide spreads.
- » There are only seven other managers on this list though as mentioned, some or these CLOs/Managers may require a wider spread to reset the reinvestment period.

# 20 Managers with Least Percent Easily Reset

Manager	CLOs	Collateral	Reinvestment Ended or Ending	% Ended & Ending	Par for Spread<1.75 & End date by Dec 31, 2023	% Reinvest. End & Low Spread
40/86 Advisors Inc.	4	\$1,175,718,688	\$1,175,718,688	100%	\$1,175,718,688	100%
Crestline Denali Capital LP	6	\$2,030,342,525	\$2,030,342,525	100%	\$2,030,342,525	100%
PineBridge Investments LLC	12	\$5,443,320,794	\$4,659,039,260	86%	\$4,659,039,260	86%
American Money Management Corporation	14	\$5,073,158,973	\$4,262,333,314	84%	\$4,262,333,314	84%
TCI Capital Management LLC	5	\$2,542,570,282	\$2,039,921,273	80%	\$2,039,921,273	80%
Canaras Capital Management, LLC	5	\$1,588,740,612	\$1,232,542,142	78%	\$1,232,542,142	78%
Telos Asset Management LLC	4	\$593,594,245	\$593,594,245	100%	\$452,130,736	76%
MidOcean Credit Fund Management LP	8	\$3,253,161,042	\$2,441,157,157	75%	\$2,441,157,157	75%
Alcentra Inc.	11	\$4,945,546,100	\$3,693,659,404	75%	\$3,693,659,404	75%
H.I.G. WhiteHorse Capital LLC	4	\$626,265,306	\$626,265,306	100%	\$443,643,724	71%
Nassau Corporate Credit LLC	8	\$3,409,968,273	\$2,356,602,460	69%	\$2,356,602,460	69%
Guggenheim Investment Management LLC	3	\$1,280,781,677	\$881,840,640	69%	\$881,840,640	69%
HPS Investment Partners, LLC	17	\$8,119,497,825	\$5,859,724,466	72%	\$5,464,239,548	67%
Apex Credit Partners LLC	13	\$4,154,224,808	\$2,692,996,835	65%	\$2,692,996,835	65%
Voya Alternative Asset Management	31	\$15,287,524,403	\$9,610,662,107	63%	\$9,610,662,107	63%
Steele Creek Investment Management	8	\$3,055,054,474	\$1,903,186,739	62%	\$1,903,186,739	62%
Bardin Hill Loan Management LLC	15	\$3,034,998,613	\$2,203,616,114	73%	\$1,868,647,353	62%
Seix Investment Advisors LLC	9	\$3,252,879,895	\$2,040,351,460	63%	\$1,966,851,650	60%
LCM Asset Management LLC	28	\$12,089,770,988	\$7,257,227,729	60%	\$7,257,227,729	60%
Sculptor Capital Management	24	\$10,865,825,106	\$6,460,206,098	59%	\$6,460,206,098	59%

» A low spread helps today but makes the CLO less economic to reset and extend the reinvestment period.

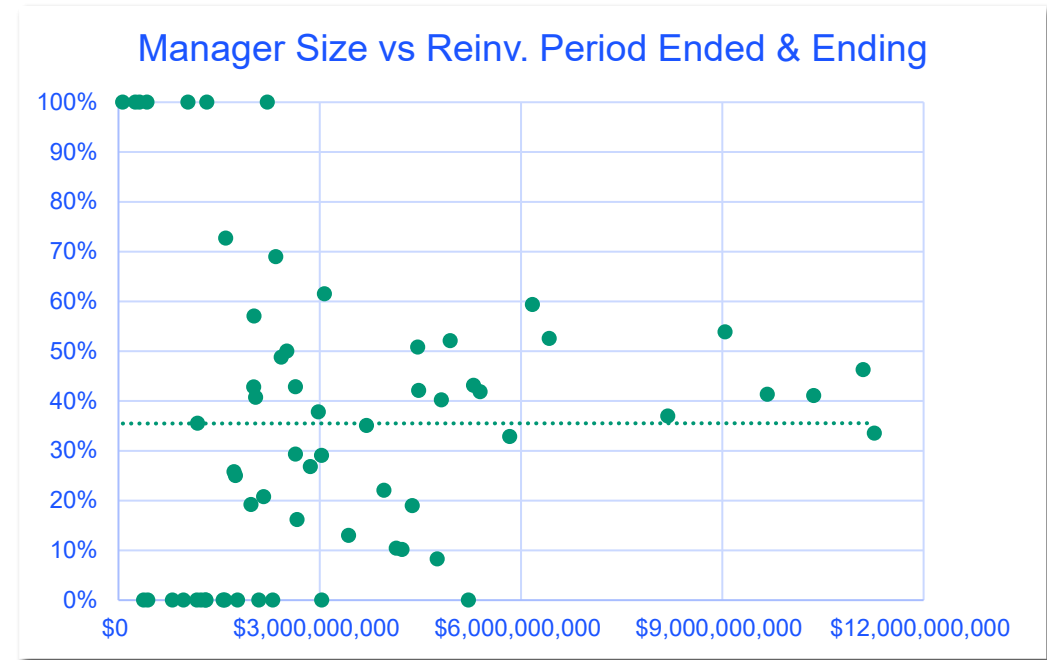
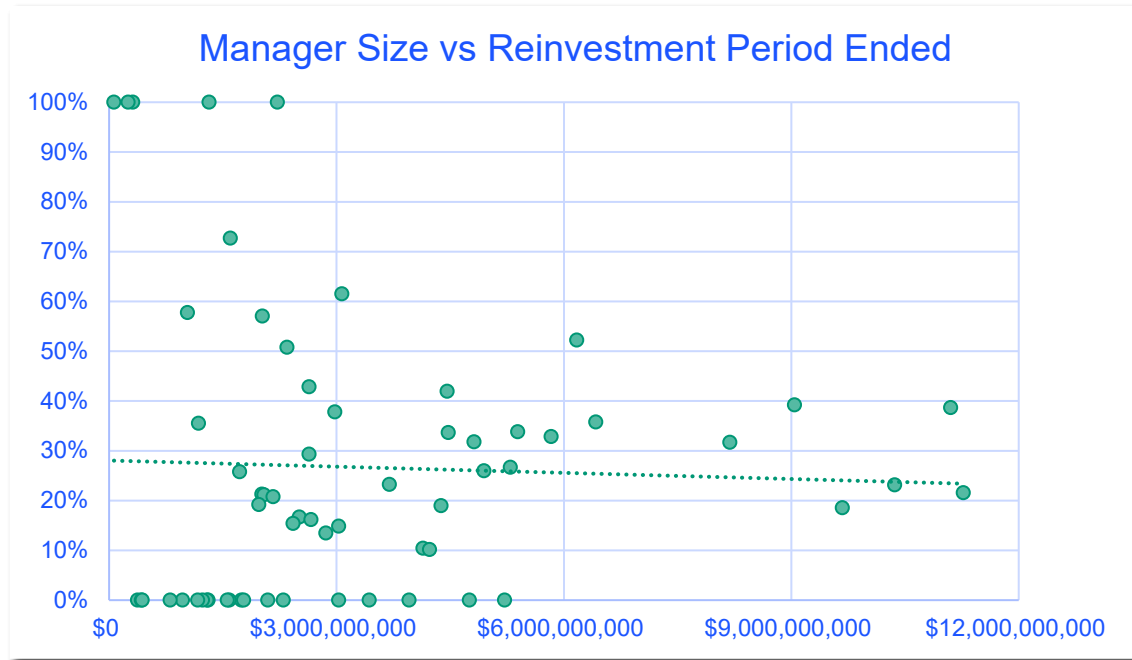
# Manager Results

- » Many managers are unlikely to be able to reset a high percentage of their CLOs and restart or extend their reinvestment period.
- » This will reduce the leverage in these structures over time and may lower the demand for leveraged loan collateral in general.
- » Mitigating this is reinvestment which is allowed after the end of the revolving though reinvestment likely declines with time based upon the rules of the specific CLO.
- » Current lower collateral prepayment rates necessitate less reinvestment helping to maintain CLO leverage.
- » Yet certain collateral sales may not happen if reinvestment becomes more challenging which could add to collateral risk.
- » The CLOs with the tightest spreads and therefore the hardest to reset will enjoy the largest excess spread partially mitigating any decline in leverage.

4

Euro Manager Analysis

# Euro Managers' CLOs Ending Reinvestment vs Size



- » There are several managers with 100% of their CLOs ending their reinvestment by year end.
- » Smaller managers have a greater percent of their CLOs past their reinvestment.
- » Yet when those ending in 2023 are also included, there is little correlation to manager size as shown by the green dotted line in the chart to the right.

# Euro Managers' CLOs Ending Reinvestment Histograms



- » Most managers have less than 30% of their CLOs already post reinvestment period, but a few have 100%.
- » 11% of managers have at least 60% of their CLOs stopping their reinvestment period by the end of 2023.

# Can CLOs Reset Their Reinvestment Period?

- » Reinvestment Periods can be extended during a reset.
- » However, investors typically require the spreads to also be reset.
- » This will be expensive for CLOs with low spreads (160 is used for the Euro CLO analysis) and may preclude it happening.
- » Only \$431mm of Euro CLOs have/will end their reinvestment period by year end and have a Aaa spread of at least 160 which is a very low percentage.



# Reinvestment Ended & Ability to Reset

- » Following tables look at reinvestment end dates by Euro manager:
  - Collateral that is past its CLO reinvestment end date.
  - Collateral which ends its reinvestment by the end of 2023.
- » CLOs are assumed to be reset or refinancable during 2023 if their senior spread is greater than 160 (vs 175 for the US).

# 15 Largest Euro Managers

Manager	CLOs	Collateral	Reinvestment Ended	% Ended	Reinvestment End by Dec 31, 2023	% Reinvest. Ending	Ended & Ending 12-23	% Ended & Ending 12-23	Euro Refi
Blackstone Inc.	26	\$11,267,993,939	\$2,428,646,748	22%	\$1,348,419,062	12%	\$3,777,065,810	34%	0%
Carlyle Investment Management LLC	25	\$11,101,208,896	\$4,291,567,486	39%	\$845,818,176	8%	\$5,137,385,661	46%	0%
PGIM	22	\$10,364,414,693	\$2,397,973,076	23%	\$1,857,584,754	18%	\$4,255,557,830	41%	0%
CVC Credit Partners LLC	21	\$9,672,672,515	\$1,793,104,443	19%	\$2,205,795,926	23%	\$3,998,900,370	41%	0%
Investcorp B.S.C.	21	\$9,042,330,498	\$3,546,541,885	39%	\$1,324,086,406	15%	\$4,870,628,291	54%	0%
KKR Financial Advisors LLC	17	\$8,189,053,981	\$2,594,883,817	32%	\$430,833,310	5%	\$3,025,717,127	37%	0%
Credit Suisse Asset Management	13	\$6,420,143,204	\$2,297,435,276	36%	\$1,076,532,433	17%	\$3,373,967,709	53%	0%
Alcentra Inc.	15	\$6,170,064,549	\$3,221,579,450	52%	\$440,701,198	7%	\$3,662,280,649	59%	0%
Intermediate Capital Group plc	13	\$5,831,098,835	\$1,914,590,163	33%	\$0	0%	\$1,914,590,163	33%	0%
Barings LLC	12	\$5,390,023,235	\$1,821,697,708	34%	\$433,611,013	8%	\$2,255,308,721	42%	0%
BlackRock Financial Management	12	\$5,294,386,696	\$1,411,974,278	27%	\$871,387,147	16%	\$2,283,361,425	43%	0%
Redding Ridge Asset Management (UK) LLP	10	\$5,217,819,933	\$0	0%	\$0	0%	\$0	0%	0%
Ares Management, LLC	11	\$4,945,080,397	\$1,283,609,999	26%	\$1,292,951,759	26%	\$2,576,561,758	52%	0%
Bain Capital Credit	12	\$4,813,942,900	\$1,530,145,012	32%	\$405,656,004	8%	\$1,935,801,016	40%	0%
Hayfin Capital Management LLP	10	\$4,752,679,890	\$0	0%	\$392,024,645	8%	\$392,024,645	8%	0%

- » Four managers have greater than 50% of their CLOs ending their reinvestment period by the end of 2023.
- » Unlike the US, none of the Euro managers have greater than 60% of their CLOs ending their reinvestment period by year end.

# Greater than 60% of CLOs Ending Reinvestment

Manager	CLOs	Collateral	Reinvestment Ended	% Reinvestment Ended	Reinvestment End by Dec 31, 2023	% Reinvest Ending	% Ended & Ending	Reset Ability
Man Group plc	6	\$2,219,991,700	\$2,219,991,700	100%	\$0	0%	100%	0%
Apollo Credit Management LLC	3	\$1,318,949,797	\$1,318,949,797	100%	\$0	0%	100%	0%
Black Diamond Capital Management LLC	3	\$1,035,525,930	\$598,131,699	58%	\$437,394,231	42%	100%	0%
Accunia Credit Management								
Fondsmaeglerselskab A/S	4	\$1,599,822,117	\$1,162,780,059	73%	\$0	0%	73%	0%
Oak Hill Advisors LP	6	\$2,346,623,586	\$1,191,855,485	51%	\$426,796,353	18%	69%	0%
Palmer Square Capital Management LLC	7	\$3,071,583,005	\$1,888,822,341	61%	\$0	0%	61%	0%

- » Few Euro CLOs have 60% of their CLOs ending their reinvestment period.
- » Though it is 100% of the CLOs for three of the managers.
- » None of the CLOs will be easy to reset based upon their Aaa spread being below 160.

# US vs Euro Managers With At Least 20% Difference

Manager	Euro % Ended & Ending	US % Ended & Ending	Difference
Black Diamond Capital Management LLC	100%	46%	54%
Apollo Credit Management LLC	100%	48%	52%
CIFC Asset Management LLC	0%	49%	(49%)
Oak Hill Advisors LP	69%	20%	49%
Sound Point Capital Management LP	10%	59%	(48%)
Hayfin Capital Management LLP	8%	55%	(47%)
Angelo, Gordon & Company LP	0%	47%	(47%)
PineBridge Investments LLC	41%	86%	(45%)
Voya Alternative Asset Management	19%	63%	(44%)
Guggenheim Investment Management LLC	26%	69%	(43%)
Napier Park Global Capital, LLC	0%	42%	(42%)
Man Group plc	100%	61%	39%
Neuberger Berman Fixed Income LLC	0%	30%	(30%)
HPS Investment Partners, LLC	42%	72%	(30%)
Fidelity Management & Research	0%	26%	(26%)
Sculptor Capital Management	35%	59%	(24%)
Onex Credit Partners LLC	21%	44%	(23%)
Invesco Inc.	13%	36%	(23%)
Trinitas Capital Management LLC	0%	21%	(21%)
Investcorp B.S.C.	54%	33%	21%

- » Compares managers with at least three US and two Euro CLOs.
- » 20 Managers have at least a 20% difference in the CLOs which will end their reinvestment period by year end when comparing their US and Euro CLOs.
- » Of these, most have a higher percentage ending for US CLOs.
- » Six of the managers have no Euro CLOs whose reinvestment period ends by year end.
- » A few managers in the table are among the largest managers.

# Manager Results

- » All the Euro managers are unlikely to be able to reset a high percentage of their CLOs and restart or extend their reinvestment periods.
- » As with the US, this will reduce the leverage in these structures overtime and lower the demand for leveraged loan collateral.
- » Mitigating this is reinvestment which is allowed after the end of the reinvestment though it declines with time.
- » Also, lower collateral prepayment rates necessitating less reinvestment.
- » Yet certain collateral sales may not happen if reinvestment becomes more challenging potentially increasing collateral risk.
- » The CLOs with the tightest spreads and therefore the hardest to reset will enjoy the largest excess spread somewhat compensating for any decline in leverage in those CLOs.

5

Conclusion

# Conclusion

- » A large percent of outstanding US (41%) and Euro CLOs (36%) have ended or will end their reinvestment period by year end if nothing is done.
- » Prior to CLO spread widening, the cure was to reset the CLO and extend the reinvestment period.
- » However, this is more challenging for CLOs with a relatively tight liability spread given a reset typically also “resets” the liabilities to market levels.
  - Larger managers often have tighter spreads thereby making their resets more challenging.
- » Alternatively, new issuance could replace these CLOs, but a strong market is dependent upon a more attractive arbitrage than currently exists.
- » Mitigating the effect of ending the reinvestment period is permitted post reinvestment period reinvestment.
  - This feature was added in early Bear Stearns underwritten CLOs and became a market standard.

# Conclusion

- » Nevertheless, post reinvestment period reinvestment is more constrained than during the reinvestment period.
  - Certain tests such as the WAL and maturity test must be met which become more challenging over time.
  - As shorter collateral is needed, choices are fewer and yields are likely to decline.
- » The current market has lower collateral prepayments partially reducing the need to reinvest.
- » However, certain collateral sales may not happen if reinvestment is too challenging which may increase the risk to the CLO.
- » CLOs that have tight liability spreads and which will be more difficult to reset, will enjoy greater excess spread resulting from the tight liabilities until their leverage declines.
- » Overall, this is a risk that is starting slowly and will grow over time if market conditions do not change.



A

Assumptions and Criteria

# Assumptions and Criteria

- » US or Euro BSL CLOs with a Monthly Report available within the last 6 months.
- » 1718 US CLOs with \$825 billion of collateral is included in the analysis.
- » 488 Euro CLOs with \$210 billion equivalent of collateral is included in the analysis. For easier comparison, the USD equivalent is shown for Euro CLOs. An exchange rate of 1.074 is used.
- » US CLOs charts are generally blue while Euro CLOs are in green.
- » A few CLOs with limited collateral are not included.
- » 175 and 160 are the spreads used for US and Euro CLO Aaa as the minimum spread that may be reset. These levels are below today's.

# Assumptions and Criteria

- » LIBOR tranches are assumed to be converted to SOFR plus an additional 23bps as applicable. While this is important, it is not the key constraint on the analysis.
- » The reset analysis ignores most spread differential due to structure and manager style as a simplifying assumption.
  - Certain CLOs with riskier structures and newer managers may require wider spreads to reset their reinvestment periods. An example is given in the body of this report.
- » Some of the manager comparison limits the US managers to those with at least three CLOs and Euro managers to those with at least two CLOs in order to reduce the effect of any individual CLO.

# B

## Appendix B: Details by Manager

# US Managers % Reinvestment Ending by 1-24

Manager	CLOs	Collateral	% Ended	% Ended & Ending	Manager	CLOs	Collateral	% Ended	% Ended & Ending
40/86 Advisors Inc.	4	\$1,175,718,688	75%	100%	Carlson Capital, L.P.	5	\$2,029,569,917	41%	41%
AEGON USA Investment Management, LLC	12	\$5,389,821,808	0%	26%	Carlyle Investment Management LLC	63	\$37,534,858,021	13%	44%
AGL CLO Credit Management LLC	21	\$11,036,076,495	4%	4%	CarVal CLO Management, LLC	6	\$3,064,849,603	0%	16%
AIG Global Investment Group	7	\$3,243,760,644	0%	0%	Centerbridge Credit Funding Advisors LLC	3	\$1,102,913,111	0%	0%
Alcentra Inc.	11	\$4,945,546,100	34%	75%	CFI Partners, LLC	4	\$1,646,801,157	19%	44%
AllianceBernstein LP	3	\$1,305,045,563	0%	0%	CIFC Asset Management LLC	47	\$25,989,361,626	24%	49%
Allstate Investment Management Company	12	\$5,274,628,201	0%	8%	Columbia Management Investment Advisors	7	\$3,022,655,084	34%	34%
American Money Management Corporation	14	\$5,073,158,973	45%	84%	Covenant Credit Partners, LLC	1	\$332,472,474	100%	100%
Anchorage Capital Group LLC	38	\$17,230,173,321	19%	30%	CQS Investment Management Ltd.	1	\$401,728,273	0%	0%
Angelo, Gordon & Company LP	13	\$6,398,471,499	8%	47%	Credit Suisse Asset Management	45	\$30,936,227,681	29%	45%
Apex Credit Partners LLC	13	\$4,154,224,808	37%	65%	Crescent Capital Group LP	14	\$5,686,904,436	21%	63%
Apollo Credit Management LLC	14	\$11,149,882,394	18%	48%	Crestline Denali Capital LP	6	\$2,030,342,525	25%	100%
Aquarian Credit Partners LLC	1	\$487,089,068	0%	100%	Cutwater Investor Services	2	\$317,165,138	100%	100%
Ares Management, LLC	37	\$20,882,644,244	10%	35%	CVC Credit Partners LLC	25	\$12,918,201,365	8%	51%
ArrowMark Colorado Holdings, LLC	14	\$5,604,566,754	26%	45%	Diameter Capital Partners LP	7	\$2,662,989,920	0%	0%
Assured Investment Management LLC	25	\$11,836,300,437	12%	52%	DoubleLine Capital LP	7	\$2,315,653,486	18%	35%
AXA Investment Managers	13	\$5,511,070,385	21%	54%	East West Bancorp Inc.	1	\$350,017,915	0%	0%
Bain Capital Credit	30	\$14,478,071,989	12%	23%	Eaton Vance Management	11	\$4,710,126,700	0%	28%
Bardin Hill Loan Management LLC	15	\$3,034,998,613	42%	73%	Ellington CLO Management LLC	4	\$1,343,524,419	100%	100%
Barings LLC	27	\$11,359,319,269	17%	41%	Elmwood Asset Management LLC	20	\$11,508,201,244	0%	0%
Benefit Street Partners LLC	25	\$12,398,489,757	16%	36%	Empower Capital Management LLC	1	\$502,115,697	0%	0%
Birch Grove Capital LP	4	\$1,917,703,927	0%	21%	Fidelity Management & Research	11	\$4,933,537,967	8%	26%
Black Diamond Capital Management LLC	4	\$1,683,858,511	17%	46%	First Eagle Investment Management	29	\$13,258,838,368	13%	46%
BlackRock Financial Management	23	\$12,317,939,826	17%	39%	Five Arrows Managers LLP	7	\$2,660,100,283	15%	29%
Blackstone Inc.	47	\$26,967,107,260	20%	42%	Fort Washington Investment Advisors, Inc.	2	\$1,058,033,024	0%	0%
BNP Paribas	1	\$36,860,335	100%	100%	Fortress Investment Group LLC	14	\$7,588,636,995	8%	44%
Brigade Capital Management LP	17	\$7,580,707,163	6%	31%	Franklin Advisors Inc.	1	\$388,230,489	0%	0%
Canaras Capital Management, LLC	5	\$1,588,740,612	55%	78%	Franklin Square Holdings, LP	2	\$706,188,242	0%	0%
Canyon Capital Advisors LLC	16	\$7,420,541,405	12%	35%	Gallatin Loan Management LLC	1	\$284,256,325	100%	100%
Capital Four CLO Management K/S	2	\$799,921,580	50%	50%	Generate Advisors LLC	9	\$4,406,275,383	14%	51%

# US Managers % Reinvestment Ending by 1-24

Manager	CLOs	Collateral	% Ended	% Ended & Ending	Manager	CLOs	Collateral	% Ended	% Ended & Ending
GoldenTree Asset Management LP	20	\$11,263,010,580	8%	36%	Neuberger Berman Fixed Income LLC	36	\$18,811,589,283	15%	30%
Goldman Sachs Asset Management	1	\$351,211,350	0%	0%	New Mountain Credit CLO Advisers LLC	2	\$916,018,240	0%	0%
Golub Capital Management LLC	18	\$8,412,462,344	6%	28%	New York Life Investment Management LLC	8	\$3,334,130,768	22%	49%
Greywolf Capital Management LP	6	\$3,191,795,747	0%	52%	Newfleet Asset Management LLC	1	\$140,617,040	100%	100%
Guggenheim Investment Management LLC	3	\$1,280,781,677	38%	69%	Nuveen Alternatives Advisors LLC	8	\$3,633,395,663	10%	10%
Gulf Stream Asset Management LLC	6	\$2,802,221,321	0%	0%	Oak Hill Advisors LP	25	\$13,758,349,278	0%	20%
H.I.G. WhiteHorse Capital LLC	4	\$626,265,306	29%	100%	OakTree Capital Management LLC	11	\$5,876,002,370	0%	9%
HalseyPoint Asset Management, LLC	6	\$2,795,852,372	13%	13%	Octagon Credit Investors, LLC	44	\$24,008,506,645	12%	46%
HarbourView Asset Management Corp.	1	\$366,957,988	0%	100%	OFS Capital Management	4	\$1,300,981,495	22%	76%
Hayfin Capital Management LLP	6	\$2,778,966,630	0%	55%	Onex Credit Partners LLC	21	\$10,338,069,178	34%	44%
HPS Investment Partners, LLC	17	\$8,119,497,825	21%	72%	ORIX Holdings	11	\$5,065,154,780	16%	36%
Intermediate Capital Group plc	16	\$6,353,344,481	5%	30%	Pacific Asset Management	5	\$2,201,683,286	0%	23%
Invesco Inc.	16	\$7,739,847,008	6%	36%	Pacific Investment Management Company	4	\$1,608,376,441	0%	25%
Investcorp B.S.C.	10	\$4,281,734,080	23%	33%	Palmer Square Capital Management LLC	26	\$14,044,138,271	41%	57%
Irradiant Partners, LP	4	\$1,794,673,474	0%	0%	Par- Four Investment Management LLC	5	\$1,761,637,661	36%	36%
Jocasse Partners LLC	1	\$361,506,210	0%	0%	Park Avenue Institutional Advisers LLC	7	\$2,802,671,789	0%	28%
Kayne Anderson Capital Advisors, L.P.	9	\$3,911,748,047	0%	20%	Partners Group	11	\$4,418,567,654	0%	9%
King Street Capital Management	14	\$6,566,243,635	7%	30%	PGIM	46	\$23,653,815,073	22%	51%
KKR Financial Advisors LLC	35	\$16,978,648,894	15%	40%	PineBridge Investments LLC	12	\$5,443,320,794	26%	86%
Kramer Van Kirk Credit Strategies LP	1	\$137,998,060	100%	100%	PPM America Inc.	5	\$1,941,192,673	0%	20%
LCM Asset Management LLC	28	\$12,089,770,988	29%	60%	Pretium Credit Management LLC	6	\$2,455,057,724	0%	36%
Man Group plc	3	\$894,912,929	6%	61%	Principal Global Investors LLC	3	\$1,203,742,200	0%	33%
Marathon Asset Management LP	14	\$5,222,382,830	33%	67%	Putnam Advisory Company Inc.	1	\$401,499,906	0%	0%
Marble Point Credit Management LLC	17	\$7,513,737,630	18%	31%	RBC	1	\$401,889,213	0%	0%
Medalist Partners Corporate Finance LLC	4	\$1,319,141,537	55%	55%	Redding Ridge Asset Management LLC	7	\$3,771,338,794	0%	0%
MidOcean Credit Fund Management LP	8	\$3,253,161,042	33%	75%	Sancus Capital Management LP	2	\$437,098,433	0%	0%
MJX Asset Management LLC	32	\$17,072,223,224	32%	58%	Saratoga Investment Corp	2	\$1,068,076,770	0%	0%
MS 522 CLO CM LLC	7	\$2,944,077,788	14%	44%	Sculptor Capital Management	24	\$10,865,825,106	27%	59%
Napier Park Global Capital, LLC	20	\$9,641,910,722	12%	42%	Seix Investment Advisors LLC	9	\$3,252,879,895	34%	63%
Nassau Corporate Credit LLC	8	\$3,409,968,273	23%	69%	Shenkman Capital Management Inc.	10	\$3,841,038,890	15%	49%

# US Managers % Reinvestment Ending by 1-24

Manager	CLOs	Collateral	% Ended	% Ended & Ending
Silver Rock Management LLC	2	\$757,903,939	0%	47%
Sixth Street Partners	19	\$7,616,167,411	10%	37%
Sound Point Capital Management LP	29	\$15,967,955,829	25%	59%
Steele Creek Investment Management	8	\$3,055,054,474	27%	62%
Sycamore Tree CLO Advisors L.P.	1	\$402,340,165	0%	0%
Symphony Asset Management LLC	11	\$4,577,204,094	12%	40%
Tall Tree Investment Management LLC	1	\$386,417,301	100%	100%
TCI Capital Management LLC	5	\$2,542,570,282	45%	80%
TCW Asset Management Company	8	\$3,439,865,570	0%	12%
Teachers Insurance and Annuity Association of America	4	\$1,936,802,470	0%	46%
Telos Asset Management LLC	4	\$593,594,245	100%	100%
Tikehau Capital Europe Limited	2	\$727,334,293	0%	0%
Trimaran Advisors LLC	8	\$3,556,774,723	19%	31%
Trinitas Capital Management LLC	15	\$7,714,875,922	2%	21%
Vibrant Capital Partners	13	\$5,956,000,121	13%	47%
Voya Alternative Asset Management	31	\$15,287,524,403	25%	63%
Wellfleet Credit Partners LLC	18	\$7,276,449,327	22%	40%
Western Asset Management Company	4	\$1,447,347,227	0%	0%
Whitebox Capital Management LLC	3	\$1,217,059,473	0%	0%
York CLO Managed Holdings LLC	1	\$481,269,963	100%	100%
Z Capital Credit Partners LLC	2	\$665,052,172	0%	100%
ZAIS Group Inc.	13	\$4,783,640,938	33%	54%

# Euro Managers % Reinvestment Ending by 1-24

Manager	CLOs	Collateral	% Ended	% Ended & Ending	Manager	CLOs	Collateral	% Ended	% Ended & Ending
Accunia Credit Management Fondsmæglersekskab	4	\$1,599,822,117	73%	73%	Guggenheim Investment Management LLC	4	\$1,722,241,611	26%	26%
Acer Tree Investment Management LLP	1	\$437,918,720	0%	0%	Hayfin Capital Management LLP	10	\$4,752,679,890	0%	8%
AlbaCore Capital LLP	4	\$1,774,720,498	0%	0%	HPS Investment Partners, LLC	11	\$4,475,806,069	34%	42%
Alcentra Inc.	15	\$6,170,064,549	52%	59%	Intermediate Capital Group plc	13	\$5,831,098,835	33%	33%
Anchorage Capital Group LLC	6	\$2,663,875,929	16%	16%	Invesco Inc.	8	\$3,431,674,827	0%	13%
Angelo, Gordon & Company LP	5	\$2,299,356,070	0%	0%	Investcorp B.S.C.	21	\$9,042,330,498	39%	54%
Apollo Credit Management LLC	3	\$1,318,949,797	100%	100%	King Street Capital Management	4	\$1,744,933,181	0%	25%
Ares Management, LLC	11	\$4,945,080,397	26%	52%	KKR Financial Advisors LLC	17	\$8,189,053,981	32%	37%
Assured Investment Management LLC	7	\$2,637,967,141	43%	43%	Man Group plc	6	\$2,219,991,700	100%	100%
AXA Investment Managers	6	\$2,427,099,214	15%	49%	MV Credit Sarl	1	\$426,990,477	0%	100%
Bain Capital Credit	12	\$4,813,942,900	32%	40%	Napier Park Global Capital, LLC	7	\$3,029,678,497	0%	0%
Barings LLC	12	\$5,390,023,235	34%	42%	Nassau Corporate Credit LLC	1	\$376,610,823	0%	0%
Black Diamond Capital Management LLC	3	\$1,035,525,930	58%	100%	Natixis Asset Management	1	\$312,975,455	100%	100%
BlackRock Financial Management	12	\$5,294,386,696	27%	43%	Neuberger Berman Fixed Income LLC	3	\$968,853,266	0%	0%
Blackstone Inc.	26	\$11,267,993,939	22%	34%	NIBC Bank N.V.	3	\$1,306,123,488	0%	0%
BNP Paribas	5	\$2,022,467,755	57%	57%	Oak Hill Advisors LP	6	\$2,346,623,586	51%	69%
Bridgepoint Group Limited	3	\$1,169,399,180	0%	0%	OakTree Capital Management LLC	9	\$3,956,846,062	0%	22%
Brigade Capital Management LP	5	\$2,015,842,916	21%	43%	Onex Credit Partners LLC	5	\$2,164,645,258	21%	21%
Cairn Capital Ltd.	12	\$4,460,898,338	42%	51%	Palmer Square Capital Management LLC	7	\$3,071,583,005	61%	61%
Capital Four CLO Management K/S	4	\$1,585,967,680	0%	0%	Partners Group	10	\$4,227,307,519	10%	10%
Carlyle Investment Management LLC	25	\$11,101,208,896	39%	46%	Permira Debt Managers Group Holdings Limited	7	\$2,860,817,931	13%	27%
Chenavari Investment Management	7	\$2,638,517,374	29%	29%	PGIM	22	\$10,364,414,693	23%	41%
CIFC Asset Management LLC	5	\$2,093,825,779	0%	0%	PineBridge Investments LLC	5	\$2,043,964,672	21%	41%
Commerzbank	3	\$1,179,480,540	36%	36%	RBC	3	\$1,293,021,605	0%	0%
CQS Investment Management Ltd.	1	\$252,531,293	100%	100%	Redding Ridge Asset Management (UK) LLP	10	\$5,217,819,933	0%	0%
Credit Suisse Asset Management	13	\$6,420,143,204	36%	53%	Sculptor Capital Management	9	\$3,697,854,578	23%	35%
CVC Credit Partners LLC	21	\$9,672,672,515	19%	41%	Sound Point Capital Management LP	9	\$4,141,670,727	10%	10%
Dekania Capital Management LLC	1	\$64,458,000	100%	100%	Spire Partners LLP	10	\$4,379,574,370	19%	19%
Fair Oaks Capital Ltd	4	\$1,560,997,224	0%	0%	Tikehau Capital Europe Limited	7	\$3,028,272,554	15%	29%
Fidelity Management & Research	3	\$1,233,050,142	0%	0%	Trinitas Capital Management LLC	2	\$806,208,217	0%	0%
Five Arrows Managers LLP	7	\$2,978,828,231	38%	38%	Voya Alternative Asset Management	5	\$1,976,923,089	19%	19%
GoldenTree Asset Management LP	6	\$2,510,940,214	17%	50%					



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