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Private Credit – Deep dive on Direct Loans, CLOs, and Private Placements



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Executive Summary

Many investors, including some insurers, have been increasingly investing in private credit, driven by factors such as the prolonged low-interest rate environment and the related search for higher yield, among other things. This report provides an overview of some relevant private credit asset classes, their historical loss experience, and forward-looking considerations not necessarily captured in the historical data.

"Private credit" is a broad term encompassing an array of asset classes. This report considers a subset of these assets in detail:

- Direct loans, including leveraged loans (LL)¹
- Securitisations based on pools of leveraged loans, namely Collateralised Loan Obligations (CLOs)
- "Traditional" private placements, mainly investment-grade

Key highlights from the report include:

- The historical realised credit loss experience of these asset classes overall compares favourably to public investments of similar credit quality.
 - For private placements and leveraged loans this is mainly driven by higher historical recovery rates compared to corporate bonds of similar credit quality. There is less publicly available data for direct private loans, although these share many characteristics affecting recovery rates (e.g., they are typically senior secured)
 - The historical loss experience of CLOs is favourable relative to corporate bonds of the same rating. The realised credit losses have also been low on an absolute basis for investment grade rated tranches. This is particularly the case for post-crisis CLO structures (CLO 2.0 and CLO 3.0), but data shows that even the pre-crisis structures (CLO 1.0) fared relatively well during the financial crisis on a credit loss basis; however, the credit loss experience over the financial crisis should be viewed in the context of the government intervention that provided significant support to the markets. The loss experience of the CLOs comes down mainly to the protection offered to senior and mezzanine tranches by the riskier junior tranches (the subordination)
- Despite the favourable historical track record, certain recent developments increase the uncertainty around the credit performance for some of these assets (e.g., leveraged loans) on a forward-looking basis. This includes signs of recent below-average and declining recovery rates on first-lien loans, driven, among other things, by higher indebtedness of accepted borrowers, changes in loan/financing structures (higher first-lien debt leverage, reduced junior debt cushions), and less contractual creditor protections (so-called covenant-lite loans). The recent interest rate hikes have also put significant pressure on weaker borrowers with floating-rate loans. When leveraging historical performance data for

¹ The term "leveraged loans" does not mean that the loans involve explicit leverage; rather, the term "leveraged" refers to the capital structure i.e. the indebtedness of the corporate borrower. In other words, "leveraged loans" are loans to borrowers that already have a high level of debt – corresponding to non-investment grade borrowers (which, if they obtained financing through issuing bonds instead, would be high-yield bond issuers).

assessments of future performance, the evolution of collateral characteristics for leveraged loans and CLOs over time should be considered

- Given their sometimes complex and bespoke nature, a proper risk assessment of private investments should be based on a detailed understanding of the mechanics and specifics of the assets and structures in question within the context of recognising relevant trends and risks/factors not in the data set; and should be complemented by robust stress testing and scenario analysis
- While private assets and related structures have historically offered higher yields combined with favourable realised credit losses, this comes with potential trade-offs such as less/no liquidity and greater uncertainty around valuations (and potential losses from both if selling the assets prior to maturity). Spread risk also affects the fair values of the investments and can be elevated compared to similar public assets, particularly during periods of financial distress, as has been observed historically (e.g., during 2008-2009); even absent a need to sell, this is particularly relevant for investors that are subject to economic valuation-based capital and solvency frameworks, such as many insurers. Private asset valuation practices must also protect against potential conflicts of interest
- In the case of insurers investing in private assets, a holistic risk assessment should crucially include consideration of the nature of the liabilities that those assets are backing, particularly the illiquidity and predictability of liabilities. It is critical to ensure that private assets are funded by well-matched illiquid liabilities (or sufficient liquidity otherwise exists even in stressed conditions) so that insurers are not forced sellers of the private assets
- The Bermuda Monetary Authority (BMA) views Bermuda insurers allocation to private credit through the overarching lens of the Prudent Person Principle in the context of the nature of the liabilities and the available liquidity resources. The overall exposure of Bermuda long-term insurers to these assets remains moderate and should be viewed against the characteristics of the liabilities they are backing. The large majority of the investments of Bermuda insurers in these assets are investment grade (e.g., 80%+ of private placement and 90%+ of CLO investments are investment grade for Bermuda asset-intensive (re)insurers, as noted later in the report). Exposures to below-investment-grade assets, whether public or private, should be limited and in the context of an overall diversified, investment-grade portfolio

The above points will be examined and expanded on in the main sections of this report.

Introduction

Some insurers have been increasingly investing in private credit. In the case of Bermuda insurers, this has consisted mostly of investment-grade assets, as detailed in a later section of this report, with some smaller allocation to unrated or below-investment-grade loans. "Private credit" is a broad term encompassing an array of asset classes.² This report considers a subset of these assets in detail:

- Direct loans, including leveraged loans (LL)
- Securitisations based on pools of leveraged loans, namely Collateralised Loan Obligations (CLOs)
- "Traditional" private placements

It is noted that so-called broadly syndicated loans (BSL) have tended to be the most common type of LL, but in recent years LL funding has increasingly come from private lenders.³ BSLs are typically underwritten by banks but widely distributed across various institutional investors, while direct lenders, such as credit-focused private or public funds, make loans directly to borrowers without any intermediation from banks. Direct loans, in particular, have seen increasing interest from insurers. More broadly, CLO vehicles have consolidated their position as major buyers of LLs, sometimes managed by affiliated asset managers and/or based on loans originated from affiliated parties.

The CLO markets, and to an extent the leveraged loan markets, have historically had relatively lower realised credit loss rates and performed comparatively well even during the financial crisis. The same applies to private placements relative to their public counterparts. This historical performance is further studied in the subsequent sections. At the same time, the structure of loans and the leveraged loan market itself have evolved markedly since the financial crisis, including both in characteristics of the borrowers and the investor base, including a rise in direct private lending and prominence of Private Equity (PE) related players. Globally, both the loan and the CLO markets have experienced significant growth⁴ driven by an expanding economy and the low-interest rate environment (the so-called "easy money" period), which characterised the post-financial crisis period until early 2022, when the global central banks led by the Federal Reserve (FED) embarked on hiking rates. These changes and developments have implications for current and forward-looking risks and will be explored later in the report regarding their impact on private assets.

Investing in Private Credit

For investors, the attractiveness of private credit, relative to similar public credit (whether non-investment grade or investment grade), traditionally comes down to the higher yield private credit

² There are different views of what is "public" and what is "private". Corporate bonds, CLOs and other securitizations may be public or private, depending on whether they are distributed and traded broadly and therefore "liquid"/"traded", or bilaterally negotiated and therefore less traded or not traded. Corporate bonds are generally public, except for some private placements. While market views vary, BSL CLOs are generally considered public/traded, while other CLOs may be public or private. All loans are generally considered private; however, a distinction is made between broadly syndicated loans and private loans, where BSL are relatively liquid compared to private loans.

³ IOSCO CR05/2023 (September 2023): "Leveraged Loans and CLOs – Good Practices for Consideration Consultation Report"

⁴ Ibid.

often offers, i.e., the so-called illiquidity premium. The broad illiquidity premium⁵ can be conceptually defined as the difference between the yield of a private debt investment and the yield of a (theoretical) otherwise identical public debt investment. It is important to note that the illiquidity premium is compensation required by investors for taking on associated risks (e.g., illiquidity risk, non-default related spread risk and complexity risk) and is typically only realised if the investor is able to hold the asset to its maturity, assuming the asset does not default. In case of a sale prior to asset maturity, the premium may or may not be realised. In fact, due to the potential illiquidity of the private assets, significant losses could be realised if the asset had to be disposed of prior to maturity due to uncertain and potentially volatile⁶ prices at which such assets could be sold at a future time (exacerbated by a lack of observable pricing inputs, by definition, and related valuation risk). The same may also apply to structured assets/securitisations,⁷ some of which, depending on their nature, could be less liquid or, where traded, could still be exposed to greater volatility (spread risk) on a market price basis compared to, e.g. public corporates of similar credit quality, particularly in stressed conditions.⁸

To manage the potentially significant liquidity risk and the risk of forced sales, it is critical that private assets are funded using stable funding sources. Crucially, illiquid assets should not be funded by liquid liabilities. Private assets are, therefore, generally appropriate mainly for "long-term investors", specifically, investors employing capital/funding whose horizon is longer than the expected payoffs from the illiquid assets.⁹ ¹⁰ For insurers with illiquid, long-term liabilities, private assets could fit within an overall high-quality investment portfolio, provided that the assets and liabilities are well matched and the insurers have adequate governance and risk management frameworks in place to invest in private markets. Because of their predictable, long-duration liabilities, research has found that insurers can contribute to stabilising capital markets by acting countercyclically and buying assets in market downturns rather than being forced sellers.¹¹ Some illiquid assets could also provide long-duration cash flows to allow insurers to match their long-term

⁵ The illiquidity premium in the wide sense is often further broken down into components, e.g., "pure" illiquidity premium and complexity premium. For one take on illiquidity risk premium, see further Willis Towers Watson (2016): "Understanding and measuring illiquidity risk".

⁶ It is noted that historical mark-to-market data for private assets, taken at face value, may often display reduced volatility compared to similar public assets. However, this can be generally attributed to valuation and reporting lags (e.g. quarterly valuations) and the nature of the valuation methods (e.g., appraisal values) used to provide marks for the assets in the absence of active markets and observable traded prices – i.e., to issues of stale prices and "volatility smoothing". This should not be confused with lower economic volatility – where the actual inherent volatility may be "hidden" by unchanging or less responsive reported valuations, and only revealed when the assets are transacted. This is also related to valuation risk. The same comments also apply to the occasionally purported diversification benefits between private and public markets, which on closer inspection, often turn out to be driven by data issues and mismeasurement of volatility and correlations.

⁷ Though there are important exceptions e.g., the highest-rated Agency MBS in the US and certain other types of typically highly rated securitizations. See also footnote 2.

⁸ This was demonstrated e.g. during the financial crisis in 2008-09, when liquidity (demand) for certain types of securitisations dried and deeply discounted prices were quoted.

⁹ See, e.g., Ang and Kjaer (2012): "Investing for the Long Run", Netspar DP 11/2011-104 (revised January 2012) for discussion.

¹⁰ Note that the horizon can differ materially between different classes of illiquid assets. For instance, the term/holding period for private corporate credit is typically relatively short term (1-5 years), reflecting the nature of the corporate debt markets; while for real estate, private equity, and infrastructure, the holding period could be significantly longer.

¹¹ See, e.g., Timmer (2017): "Cyclical investment behaviour across financial institutions", ESRB Working Paper Series No 77; and Chodorow-Reich, G., Ghent, A. and Haddad, V. (2021): "Asset Insulators", Review of Financial Studies, 34(3), pp. 1509–1539.

liabilities where appropriate public market investments are limited or non-existent, providing a separate rationale for investment; however, this is less the case for the assets covered by this report.

In contrast to investors with shorter-term horizons or less stable funding sources—insurers with illiquid liabilities may be well positioned to take on asset illiquidity risk and be compensated for doing so, subject to appropriate risk management. The higher yield from capturing an illiquidity premium can benefit policyholders to the extent it is passed on to them¹², contributes to greater policyholder protection through the build-up of surplus, or otherwise enables the insurer to offer competitive products or products that the insurer might otherwise not consider economical to offer; in all cases provided that associated risks (e.g., illiquidity risk) are effectively managed and the extra yield is not simply a reflection of incremental credit risk. However, it is important to point out that investing in illiquid assets is not a panacea: it is still important to ensure that the illiquidity premium on offer is also adequate relative to the risks taken on (and relative to other investment opportunities available), particularly in the context of recent years as demand for certain assets has tended to outweigh the supply, depressing spreads.

Assuming that liquidity risk is effectively managed from a held-to-maturity perspective, the focus of risk assessment shifts to the underlying fundamental credit risk, i.e., the risk of credit losses due to defaults and impairments. This is considered in the following sections, both in light of actual historical data and considering recent developments not (fully) reflected in the historical data. From an overall prudential supervision perspective, it is noted that interim mark-to-market volatility due to spread risk continues to be also relevant, as does valuation risk, even absent the need to sell; refer to Appendix A for a discussion on the latter. In addition to the focus on realised credit losses, the perspective of this report is that of (micro)prudential supervision, as opposed to a macroprudential and financial stability perspective.

Direct Loans

With direct loans, a distinction can be made between non-investment grade leveraged loans and investment grade corporate direct lending. Generally, leveraged loans are loans to highly leveraged, non-investment grade, non-financial corporate issuers. LLs and investment grade direct loans usually have a floating rate of interest and, in contrast to typical corporate bonds, are generally secured by the borrower's assets (senior secured). Most corporate bonds are unsecured and would be subordinated to senior secured private/leveraged loans within the borrower's capital structure. In addition, the loans have historically tended to include covenants¹³ protecting the lenders (though this has been changing more recently), whereas corporate bonds generally do not include such.

¹² For example, Knox and Sørensen highlight the interdependency between the stability of insurers' funding, investments, and pricing decisions. Their model finds an economically significant pass-through of investment yields to insurance prices in both the annuity and P&C insurance markets studied, suggesting, as per the authors, that policyholders may "receive a meaningful share of the value they provide to insurers through stable funding". See Knox, Benjamin, and Jakob Ahm Sørensen (2024). "Insurers' Investments and Insurance Prices," Finance and Economics Discussion Series 2024-058. Washington: Board of Governors of the Federal Reserve System, <https://doi.org/10.17016/FEDS.2024.05>

¹³ Covenants can include (but are not limited to): limits on leverage ratios (e.g., Debt/EBITDA) and debt service coverage ratios, restrictions on incurring additional debt, restrictions on capital expenditures and dividend distributions, and limitations on asset sales or transfers.

Leveraged loans can be further divided into 1) Broadly syndicated loans and 2) Direct private (non-investment grade) lending. Broadly syndicated loans tend to be larger loans to larger corporations, while direct private lending tends to target smaller issuers ("middle-market" or sometimes lower). However, direct loans can also be larger, and such larger loans are sometimes categorised as "large cap" direct lending (whether investment grade or not). There is limited publicly available data on the performance and loss experience of private loan transactions, apart from the data available to the investors/asset managers investing in the individual transactions. As such, broadly syndicated loans with similar characteristics to direct loans are often used as the closest proxy for benchmarking purposes; this is the approach considered here as well in terms of historical data.

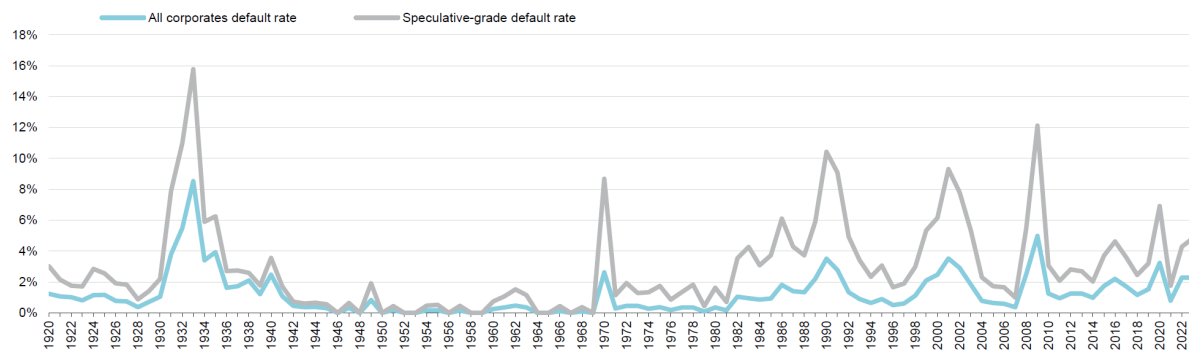
The following subsections discuss default and recovery rates for the loans and comparable public corporate bonds. Overall, the available data generally indicates broadly similar default rates for loans compared to corporate bonds of similar credit quality but with higher recovery rates compared to bonds. Taken together, this points to generally lower realised credit loss rates for loans, driven by the higher historical recovery rates. When it comes to private lending deals, the credit quality of the borrowers can vary widely compared to the general broadly syndicated loan market, ranging from high investment grade to small and riskier borrowers that would be unable to obtain a bank loan; accordingly, the credit quality mix should be taken into account when comparing aggregate default and loss rates (at asset class or portfolio level). Private loans still tend to include more creditor protections in terms of covenants than broadly syndicated leveraged loans; see the section on recent developments for more details.

Default rates

For corporate issuers, defaults generally happen at the level of the issuer, i.e., either the issuer defaults – in which case all its debt issues default (whether bonds, loans, or both) – or the issuer does not default (though pre-bankruptcy restructurings, such as distressed exchanges, can change this dynamic, as discussed later). In contrast, recoveries are issue-specific, depending on the position of the issue in the capital stack and any security. The figure below shows the historical default rates for corporate issuers of bonds and loans included in the Moody's rated universe.¹⁴ It should be noted that below- investment grade default data prior to the early 1980s primarily reflects "fallen angels," as these pre-date the emergence of a fully developed below- investment grade issuance market.

¹⁴ Moody's Annual default study: Corporate default rate to moderate in 2024 but remain near its long-term average (26 Feb 2024)

The default rate rose for speculative-grade issuers but stabilized for all issuers*



* Issuer-weighted.
Source: Moody's Investors Service

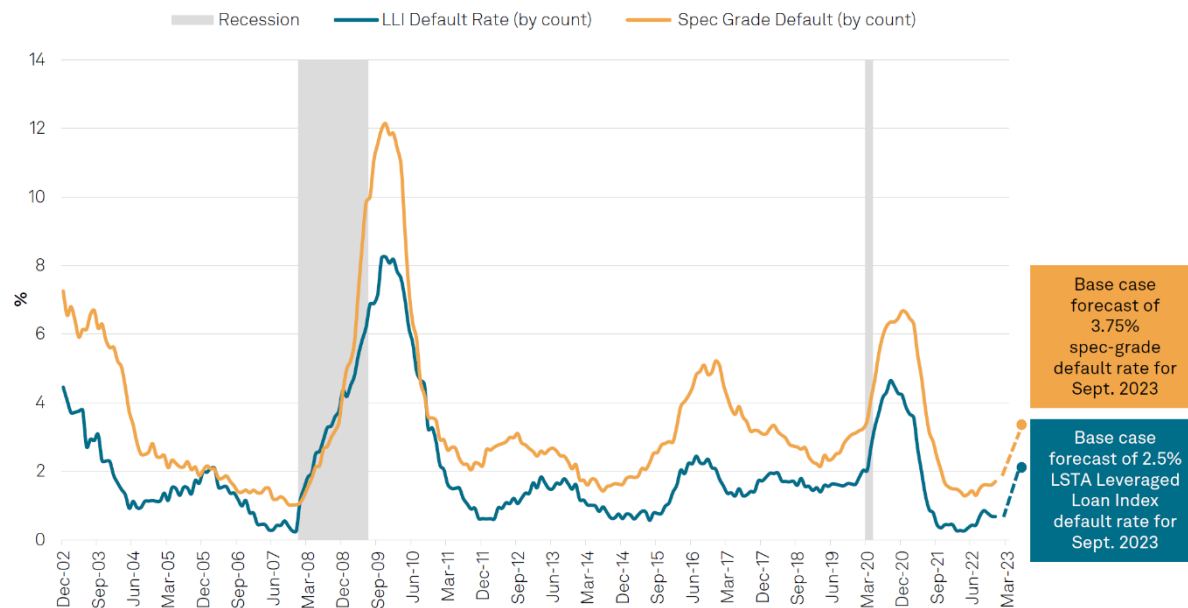
In contrast, the figure below shows historical issuer-weighted default rates for leveraged loans included in the Morningstar LSTA Leveraged Loan Index¹⁵ (LLI), excluding non-loan defaults (i.e. bond defaults) and selective defaults. This LLI loan default rate is compared to the overall S&P US speculative-grade default rate (on issuer count basis), where the latter is broadly consistent with Moody's corresponding global rate reported in the previous figure. In comparing the default rates shown below, it is, however, important to stress that the LLI default rate specifically excludes "selective defaults", a category which S&P notes primarily consists of distressed exchanges.¹⁶ In contrast, Moody's includes distressed exchanges as defaults (as do S&P's overall issuer default rates by including the "selective defaults" into the applicable definition of default). S&P notes that selective defaults have been significant, representing approximately 47% of all speculative-grade defaults in 2020, 64% in 2021, and 60% in 2022.¹⁷

¹⁵ Formerly known as the S&P LSTA Leveraged Loan Index

¹⁶ S&P Global Ratings: Credit Trends: A Rise In Selective Defaults Presents A Slippery Slope (26 Jun 2023)

¹⁷ S&P Global Ratings: US BSL CLO and Leveraged Finance Quarterly, Q1 2023 (9 Feb 2023)

LTM Default Rates (Including Estimates Through YE 2022 (By Issuer Count))

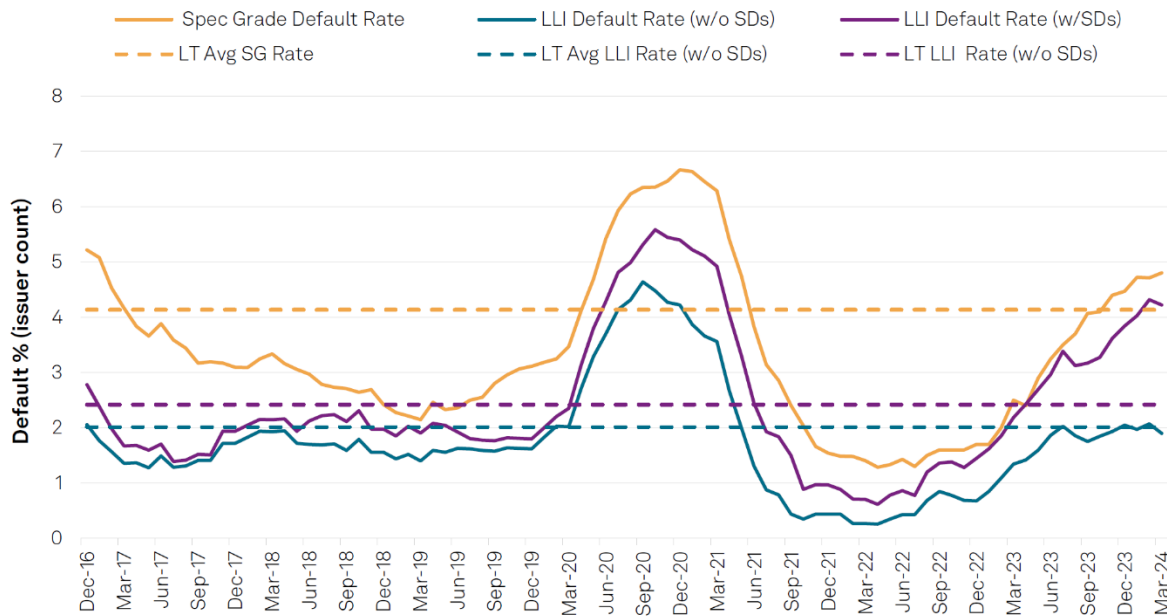


Measures of LLI defaults exclude nonloan defaults and selective defaults. LTM--Last 12 months. Sources: Default, Transition, and Recovery: Global Corporate Default articles. https://www.capitaliq.com/CIQDotNet/CreditResearch/SPResearch.aspx?DocumentId=51666471&From=SNP_CRS

Pitchbook LCD has recently begun publishing a version of the default rate for the Morningstar/LSTA Leveraged Loan Index that includes selective default rating actions by S&P Global Ratings (from December 2016 forward). This is shown in the graph below for the available history.¹⁸ Adding back selective defaults increases the LLI default rates, though they remain below speculative-grade corporate default rates.

¹⁸ S&P Global Ratings: US BSL CLO and Leveraged Finance Quarterly, Q2 2024 (8 May 2024)

U.S. speculative-grade default rates on a trailing 12-month basis through March 31, 2024

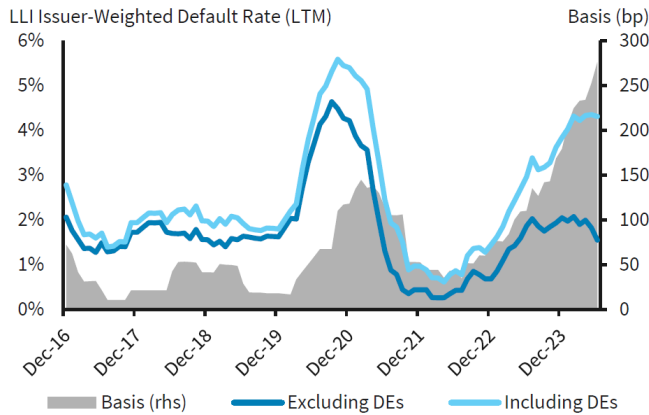


Source: S&P Global Ratings and Leveraged Commentary & Data. All default measures are shown on an issuer-count basis through March 31, 2024 (although the speculative-grade default rate is preliminary). The LLI default rate is for the Morningstar/LSTA Leveraged Loan Index and is shown without selective defaults (SDs), consistent with the default definition of the index, as well as with SDs as determined by S&P Global's rating actions.

The same adjustment to the LLI default rates to include selective defaults (distressed exchanges) is shown in the left panel of the below figure by Barclays.¹⁹ The right panel shows Barclays' estimated percentage of distressed exchanges as a proportion of defaults based on Moody's data, indicating both a drastic increase in the prevalence of distressed exchanges and an increasing trend. The picture is broadly consistent with the S&P data noted above. The increase in distressed exchanges has further potentially significant implications for recovery rates and, being a relatively more recent phenomenon, may not be captured in very long-term average statistics. Some observations regarding recent recovery rates are highlighted at the end of the next section, with more discussion of the trends and the reasons for them in a later dedicated section.

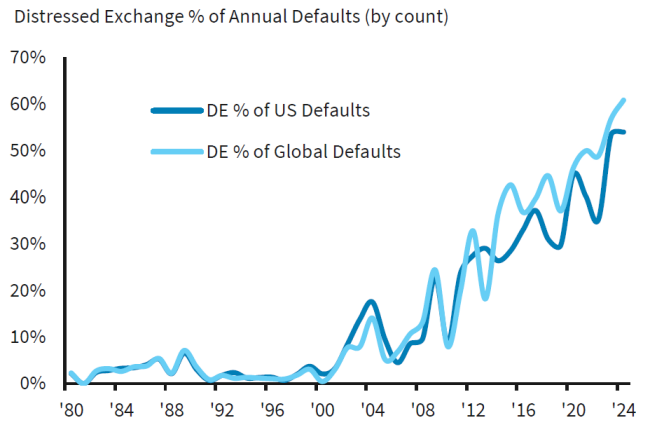
¹⁹ Barclays Research – High Yield & Leveraged Loans – LME: Trading through prisoner's dilemma (29 July 2024)

Classifying distressed exchanges as defaults has become increasingly important for default rate calculations...



Source: PitchBook LCD, Barclays Research

...since distressed exchanges have accounted for more than half of all US defaults since YE19



Across issuers of bonds and/or loans.
Source: Moody's, Barclays Research

Recovery Rates

The tables below show the average historical recovery rates for debt issues of different types/seniority based on Moody's data, both on a trading price basis and an ultimate recovery basis. The data indicates that the average recovery rates for loans have exceeded those for bonds. This is in line with the typical senior secured nature of the private/bank loans and contrasts in particular with the recovery rates of common (senior unsecured) corporate bonds. For example, the issuer-weighted long-term average recovery rate (based on trading prices post-default) for 1st lien bank loans is approximately 65%, while for senior unsecured bonds, it is 38%. On a fully resolved, i.e. ultimate recovery basis, the long-term average recovery rates for term loans are 71% (and those for revolving credit facilities are 87%), while the ultimate recovery rate for senior unsecured bonds is 47%.

Selected average corporate debt recovery rates measured by trading prices

Source: Moody's Ratings

Priority Position	1983-2023
1st Lien Bank Loan	65%
1st Lien Bond	55%
Sr. Unsecured Bond	38%

Selected average debt ultimate recovery rates

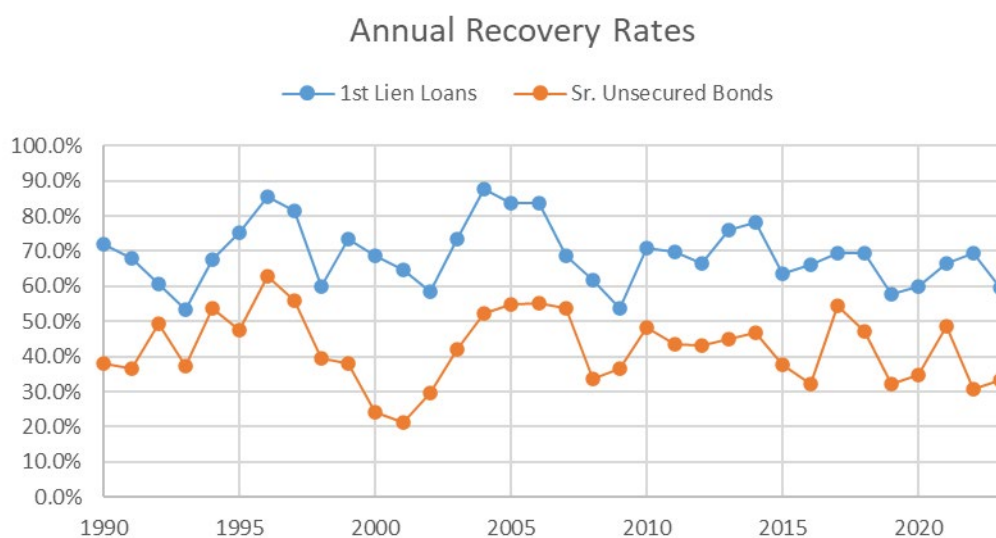
Source: Moody's Ratings

Debt type	1987-2023
Revolvers*	87%
Term loans**	71%
Senior secured bonds	62%
Senior unsecured bonds	47%

* Includes cash revolvers and borrowing base facilities.

** Includes all types of term loans: first-, second lien and unsecured

The observed average recovery rates for 1st lien loans by calendar year have varied between approximately 53% and 88% measured by trading prices, based on the period 1990-2023 for which Moody's data is available on a calendar-year basis. This variation is shown in the figure below. Senior unsecured bond recovery rates are also included for comparison.

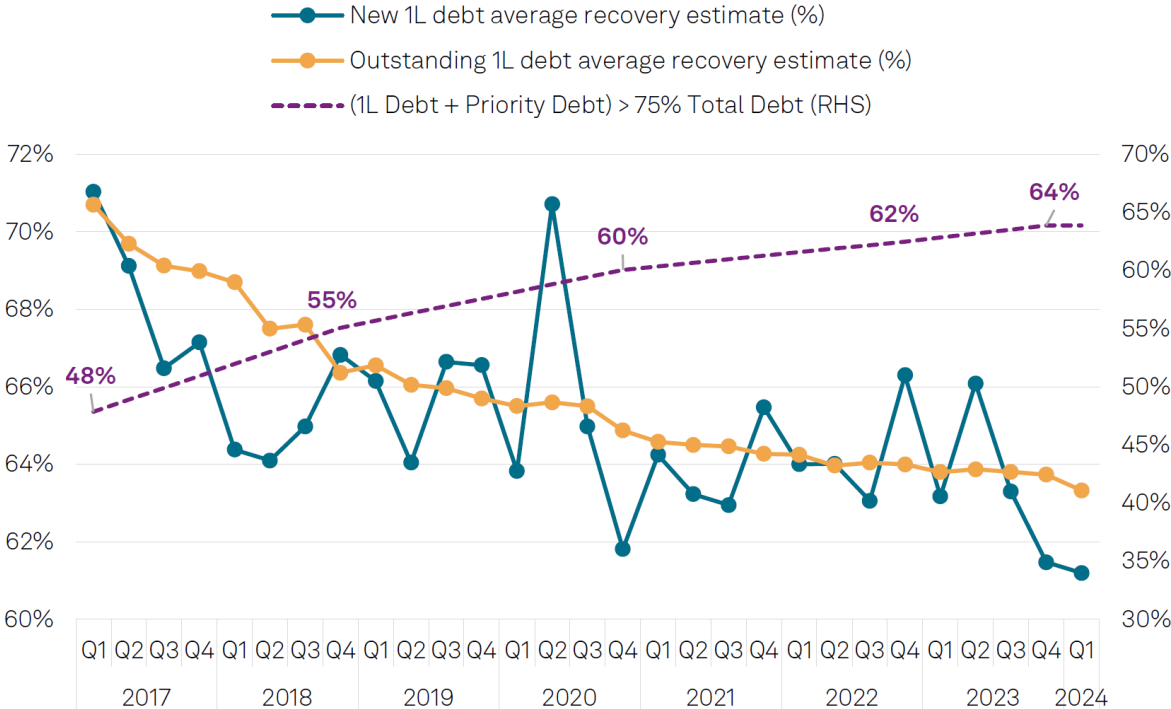


Looking at additional data points, S&P recovery rate data on the US first lien loans indicates high historical long-term averages at 75%-80% (over the past 35 years as of 2022). However, the actual average recoveries have been below historical averages in recent years and are gradually declining (see the figure below).²⁰ This is consistent with comments from Moody's and will be further discussed in a subsequent section. The figure below also indicates that the debt structures have become more top-heavy in recent years, as measured by the proportion of first lien and priority debt

²⁰ S&P Global Ratings: US BSL CLO and Leveraged Finance Quarterly, Q1 2023 (9 Feb 2023) and S&P Global Ratings: US BSL CLO and Leveraged Finance Quarterly, Q2 2024 (8 May 2024)

making up more than 75% of total debt, meaning less cushion provided by junior debt (this development is also touched on later in this report).

Expected recovery on newly issued and outstanding 1L debt based on S&P’s Recovery Ratings (U.S. and Canada)

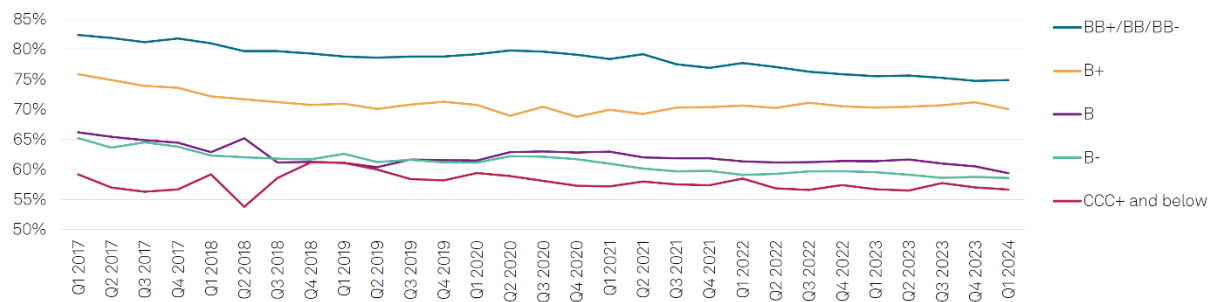


Data through March 31, 2024, based on the rounded point-estimates included in our recovery ratings for rated nonfinancial corporate entities in the U.S. and Canada. Source: S&P Global Ratings. The data on debt structure composition is from a sample that covers large portion of the relevant rated issuers as of 1QE 2017, YE 2018, YE 2020, YE 2022, and YE 2023 (with smoothed transitions between these dates). The YE 2023 sample covers roughly 80% of the rated SG issuers in the U.S. and Canada.

S&P data for the US and Canada also indicate that recovery rates of first-lien debt tend to decrease with the credit quality of the issuing entity, with debt from lower-rated issuers historically experiencing lower recovery rates.²¹ Relatively higher-rated issuers tend to be less levered with larger junior debt cushions and tend to have higher recoveries. This also has important implications for CLOs in terms of the riskiness of the underlying loan pool., S&P notes that these recovery estimates do not reflect "event risk" related to future aggressive-out-of-court restructurings or liability management transactions; the uncertainty created by the recent increase in these types of actions is briefly discussed later in this report.

²¹ S&P Global Ratings: US BSL CLO and Leveraged Finance Quarterly, Q2 2024 (8 May 2024)

Average recovery estimate of first-lien debt: U.S. and Canada



Data through March 31, 2024, based on the rounded point-estimates included in our recovery ratings for rated nonfinancial corporate entities in the U.S. and Canada. Source: S&P Global Ratings.

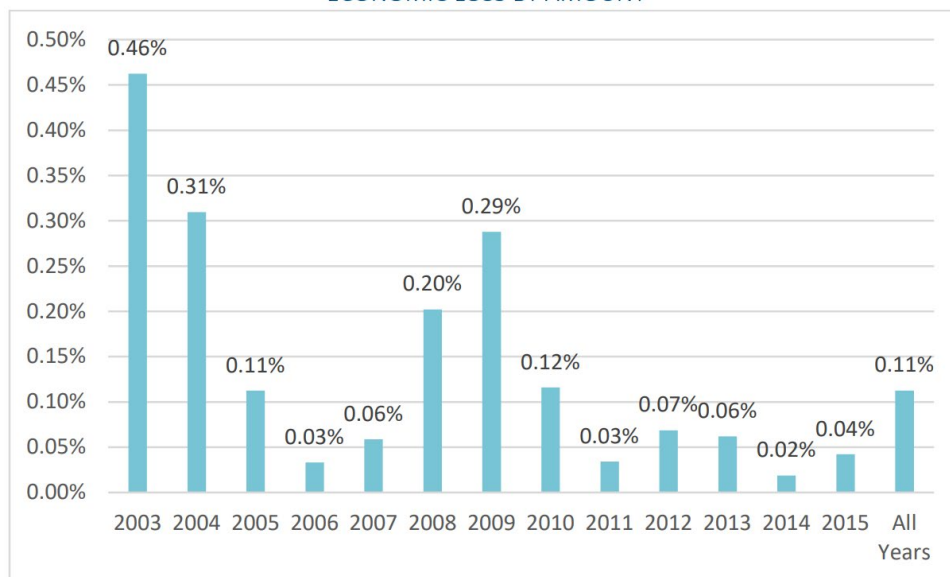
Private placements

Another publicly available data source relevant to insurers' investment in private assets is the Society of Actuaries (SOA) study on "traditional" private placements invested in by US insurers.²² The private placements in the study's scope comprise 86% of investment-grade credit-quality notes, bonds, and debentures; the remaining 14% includes project finance, credit tenant leases, and equipment trusts/lease obligations. 94% of the assets in the study sample were fixed-rate, which contrasts with the typically floating-rate leveraged loans.

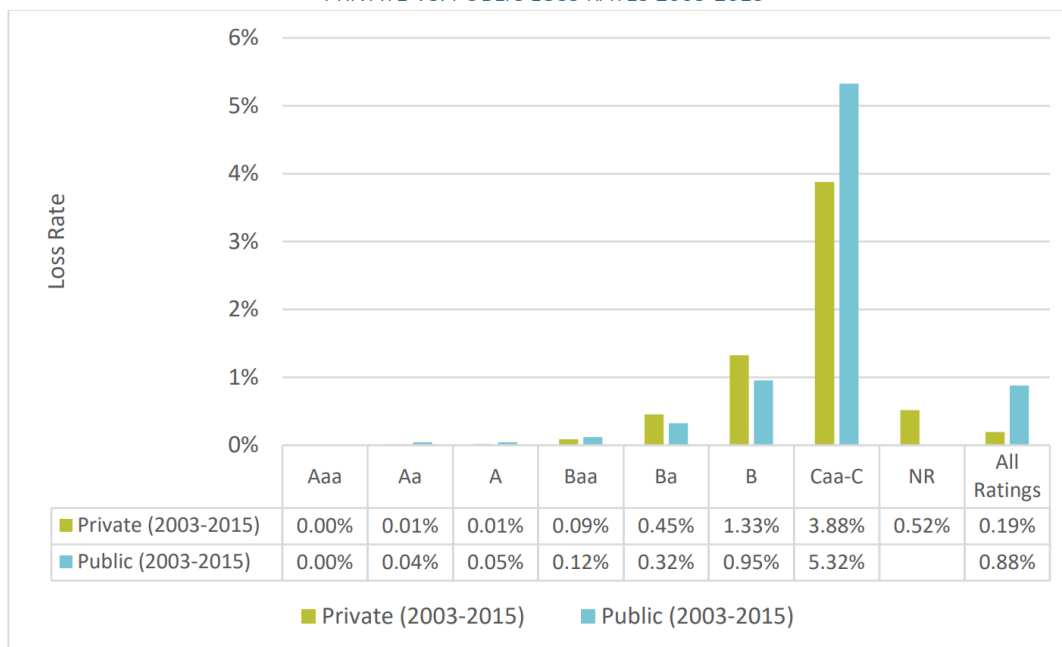
The figure below shows the credit losses by calendar year. The average annual credit loss observed over the study period was 0.11%. Credit quality/ratings should be accounted for when comparing losses to comparable public credit. A comparison is shown further down. Note that the credit ratings used for the private assets are the internal ratings of the insurers investing in the assets. The internal ratings criteria used by different companies may not necessarily be homogeneous, and the use of internal ratings could introduce biases with respect to credit rating agency ratings; these are inherent limitations of the data and the study.

²² Society of Actuaries (April 2019): "2003-2015 Credit Risk Loss Experience Study: Private Placement Bonds"

ECONOMIC LOSS BY AMOUNT



PRIVATE VS. PUBLIC LOSS RATES 2003-2015



Source for Public Bonds: Moody's 2017 Public Corporate Bond Default Study (1970-2017), Exhibit 23 with Exhibits 16, 30, and 41 used to develop weightings to combine annual experience.

Private bond figures calculated using issuer default and senior unsecured recovery rates, which is an attempt at reproducing the basis of Moody's Exhibit 23).

The report further attempts to make the comparison on a like-for-like basis by adjusting the rating/credit quality distributions to more closely match each other (using either the private bond credit quality mix or the public bond credit quality mix to weigh the rating-specific loss rates for both

public and private bonds). The results are shown below and they bring the private and public loss rates closer to each other, with the estimated private loss rates remaining slightly lower.

PUBLIC VS. PRIVATE LOSS RATES WITH ADJUSTMENTS FOR COUNTERPART QUALITY MIX 2003-2015

Basis	Loss Rates (bps)		
	Public	Private	Difference
Unadjusted	88	19	69
Public estimated based on private quality mix	25	19	6
Private estimated based on public bond quality mix	88	74	15

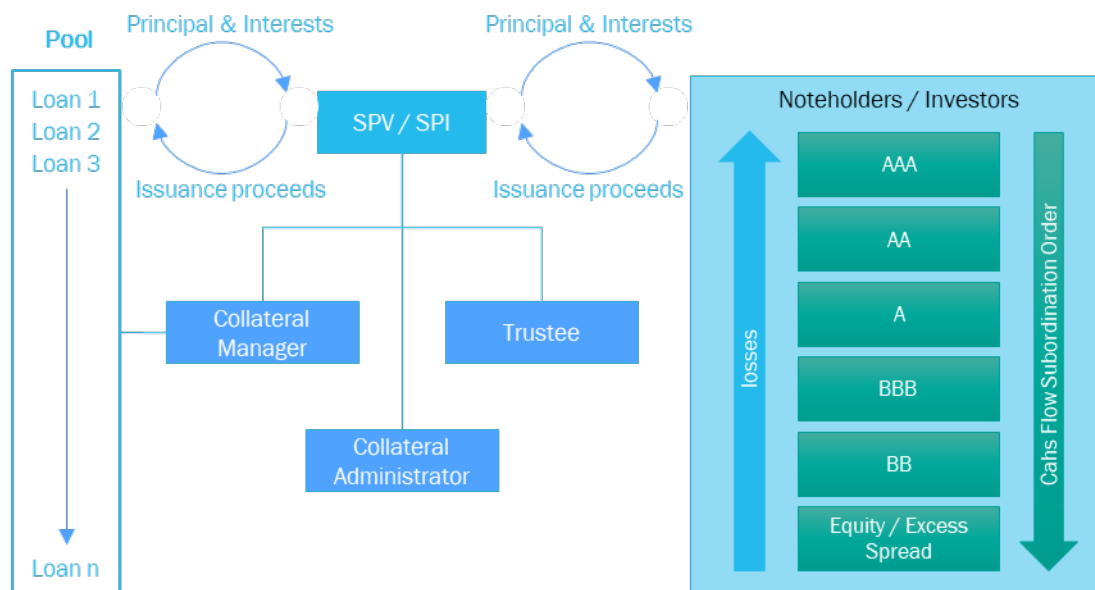
Finally, it can be noted that the lower overall loss rates for the studied private placements relative to public corporate bonds were driven by higher recoveries in case of default. In comparison, the default rates of the private placements were higher than those for comparable publics (except in the AAA-A credit quality bucket). The average dollar-weighted loss severity over the study period (overall seniorities) was 32%, for an average recovery rate of 68%, but with some significant variation across calendar years – likely driven, in part, by data limitations.

LOSS SEVERITY BY AMOUNT



Collateralised Loan Obligations

Collateralised Loan Obligations are a type of securitisation backed by a pool of debt (the collateral), typically corporate loans. These loans are typically leveraged loans, with overall credit quality in the single-B range. CLOs generally involve a bankruptcy-remote special purpose vehicle (SPV) that issues financial instruments (notes) and uses the proceeds from the note issuance to acquire the portfolio of loans that functions as collateral. The figure below shows a typical CLO setup.

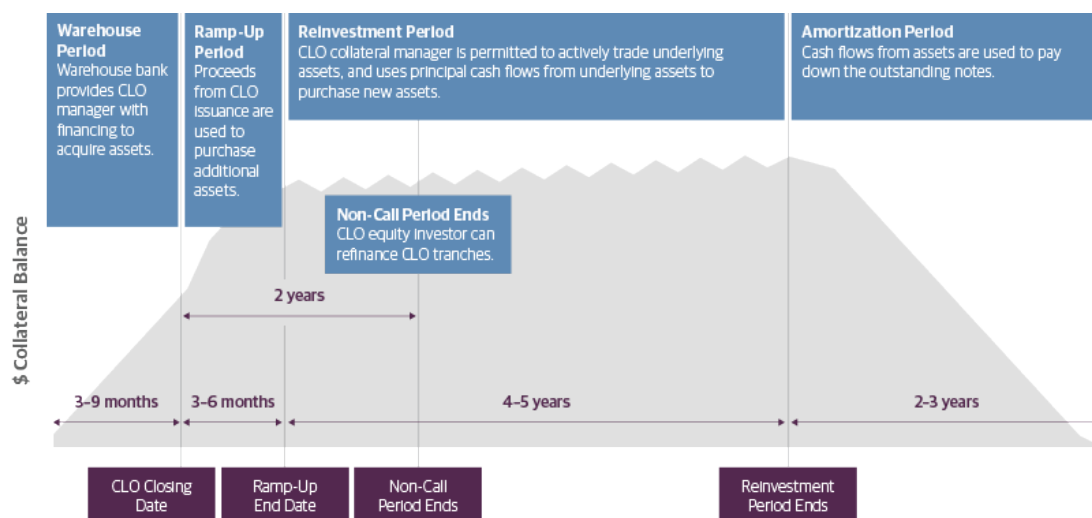


The notes issued by the SPV correspond to different tranches with varying risk/return profiles. The cash flows (interest and principal payments) from the underlying loan pool are allocated to the tranches in order of priority by what is commonly known as the "waterfall". The most senior tranche has the lowest risk – and lowest coupon rate – and is paid first, followed by the mezzanine and any junior tranches (with increasing credit risk and increasing compensation in terms of higher coupon rates), with the residual/equity tranche receiving what's left. For any given tranche except for the equity tranche, the lower (subordinated) tranches provide protection: in order for the tranche to take principal losses, all the lower tranches must have been wiped out first. This provides significant protection to the most senior tranches (generally rated AAA or sometimes AA). The equity tranche takes the first loss and does not have a fixed coupon (nor a rating), receiving what may be left after paying out all the other tranches and/or after allocating any losses.²³

The figure below illustrates the typical life cycle of a CLO transaction, with three main phases: the ramp-up period, the reinvestment period, and the amortisation period.²⁴

²³ While the equity tranche has the greatest risk, it also has correspondingly larger return potential and upside in favourable scenarios e.g., through receiving unwinding of any over-collateralisation and excess spread in scenarios where losses do not materialise.

²⁴ Guggenheim Investments: "Understanding Collateralized Loan Obligations (CLOs)" (December 7, 2024)



CLOs are managed by an investment management firm (called the CLO manager or collateral manager). CLO managers select the loans to be included in the initial portfolio (generally 150 or more) and can actively manage the loan portfolio – buying and selling loans – during the reinvestment period. CLOs are the largest purchasers of broadly-syndicated leveraged loans. CLOs purchased nearly 65% of all institutional LLs that were syndicated in 2021 and held 25% of global outstanding LLs in 2020.²⁵ Rating agencies and investors expect CLO structures to maintain a high level of corporate sector diversity within their portfolios. The CLO indenture rules generally include formal "single name limits" that limit any single borrower exposure and "industry limits" that prevent one industry from dominating the underlying collateral pool.

Two main factors drive the credit risk of CLO tranches: 1) The credit quality and performance of the underlying pool of loans, and 2) the CLO structure, i.e., the level of subordination (the priority of the tranche in the waterfall) and other protections present. The protections typically include over-collateralisation²⁶ and excess spread, where the excess spread is the difference between the interest received from the underlying collateral pool and the interest paid to CLO debt holders. In addition to the above, manager skills can affect credit performance through active management of the loan pool, whether positively or negatively.

See Appendix B for an example of a typical CLO structure and an illustration of the waterfall's functioning.

In order to be marketable, all the CLO notes are generally rated (save for the residual equity tranche). Rating agencies publish data on structured finance impairments and losses, including on CLOs. Historical data from Moody's shows no credit losses on CLOs rated A or better during the study period covered (1994-2023), including no ultimate credit losses arising from the financial crisis.²⁷ It

²⁵ IOSCO CR05/2023 (September 2023)

²⁶ And if cashflow on the underlying collateral pool deteriorates and results in a failure of an overcollateralization ratio test, the CLO structure retaining cash and using this cash to de-lever the senior tranches.

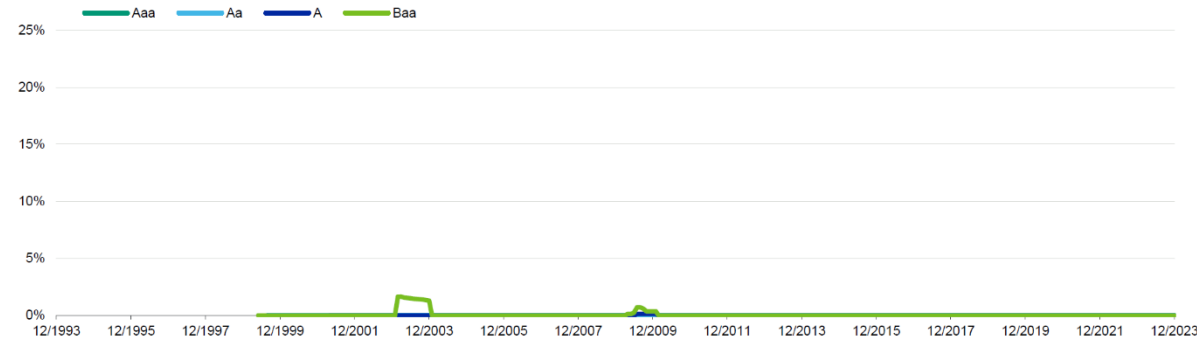
²⁷ Moody's Data Report (Structured Finance) - Impairment and loss rates of Global CLOs: 1993-2023 (24 June 2024)

is noted that the data does show impairment²⁸ on up to single-A-rated tranches, as measured by the original rating. However, these impairments are indicated not to have led to ultimate credit losses on the A-rated tranches.²⁹ The historical data demonstrates relatively good credit performance for even the pre-crisis CLO structures in comparison to many other types of pre-crisis structured finance products (e.g., RMBS, CMBS, CDOs, where often even the highest-rated tranches, including those rated AAA, took losses). However, the financial crisis was primarily a liquidity and financial stress with the government stepping in to provide significant support to the markets (loan performance deteriorated for only one year), and the historical experience should be viewed in this context.

After the financial crisis, the CLO structures observed in the markets were further revised to provide more credit protection to the higher tranches; practitioners often refer to these post-crisis CLOs using labels "CLO 2.0" or "CLO 3.0" to contrast with the earlier structures ("CLO 1.0"). According to Moody's data, there have been no losses on investment grade rated CLO tranches (BBB- or better) post-financial crisis, so no losses on investment grade tranches of the so-called CLO 2.0 or CLO 3.0 structures (albeit in a period that could be regarded as characterised by relatively benign overall market conditions).

The figures below show the trailing 12-month impairment rates for Global CLOs (only available by cohort rating), as reported by Moody's, while the table that follows displays the cumulative impairment rates by original rating. The cumulative loss rates by original rating are shown further below, together with comparison data on corporate bonds.

Trailing 12-month impairment rates for global CLOs by cohort rating (Aaa, Aa, A, Baa)

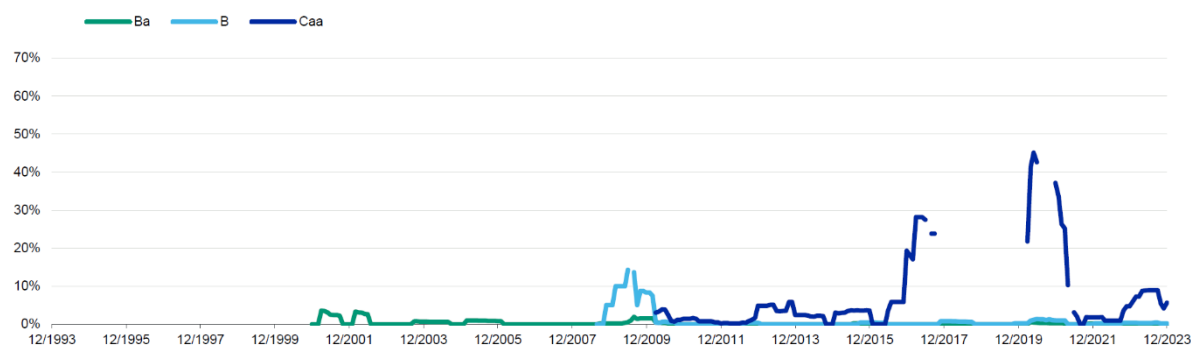


Source: Moody's Ratings

²⁸ A note on terminology: The underlying loans default, while the tranches get impaired. A tranche is impaired if the losses in the underlying loan pool pierce it (after wiping all the lower tranches).

²⁹ Other data suggests impairment of up to an AA-rated tranche in individual instance. E.g. Guggenheim Investments: "Understanding Collateralized Loan Obligations (CLOs)" (December 7, 2024)

Trailing 12-month impairment rates for global CLOs by cohort rating (Ba, B, Caa)



Source: Moody's Ratings

Global CLOs, Multi-year WR-adjusted cumulative impairment rates by original rating, 1993-2023

Source: Moody's Ratings

	1	2	3	4	5	6	7	8	9	10
Aaa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A	0.00%	0.00%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%
Baa	0.03%	0.03%	0.08%	0.25%	0.46%	0.46%	0.78%	1.3%	1.7%	1.7%
Ba	0.00%	0.08%	0.31%	0.62%	1.0%	1.8%	2.0%	3.3%	4.1%	6.1%
B	0.09%	0.20%	0.55%	0.55%	1.8%	5.3%	12%	16%	16%	16%
Caa										
IG	0.01%	0.01%	0.03%	0.06%	0.11%	0.11%	0.19%	0.31%	0.40%	0.40%
SG	0.03%	0.11%	0.38%	0.61%	1.2%	2.5%	3.3%	4.7%	5.5%	7.3%
All	0.01%	0.02%	0.09%	0.17%	0.33%	0.58%	0.78%	1.1%	1.3%	1.6%

It should be noted that recoveries on CLO tranches, conditional on the tranches being impaired, could be very low. This is due to the general nature of a tranching securitisation and the loss allocation mechanism (the waterfall): If a given tranche is impaired, this generally means that all the lower tranches experienced a total loss. In addition, if the loss severity is high enough to reach a given tranche to begin with, then, depending on the thickness of that tranche, it may not take a much bigger loss (on the underlying collateral pool) to wipe the tranche out completely – except for the most senior tranche which tends to be by far the thickest. Therefore, a good credit experience for CLO investments relies largely on the tranche not being impaired in the first place.

This is also related to the fact that securitisation does not change the overall credit risk. From an economic perspective, the risk of holding all the underlying individual loans is equivalent to the risk of holding all the CLO tranches. Securitisation merely slices and allocates the underlying risk differently to cater to investors with different risk and return preferences. The most senior tranches are much less risky than the underlying individual loans, mainly due to the protection provided by the lower tranches, but this means that, equally, the lowest tranches are much riskier due to this subordination. The relative riskiness of the tranches is also reflected in the yields offered by each tranche relative to each other (and relative to the yields on the underlying loans).

Despite the higher LGDs for below-investment-grade tranches noted above, the overall historical loss rates for CLOs have remained moderate. In fact, the actual average historical loss rates for CLOs

compare very favourably to corporate bonds of the same rating, as shown in the tables and the graph below. Note that losses for the unrated equity tranches are not shown (nor available in the rating agency data).

Global CLOs, Estimated Multi-year cumulative loss rates by original rating, 1993-2023

Source: Moody's Ratings

Rating\Year	1	2	3	4	5	6	7	8	9	10
Aaa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Baa	0.02%	0.02%	0.02%	0.16%	0.18%	0.18%	0.24%	0.35%	0.57%	0.57%
Ba	0.00%	0.03%	0.17%	0.31%	0.51%	1.03%	1.2%	2.0%	2.7%	3.7%
B	0.08%	0.11%	0.46%	0.46%	1.1%	3.3%	5.3%	7.1%	7.1%	7.1%
Caa										
IG	0.00%	0.00%	0.00%	0.03%	0.04%	0.04%	0.05%	0.08%	0.13%	0.13%
SG	0.02%	0.05%	0.24%	0.35%	0.66%	1.5%	1.8%	2.7%	3.3%	4.3%
All	0.01%	0.01%	0.05%	0.10%	0.16%	0.32%	0.39%	0.55%	0.69%	0.86%

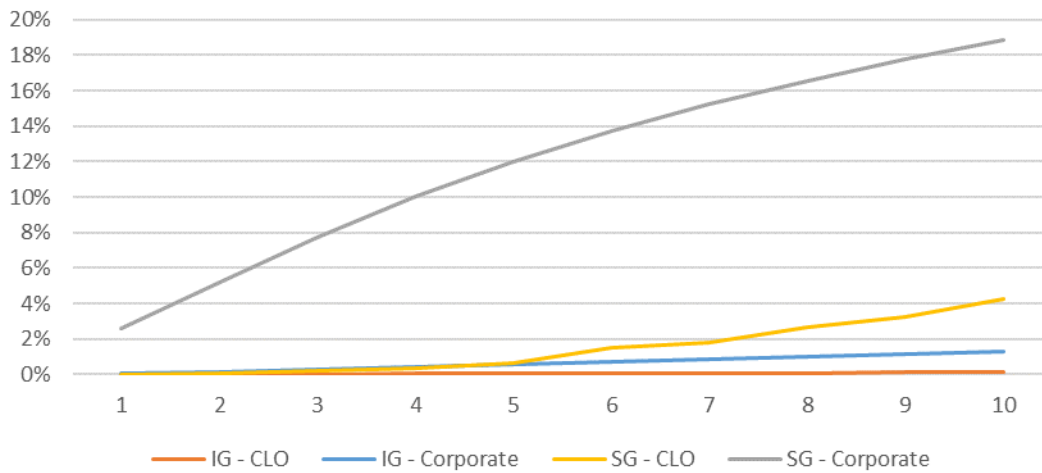
Average cumulative issuer-weighted global loss rates rates by letter rating, 1983-2023

Source: Moody's Ratings, BMA staff calculations

Rating\Year	1	2	3	4	5	6	7	8	9	10
Aaa	0.00%	0.01%	0.01%	0.02%	0.04%	0.05%	0.07%	0.08%	0.08%	0.08%
Aa	0.01%	0.04%	0.07%	0.12%	0.18%	0.23%	0.29%	0.34%	0.38%	0.43%
A	0.03%	0.10%	0.20%	0.31%	0.44%	0.59%	0.74%	0.89%	1.0%	1.2%
Baa	0.11%	0.26%	0.45%	0.67%	0.88%	1.1%	1.3%	1.5%	1.8%	2.0%
Ba	0.53%	1.5%	2.6%	3.7%	4.8%	5.8%	6.7%	7.5%	8.4%	9.2%
B	2.0%	4.8%	7.7%	10.4%	12.8%	15.0%	17.0%	18.7%	20.3%	21.6%
Caa-C	5.5%	10.0%	13.8%	17.2%	20.2%	22.6%	24.6%	26.4%	28.1%	29.5%
IG	0.06%	0.15%	0.27%	0.40%	0.54%	0.69%	0.84%	0.99%	1.1%	1.3%
SG	2.6%	5.2%	7.8%	10.0%	12.0%	13.8%	15.3%	16.6%	17.8%	18.9%
All	1.1%	2.1%	3.1%	3.9%	4.6%	5.2%	5.7%	6.2%	6.6%	7.0%

* Based on issuer-weighted cumulative default rates and senior unsecured bond recoveries measured on an issuer-weighted basis.

Cumulative Losses - CLOs vs. Corporate Bonds



Trends, Recent Developments and Forward-looking Risks

On one hand, the historical data highlighted in the previous sections points to good/superior historical credit loss experience of both leveraged loans relative to comparable public high-yield bonds, particularly of CLO tranches relative to similarly rated corporate bonds as well as in absolute terms.

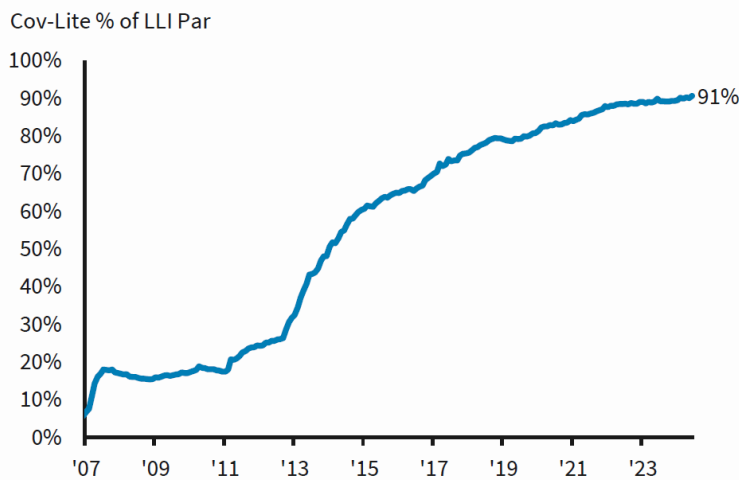
On the other hand, it may be noted that some of these assets are "untested" in the conditions of a truly severe financial crisis or downturn (e.g., CLO 2.0 and 3.0 structures³⁰). There are also indications of loosening underwriting standards/decreasing protections/increasing leverage on direct loans (also affecting CLOs based on them), contributing to increased credit risk/uncertainty on a forward-looking basis. This uncertainty may be particularly pertinent for junior and mezzanine CLO tranches, where losses on the underlying loan pool that are high enough to impair a given tranche could quickly wipe out the whole tranche, given the more binary nature of the tranche losses (i.e. the high LGDs, as noted in the previous section); that is, increased loan losses may not cause any principal losses on a tranche up to a point, but after a certain point a relatively small increase could translate to a significant (or total) loss on a tranche. CLOs have also been a subject of recent regulatory scrutiny, particularly from the National Association of Insurance Commissioners (NAIC) in the US, and the BMA is also assessing the risks and following international developments closely.

In principle, investors in direct loans, particularly privately negotiated loans, have control over the loan terms and can require greater protections e.g. in terms of security and covenants – and this has been the case historically. However, more recently, the demand for such loans has outstripped the supply, driven e.g. by institutional investors' "search for yield" in the protracted low-yield environment. The predominantly floating rate nature of the assets has continued to make them attractive in the rising rate environment, all other things being equal. The excess demand has increased the overall

³⁰ Though it should be noted that these contain added structural protections above and beyond CLO 1.0 structures which performed relatively well in the financial crisis in terms of realised credit losses. Then again, the performance of CLO 1.0s during the financial crisis should be viewed against the backdrop of government intervention, as noted earlier.

negotiating power of the borrowers and has led to some investors accepting more borrower-friendly terms and fewer protections on the loans – so-called "covenant-lite" loans; see the graph below for an illustration of BSL loans making up the LLI index, which are now mostly covenant-lite (cov-lite). However, Fitch's³¹ data indicates that there is a very significant difference in the proportion of new private loans that are covenant-lite vs. new broadly syndicated loans. According to the data³², only about 20-30% of newly issued private loans are covenant-lite in aggregate. There is still significant variation in the prevalence of covenant-lite depending on the size of the private loans, with larger loans (that overlap with the BSL market) much more likely to be covenant-lite, at around 50% for the largest private deals, though still lower than for the bank deals.

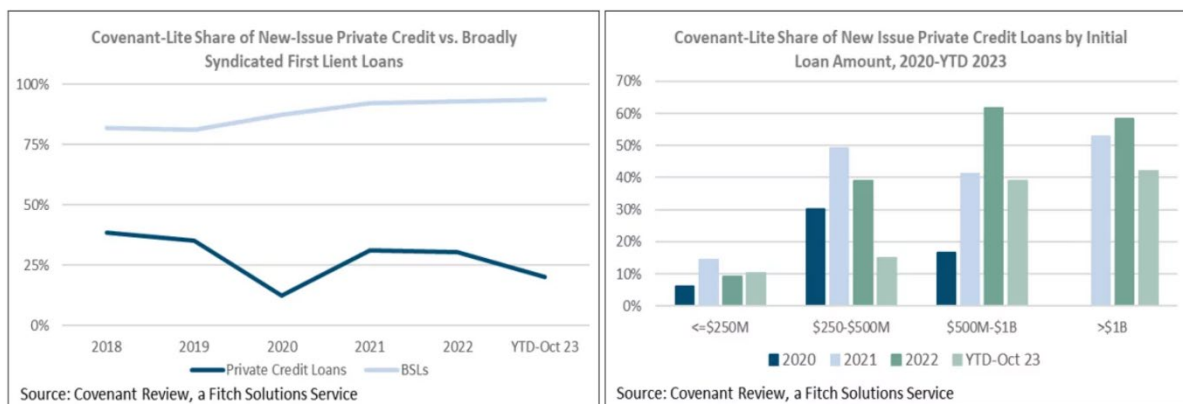
The vast majority of the LLI is now covenant-lite



Source: PitchBook LCD, Barclays Research

³¹ Covenant Review, a Fitch Solutions Service: U.S. Trendlines: New-Issue Private Credit Covenants Strengthen in YTD, with Cov-Lite Share Down (November 9, 2023)

³² Based on Covenant Review's proprietary database of 1300+ private credit institutional loans going back to 2017.



The hunt for yield has also enabled borrowers to put on more leverage, or allowed borrowers of lower creditworthiness to access the market, a sign of loosening underwriting standards. The IOSCO report also notes that the sectors to which these corporate borrowers belong have shifted over time, from traditional industrial sectors to technology, software and healthcare, which have provided higher returns but lower tangible collateral. These factors could lead to both increasing default rates and decreasing recoveries in case of default (relative to the historical track records observed).

When assessing the current credit risk of leveraged loans – and CLOs based on them – in detail, the following detailed developments outlined in a recent Moody's report³³ are further relevant:

- Interest rate hikes, tighter financing conditions and lingering inflation drove corporate defaults in 2023, with loan issuers harder hit by the interest rate hikes. The sharp increase in policy rates has put particular pressure on loan issuers whose debt is typically floating rate, i.e., the debt payments move up and down with prevailing interest rates.³⁴
- Moody's notes that leveraged loans grew rapidly during the "easy money" era, becoming a mainstay for financially weaker borrowers and debt-financed buyouts that bear higher default risk. According to Moody's, there are indications of emerging lower recovery rates in first-lien loans (see also the recent data from S&P in the direct loan Recovery Rate subsection), reflecting weaker credit quality and structural deterioration. Moody's attributes the latter points to an increase of loan-only structures in recent years; too, in the worst cases, some first-lien bank loans becoming bond-like and acting as buffers for structurally more senior asset-based loans to increase in re-defaulters, e.g. following more prevalent distressed exchanges³⁵, whose debt tends to have lower recovery rates in subsequent defaults; and to loan documentation with no or weak financial covenants (covenant-lite), which can

³³ Moody's Annual default study (26 Feb 2024). See also the IOSCO report CR05/2023 (September 2023).

³⁴As previously noted, the floating rate nature of the loans makes them attractive to investors when rates rise or are expected to rise, *assuming* that the borrowers are able to continue servicing and paying off the debt; however, at the same time, the rising rates also put pressure on the borrowers and could lead to higher defaults.

³⁵ Moody's notes that distressed exchanges are particularly prevalent among private equity-owned debt issuers. According to Moody's, distressed exchanges carried out by private equity-owned debt issuers constituted the majority of the 2023 defaulters in their data.

potentially lower the amount of assets available to securing the lenders in the event of a default, and as such, lead to lower recovery rates³⁶.

- Moody's notes they remain concerned about the lack of credit protections in current loan agreements. While less-restrictive credit documentation provides borrowers with a greater set of options and flexibility that may allow them to delay or avoid a default, it also increases the risk of further erosion for first-lien lenders, e.g. as certain covenant-lite deals provide greater allowances for collateral transfers to unrestricted subsidiaries (also known as dropdown), which raises the risk of issuers being more stressed ahead of default, therefore lowering recovery rates.

The last two points also touch on the increasingly prevalent "liability management exercises" (LME) in the context of distressed exchanges that aim to circumvent outright bankruptcy. Barclays report³⁷ notes that the backdrop for liability management has become increasingly contentious as lenders seek to enhance their claims on an issuer's assets via bespoke restructuring solutions (such as those mentioned above), often at the expense of other lenders. This dynamic is now commonly referred to as "creditor-on-creditor violence", where often the largest lenders are able to drive outcomes as a club (e.g., through co-op agreements). Apart from the consequences to individual investors – and the need for a more complicated analysis of loan documentation and market dynamics as part of underwriting and investment decisions and risk management – these recent developments, in general, increase the uncertainty around recovery rates and credit losses for even the highest ranking and traditionally safest 1st lien assets.

In summarising some of the points discussed above, it is noted that S&P also fundamentally attributes recent, below-historical average, and declining leveraged loan recovery rates to higher total debt leverage, higher first-lien debt leverage, and reduced junior debt cushions.³⁸ In S&P's view (from early 2023), covenant-lite term loans also contribute to lower recovery expectations, although considered a secondary factor. S&P notes that the lower overall average first-lien recoveries (see the figures at the end of the direct loan section) also reflect a higher concentration of lower-rated entities ("B" and "B-") within the credit quality distribution.

While some of the above trends are likely to affect direct lending as well, it is important to note that the Moody's and S&P (and Barclays) observations above concern, first and foremost, the broadly syndicated loan market. In private markets, in particular, each loan transaction is structured differently, and the investors have the opportunity to negotiate bespoke terms, including the inclusion of covenants (whether they take this opportunity due to commercial pressures or not).

On the other hand, there are also developments that mainly concern the direct lending space, such as the recent increase in "Payment-in-Kind" (PIK) debt in the context of rising interest rates (though still relatively rare overall).³⁹ With PIK debt, the interest payments are rolled onto the debt balance, with potentially no cash payments due before maturity. This can allow borrowers struggling with

³⁶ Moody's notes that covenant-lite documentation has allowed e.g. asset-stripping and priming transactions that tend to diminish recovery prospects for existing secured creditors (e.g., where companies needed more liquidity and a subset of the existing lender group provided capital while "up-tiering" existing holdings into a super-priority tranche).

³⁷ Barclays Research – High Yield & Leveraged Loans – LME: Trading through prisoner's dilemma (29 July 2024)

³⁸ S&P Global Ratings: US BSL CLO and Leveraged Finance Quarterly, Q1 2023 (9 Feb 9, 2023)

³⁹ See, e.g., Bloomberg News (12 Jul 2024): "Why 'Payment-In-Kind' Debt Is So Appealing and Risky: QuickTake"

higher debt service costs and cash liquidity to postpone actual cash payments in the short term, but often at a very high cost in the longer term. PIK loans have not traditionally been a feature of broadly syndicated loan markets, and CLOs are generally limited in the extent they can invest in PIK debt; within the direct lending markets, PIK loans have been mostly a feature associated with private equity firms and leveraged buyout transactions, separate from typical senior secured lending.

When it comes to direct lending, it is, therefore, crucial to assess the underwriting standards of the asset manager and the actual credit risk of these investments on their own merits. Moody's notes that direct lending continues to provide an alternative source of debt (re)financing for smaller and lower-quality borrowers when they cannot access the syndicated loan market; such borrowers are likely to be riskier by their nature, and successful lending and investing in the direct lending strategies through the cycle requires the right set of skills and expertise, including prudent underwriting, risk management, workout capabilities and supporting infrastructure. On the other hand, the Barclays report notes that private credit continues to seek opportunities to insert itself into public leveraged finance markets, with the two markets having become increasingly competitive in recent years (with private credit already having refinanced over \$80bn of BSLs since 2019 and continuing to capture share). To the extent this leads to increased convergence, the considerations for leveraged loans will also become increasingly directly relevant for private credit.

Summary

In addition to higher spreads⁴⁰ (in the form of an illiquidity premium), private credit can, at best, offer better terms (e.g. financial covenants), favourable realised credit loss experience (higher recovery rates), and some diversification⁴¹ relative to public bond markets, especially during benign periods. This comes with potential trade-offs such as less/no liquidity and greater uncertainty around valuations (and potential losses from both if selling the assets prior to maturity). Private asset valuation practices must also protect against potential conflicts of interest.

Despite the favourable historical track record on a relative basis, the recent developments outlined in this report increase the uncertainty around the credit performance from a forward-looking perspective. The rapid expansion of private credit, together with increasing competition and potential pressures on asset managers/funds to deploy capital, may lead to lower underwriting standards and weakening credit protections, which could increase the risk of credit losses in the future. A critical driver of investment performance and likely differentiator on a forward-looking basis in the increasingly competitive space is the quality of the asset manager/originator in terms of credit and underwriting standards (particularly with respect to leverage and protections), selectivity, and experience (particularly with issues/workouts). A proper risk assessment of the private investments should be based on a detailed understanding of the mechanics and specifics of the assets and

⁴⁰ And in particular, higher *risk-adjusted* spreads, where an illiquidity premium can be legitimately earned and the higher spreads are not merely a reflection of incremental credit risk.

⁴¹ There can be some diversification with respect to the idiosyncratic risk related to the borrowing counterparties (the "name diversification"), particularly in the face of increasing public borrower concentration (e.g., the number of public companies in the U.S. declined from around 8,000 in 1996/1997 to mid-4,000s by 2023, according to FED, SIFMA and World Bank data). However, there is unlikely to be much diversification between public and private markets that are driven by the same systematic risk factors (aside from an "illusion" of diversification driven by mismeasurement of private market risk and correlations).

structures in question, within the context of recognising relevant trends and risks/factors not in the data set and should be complemented by robust stress testing and scenario analysis. In the case of insurers investing in private assets, a holistic risk assessment should crucially include consideration of the nature of the liabilities (e.g., duration and predictability).

From a wider perspective, it may also be noted that the current financial ecosystem⁴² around increasing private transactions and increasing leverage, which has grown significantly in the aftermath of the last financial crisis and the long low-interest rate period that followed, remains largely untested by a crisis. The recent significant interest rate hikes are already showing some tensions within the system, as discussed above in the context of this report; to an extent, it remains an open question of how this ecosystem will behave in a truly distressed situation.

Investment Exposure of Bermuda Insurers

For context, the tables below show information on the overall asset allocation of Bermuda Commercial Long-term (LT) insurers in scope. This includes LT insurers that reported asset information for year-end 2023 and excludes newly established companies or companies with no business as well as LT groups (to avoid double-counting). The first table includes all the insurers, while the second table includes only those that can be classified as engaging in some type of asset-intensive reinsurance.

Overall investment allocation of Bermuda Commercial Long-Term insurers

Asset Category	Weighted Average	Average	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Cash and Cash Equivalents	4.7%	6.7%	2.4%	4.3%	8.5%	13.9%
Sovereign Bonds	6.8%	10.8%	1.6%	5.2%	15.6%	28.5%
Corporate Bonds	46.7%	50.1%	37.9%	48.8%	63.2%	70.9%
RMBS	2.5%	3.3%	0.0%	1.2%	5.1%	9.4%
CMBS	3.4%	3.5%	0.0%	2.6%	5.1%	9.8%
CLO	5.2%	4.5%	0.0%	1.6%	6.9%	13.0%
ABS	5.9%	5.2%	0.0%	2.0%	8.2%	13.0%
Residential Mortgage Loans	2.7%	1.1%	0.0%	0.0%	0.0%	4.3%
Commercial Mortgage Loans	5.0%	3.3%	0.0%	0.0%	4.9%	11.0%
Private Placements and Private Lending	3.6%	4.1%	0.0%	0.1%	6.4%	12.7%
Other Loans and Bonds	1.6%	0.9%	0.0%	0.0%	0.0%	1.1%
Listed Equities and Preference Shares	2.2%	2.1%	0.0%	0.0%	0.7%	10.3%
Private Equity	4.0%	2.0%	0.0%	0.0%	0.9%	6.3%
Alternatives	5.0%	2.0%	0.0%	0.0%	2.4%	5.9%
Real Estate	0.7%	0.3%	0.0%	0.0%	0.0%	1.1%
Total	100.0%	100.0%				

Notes: 1) "Weighted Average" is the dollar-weighted market average, considering the whole industry in the aggregate; "Average" is the simple average across individual insurers (equally weighted)

⁴² Including (but not limited to) PE firms, PE-affiliated asset managers, PE-owned corporates, vehicles structured by the asset managers, and (various layers of) investments/loans/leverage between some or potentially all of these connected or related parties. PE-backed insurers are also part of the picture. However, this is not exclusive to PE only.

2) The Corporate Bonds category above includes municipals. Of the RMBS, Agency RMBS make up 24% on a weighted average basis and 43% on a simple average basis.

Going forward, the allocation information displayed is presented for the group of insurers that can be classified as engaging in some type of asset-intensive reinsurance (which accounts for approximately 60% of the sample by count and 70% by investments), unless otherwise indicated.

Given the nature of the liabilities (e.g., the level of illiquidity), asset-intensive reinsurers tend to have higher allocations to private credit, as well as to securitisations and mortgage loans (but lower allocations, e.g. to equities, both public and private). It should be noted that the large majority of asset-intensive reinsurer investments, including investments in the asset classes covered explicitly by this report, are investment grade, as shown below.

Overall investment allocation of Bermuda asset-intensive (re)insurers

Asset Category	Weighted Average	Average	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Cash and Cash Equivalents	5.2%	7.2%	2.5%	4.4%	7.8%	19.9%
Sovereign Bonds	4.8%	6.5%	0.5%	3.2%	10.9%	18.2%
Corporate Bonds	44.8%	50.1%	37.6%	46.5%	62.0%	70.9%
RMBS	3.0%	3.1%	0.0%	1.4%	5.1%	8.7%
CMBS	4.5%	4.4%	1.0%	4.0%	6.1%	10.6%
CLO	7.0%	6.0%	0.1%	4.5%	9.5%	14.3%
ABS	7.9%	6.9%	1.2%	5.4%	9.9%	14.6%
Residential Mortgage Loans	3.8%	1.8%	0.0%	0.0%	2.2%	6.3%
Commercial Mortgage Loans	6.6%	4.3%	0.0%	1.6%	6.9%	12.0%
Private Placements and Private Lending	3.4%	4.8%	0.0%	1.1%	7.7%	15.1%
Other Loans and Bonds	2.1%	1.1%	0.0%	0.0%	0.0%	1.5%
Listed Equities and Preference Shares	0.6%	0.7%	0.0%	0.0%	0.6%	0.9%
Private Equity	0.7%	1.2%	0.0%	0.0%	0.9%	2.5%
Alternatives	5.4%	1.8%	0.0%	0.1%	2.5%	5.7%
Real Estate	0.1%	0.2%	0.0%	0.0%	0.0%	0.2%
Total	100.0%	100.0%				

The table below shows the overall rating distribution for Bermuda asset-intensive Long-term (re)insurers.

Overall ratings distribution of Bermuda asset-intensive (re)insurers

Rating Category	Weighted Average	Average	25th Percentile	50th Percentile	75th Percentile	90th Percentile
AAA	8.6%	12.6%	4.9%	9.7%	16.4%	30.8%
AA	7.8%	10.0%	5.6%	8.2%	11.1%	15.7%
A	31.1%	31.0%	23.0%	30.1%	37.0%	45.3%
BBB	30.0%	33.6%	26.5%	31.5%	39.8%	45.9%
BB	2.4%	2.1%	0.0%	1.1%	3.7%	5.5%
B	0.5%	0.3%	0.0%	0.1%	0.5%	1.0%
CCC	0.1%	0.1%	0.0%	0.0%	0.1%	0.2%
CC/C/Unrated	12.6%	6.4%	0.0%	0.9%	11.3%	20.9%
EQ	0.6%	0.7%	0.0%	0.0%	0.6%	0.9%
PE	0.7%	1.2%	0.0%	0.0%	0.9%	2.5%
ALT	5.4%	1.8%	0.0%	0.1%	2.5%	5.7%
RE	0.1%	0.2%	0.0%	0.0%	0.0%	0.2%
Total	100.0%	100.0%				

Notes: 1) EQ = Listed equity, PE = Private equity, ALT = Alternatives, RE = Real estate.

2) The rating category "CC/C/Unrated" includes BSCR Rating 8, which includes both investments rated below CCC- and unrated investments, as well as fixed-income investments reported as not rated; this, "CC/C/Unrated" is the lowest category and consists mostly of loans and mortgages (and to a lesser extent bonds) that are unrated.

The table below further displays the rating distribution for fixed-income investments, excluding equity and alternative investments. Of all these investments, ca. 83% are investment-grade on a weighted average basis (at aggregate market level), and 91% are investment-grade on a simple average basis (across insurers).

Overall ratings distribution of fixed income investments of Bermuda asset-intensive (re)insurers

Rating Category	Weighted Average	Average	25th Percentile	50th Percentile	75th Percentile	90th Percentile
AAA	9.2%	13.0%	5.2%	9.9%	16.7%	30.8%
AA	8.4%	10.3%	6.0%	8.4%	11.3%	16.0%
A	33.4%	32.2%	26.2%	31.9%	37.7%	47.2%
BBB	32.2%	35.0%	28.2%	34.2%	40.3%	49.9%
BB	2.6%	2.2%	0.0%	1.1%	3.8%	5.7%
B	0.5%	0.4%	0.0%	0.1%	0.6%	1.0%
CCC	0.1%	0.1%	0.0%	0.0%	0.1%	0.2%
CC/C/Unrated	13.6%	6.8%	0.0%	0.9%	11.7%	22.1%
Total	100.0%	100.0%				

For more details on the liquidity profile of the assets and liabilities of Bermuda's Long-term (re)insurers, refer to the BMA report "Liquidity Risk in the Bermuda Long-term Insurance Market".

Private Placements and Private Lending

The weighted average market allocation of asset-intensive reinsurers to the broad category "Private Placements and Private Lending" was 3.4%, the simple average allocation across the insurers was 4.8%, and the median was 1.1% (for all insurers, the corresponding averages were 3.6% and 4.1%, respectively, with the median 0.1%). However, there is significant relative variation in the level of exposure across insurers, as indicated by the percentile information above. The low median relative to the averages also indicates a level of concentration, i.e., there are many insurers that have little to no exposure, but on the other side, some (large) insurers have larger exposures.

The table below further breaks down the overall category into components. The largest subcategory consists of private placements, while the subcategories "Other Bonds"⁴³ and "Loans"⁴⁴ are approximately equally sized.

Private Placements and Private Lending; investment allocations

Asset Category	Weighted Average	Average	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Private Placements	1.6%	3.1%	0.0%	0.0%	4.0%	10.0%
Other Bonds	0.9%	0.9%	0.0%	0.0%	0.0%	2.1%
Loans	0.9%	0.8%	0.0%	0.0%	0.1%	3.0%
Total	3.4%	4.8%	0.0%	1.1%	7.7%	15.1%

The private placement bonds are predominantly investment grade (85% of market exposure), with the largest allocation to BBB followed by single-A. Regarding the credit quality of the categories included under Other Bonds, the secured bond subcategory consists of all investment grade (with 74% of exposure indicated AAA), and the unsecured bond subcategory is mostly investment grade as well (90% of exposure being investment grade, with 81% indicated in the AAA-AA range).⁴⁵ In contrast, the Loans category consists of predominantly below-investment grade or unrated assets.

The overall rating distribution across all of the above three categories is shown below for asset-intensive reinsurers. In line with the notes above, the exposures are investment grade for a large part (at about 2/3), while most of the remaining are indicated unrated (consisting of loan exposures).

⁴³ Includes reporting categories "Other – Secured Bonds" and "Other – Unsecured Bonds"

⁴⁴ Includes reporting categories "Private Credit Funds", "Leveraged Loans", "Middle Market Loans", "Collateral Loans", "Other Direct Loans", "Other Loan Fund", "Other Private Direct Lending"

⁴⁵ Note: These reporting categories could include investments that would not typically be considered "private credit" or "private lending".

Private Placements and Private Lending; rating distribution

Rating Category	Weighted Average	Average
AAA	20%	13%
AA	2%	3%
A	22%	27%
BBB	25%	26%
BB	2%	2%
B	1%	1%
CCC	0%	0%
CC/C/Unrated	29%	28%
Total	100%	100%

CLOs

As shown by the overall asset allocation table, for asset-intensive reinsurers, the weighted average market allocation to CLOs and the simple average allocation across insurers were 7.0% and 6.0%, respectively (while the corresponding figures were 5.2% and 4.5% for all insurers). The median was 4.5% for asset-intensive reinsurers and 1.6% for all insurers (including the asset-intensive). The percentiles again indicate variation across insurers and some concentration.

The table below shows the rating distribution of the CLO tranches for asset-intensive reinsurers. As indicated, 90%+ of the CLO holdings are investment grade, with the largest exposures to the mezzanine A and BBB tranches. The lowest category consists of CLO equity tranches.

CLO tranche rating distribution

CLOs	Wgt Avg	Average
AAA	10%	13%
AA	18%	19%
A	33%	33%
BBB	32%	25%
BB	4%	7%
B	0%	0%
CCC	0%	0%
CC/C/NR	2%	3%
Total	100.0%	100.0%

Appendix A – Valuation Risk

Conceptually, "valuation risk" can be defined as the risk that the amount at which an investment is valued (and recorded on the investor's balance sheet) deviates from the actual fair value of the investment. In practice, a "true" value may not be observable, but an investment could still be valued incorrectly relative to the prices (or price range) at which it could be traded in the market.⁴⁶

While valuation risk is generally most prominent for equity-like assets with no contractual/well-defined cash flows, e.g. private equity and equity-type alternatives, it is also relevant for private fixed-income assets. The valuation of fixed income relies critically on the credit spreads and/or probabilities of default and recovery rates used in the pricing, i.e., on the assessment of credit quality and the likelihood and extent of receiving the contractual cash flows. The relevant quantities may not be observable in the markets and may be difficult to assess for private borrowers and/or complex arrangements. The risk may be lower for short-term assets, but the uncertainty grows with duration.

Asset valuation directly impacts an insurer's financial statements and solvency ratios in economic valuation-based solvency regimes like in Bermuda. It should also be noted that asset manager fees and other compensation are typically determined based on the reported valuations. Where the asset managers themselves mark the assets, this can lead to conflicts of interest and could exacerbate the risk of optimistic or aggressive valuations.

In summary, from a prudential supervision perspective, valuation risk can be considered to have two main dimensions:

- The inherent valuation risk which arises from difficulties in valuing assets where observable traded prices in active markets are not available, particularly for certain complex or illiquid financial instruments.
- Conflicts of interest and agency problems that may exacerbate valuation risk in the presence of difficult-to-value illiquid/private investments.
 - It is observed that the structure, governance and operation of insurers and the role and influence of asset managers – e.g., as owner, director, role in setting strategic asset allocation, etc. – can contribute to the issue. Any additional role or strategy employed by the asset manager could magnify this further e.g., roles in origination, structuring and servicing (e.g., structured assets). It is also possible that an asset manager exercising influence over an insurer could lead to a concentration in an asset class the asset manager specialises in/are knowledgeable about.
 - Supervisory experience has shown that in many cases involving complex or illiquid financial instruments that are hard to value, insurers may tend to take the view that the asset manager has the most reliable information (or, indeed, might be deemed to be the only source of information) about pricing for a particular financial instrument. However, an asset manager often has the ability and may have an incentive to influence the valuation of the investments in the portfolio in ways that may not fairly reflect their value. It is, therefore, crucial that insurers perform independent validation procedures, instead of relying on controls within asset managers.

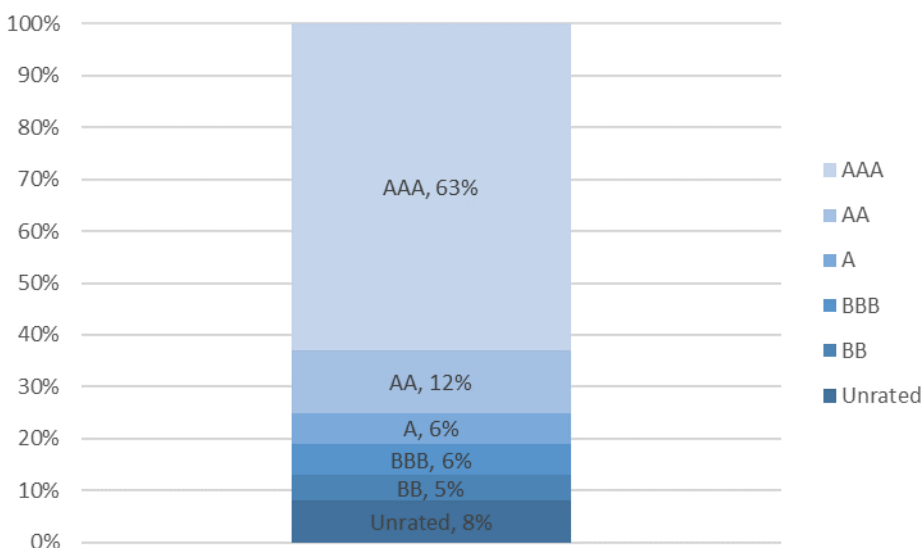
⁴⁶ In addition to active mispricing, this may include the use of stale prices that at one point in time were "accurate"/representative.

Appendix B – CLO examples

Given losses on the underlying collateral pool, the losses to the CLO tranches are directly driven by the CLO structure and other credit enhancement features (i.e., cashflow diversion). For illustration purposes, the table and graph below show a broadly representative CLO structure.⁴⁷

The attachment point for a given tranche shows the level of cumulative loss on the underlying collateral pool at which the tranche starts taking losses in the absence of cashflow diversion, while the detachment point is the level of underlying cumulative loss at which the tranche is exhausted, i.e., experiences a total loss. For example, in the illustrative CLO structure shown and excluding cashflow diversion, the cumulative loss on the underlying pool of loans would need to be over 8% of the total loan portfolio before the rated debt tranches start taking losses; over 13% before investment grade rated tranches (namely, the BBB tranche) take losses; and over 37% for the most senior, AAA-rated tranche to take a loss.

Tranche Rating	Tranche Size	Attachment Point	Detachment Point
AAA	63%	37%	100%
AA	12%	25%	37%
A	6%	19%	25%
BBB	6%	13%	19%
BB	5%	8%	13%
Unrated	8%	0%	8%
Total	100%		



In addition to "hard" credit protections provided by the structure in the above illustrative example, CLO securities, particularly more senior tranches, also have protections in the form of cashflow

⁴⁷ NAIC Valuation of Securities (E) Task Force: Risk Assessment of Structured Securities – CLOs (25 May 2022)

diversion. Cashflow diversion triggers are a critical component of the protective covenants of rated CLO tranches. If CLO portfolios underperform (via high defaults/losses or higher than prescribed exposure to CCC-rated loans), coverage tests will fail, the effect of which is to redirect cashflows from junior tranches to either buy new collateral or amortise the senior notes. In either case, the CLO uses interest income to add collateralisation (buying more assets or de-levering). This can meaningfully increase the threshold of cumulative losses that must occur prior to impairment, as indicated in the table below for an illustrative structure.

Tranche Rating	Tranche Size	Cushion Without Credit Enhancement	Credit Enhancement from Cashflow Diversion Trigger	Total Credit Protection (above which losses are taken)
Unrated	8%	0%	0%	0%
BB	5%	8%	12%	20%
BBB	6%	13%	13%	26%
A	6%	19%	14%	33%
AA	12%	25%	15%	40%
AAA	63%	37%	11%	48%
Total	100%			

Note: "Credit Enhancement from Cashflow Diversion Trigger" assumes a 10% Conditional Prepayment Rate (CPR) for life, a 95% reinvestment price, and a 50% recovery rate

To illustrate the mechanics of the CLO waterfall and loss attribution, consider three scenarios with the following cumulative loan collateral loss rates:

1. 10% loss
2. 12% loss
3. 16% loss

These losses correspond roughly to average seven-year cumulative loss rates for B-rated issuers using 1st Lien bank loan recovery rates (measured on trading price basis), based on Moody's and S&P data from 1970/1983 onwards. Scenario 1 corresponds to average/expected default rates and loss given default (LGD); Scenario 2 uses default rate bumped up by one historical standard deviation (i.e., corresponding to average + 1 standard deviation level) and average LGD; and Scenario 3 bumps up both the default rates and the LGD independently by one standard deviation.⁴⁸ As noted earlier, below-investment grade default data prior to the early 1980s primarily reflects "fallen angels," as this pre-dates the emergence of a fully developed below-investment grade issuance market.

Although the collateral loans generally have a tenor of seven years, the average life is about five years, as most companies refinance before maturity. Once a loan is prepaid, the CLO manager can purchase new loans, potentially at a discount, particularly during periods of stress if the CLO is still in

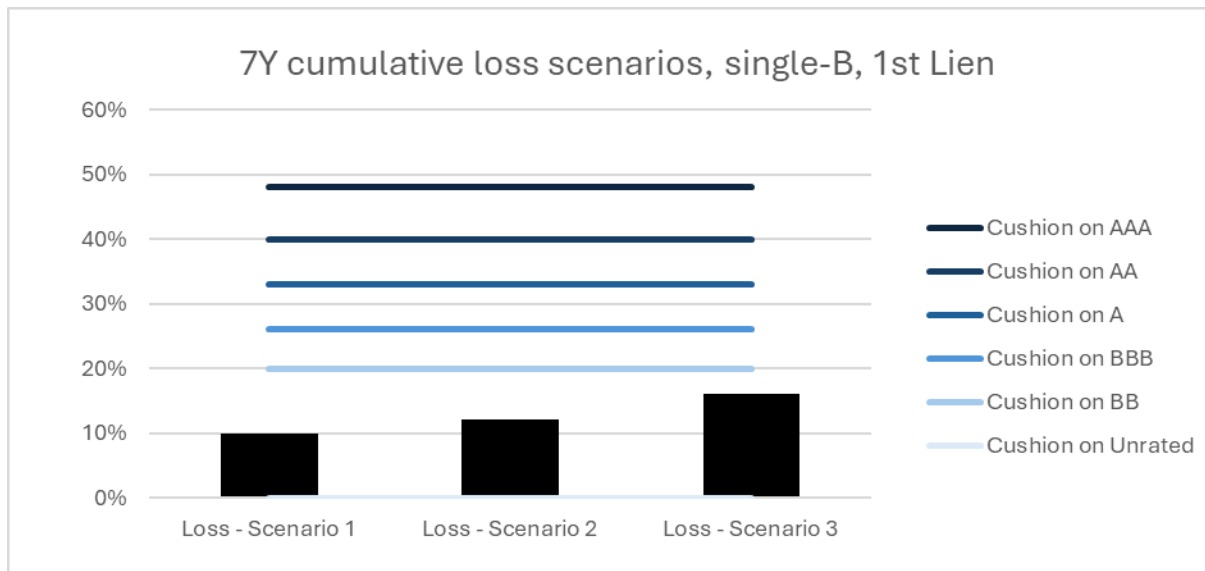
⁴⁸ It may be noted that increasing both PD and LGD by one standard deviation independently is generally more conservative than considering the "+1 standard deviation" level of the overall credit loss distribution – as the (historical/observed) correlation between PD and LGD is generally less than 100%.

its reinvestment period. Otherwise, the senior tranche principal is paid down. This makes the illustrative seven-year term an additional conservative assumption.

The graph below shows the resulting impact on the various tranches, assuming the seven-year cumulative loan losses are incurred instantaneously. The tranche losses are determined by passing the underlying losses through the above-shown CLO structure/waterfall, with the equity tranche taking the first losses; the lowest rated tranche (here: BB) starting to take losses if/when the equity tranche and cashflow diversion are exhausted, and so forth. In this simplified illustrative example, it is observed that:

- In the first scenario, the equity tranche is wiped out, i.e., the total loan loss of 10% exceeds the equity tranche thickness of 8%, while the remaining 2% losses are absorbed by cashflow diversion in support of the BB tranche.
- In the second scenario, with a total loss of 12%, the remaining 4% losses are absorbed by a cashflow diversion in support of the BB tranche.
- In the third scenario, the total loss of 16% exceeds the "hard" credit protection of the BB tranche (where the detachment point of the BB tranche/attachment point of the BBB tranche is 13%). However, the remaining 8% losses are still absorbed by cashflow diversion in support of the BB tranche. (The loss on the underlying collateral pool would need to exceed 20% and 26% for the BB and BBB-rated tranches to be impaired, respectively, within the illustrative structure of this example.)

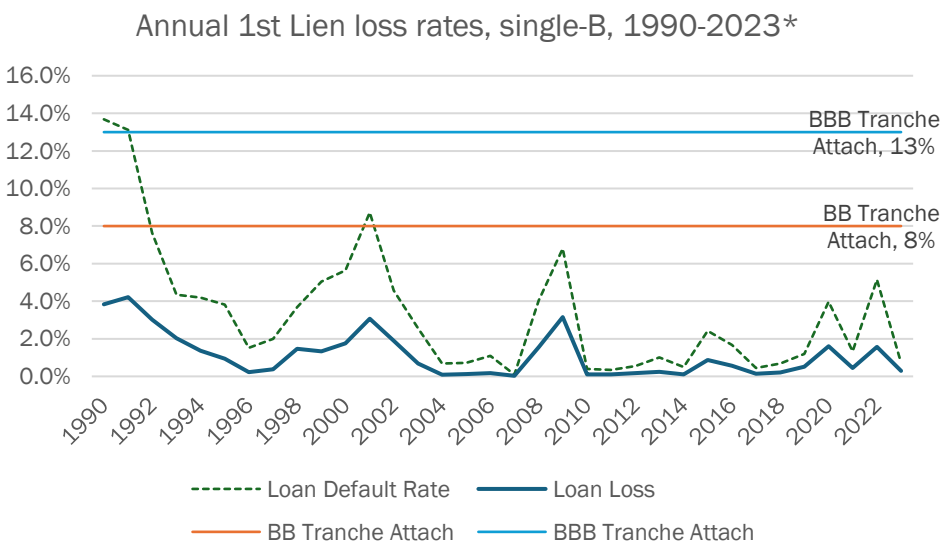
It should be noted that in each of the above scenarios, the equity tranche holders will receive payments leading up to losses exceeding the 8% threshold.



It is important to note that while the above illustrative example deals with cumulative expected losses and a "+1 standard deviation" level around them, regulatory capital models calculate losses using severely adverse scenarios. In some of these scenarios, rated CLO tranches will take credit losses.

The above example and graph considered cumulative losses over the seven years assumed transaction term/lifetime. In contrast, capital requirements are often based on a one-year view within some prudential regulatory contexts. To illustrate the one-year view in a historical context, the graphs below show the historical annual credit losses, with the attachment points of the tranches overlaid – corresponding to the loss levels that would need to be exceeded in order for the tranches to take losses (but critically, assuming no cashflow diversion and no prior losses on the CLO structure, as further noted below).

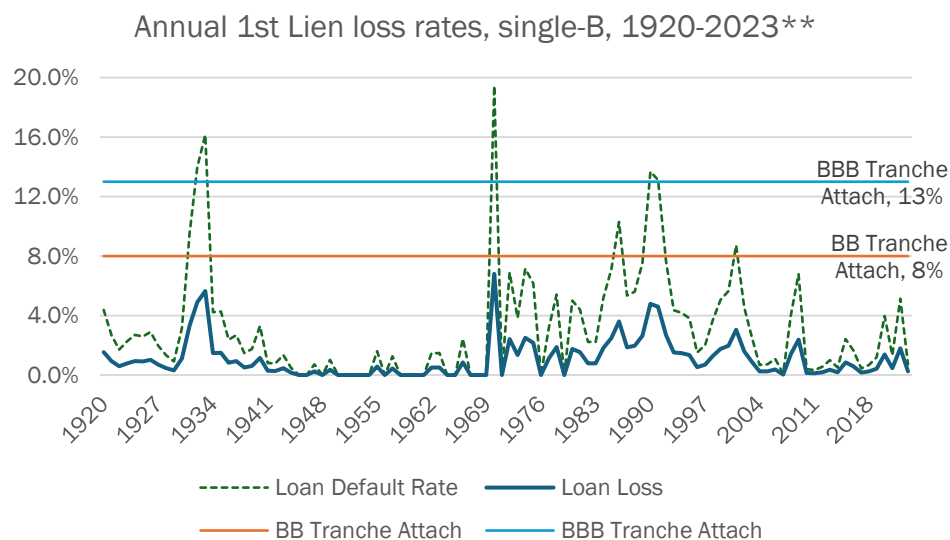
The first graph below shows the annual loan loss rates for the period 1990-2023, based on Moody's data, using annual issuer-weighted default rates (B) and calendar-year specific 1st lien bank loan recovery rates measured by trading prices. The second graph shows a significantly longer history corresponding to annual single-B default rates observed between 1920-2023 but using a long-term average recovery rate⁴⁹ (instead of annual observed recovery rates) due to data availability. For context, the graphs also include the annual *default rates*, although it is the *loss rates* (incorporating recovery rate/LGD) that ultimately matter; as indicated in the table earlier in the document, the long-term average recovery rate has been 65% for senior secured/1st lien loans, per Moody's data, with the observed annual range⁵⁰ varying approximately between 53% and 88%.



Note: The above chart reflects imputed 1-Year 1st Lien Loss from bond/loan issuers and 1st Lien recovery

⁴⁹ Specifically, using a recovery rate of 65.0% corresponding to the issuer-weighted average reported for 1983-2023 by Moody's, measured on trading price basis (refer to the recovery rate table in the body of this document).

⁵⁰ Over the period 1990-2023, for which data on individual calendar year recoveries is available (as opposed to averages/aggregates over a period).



Note: The above chart reflects imputed 1-Year 1st Lien Loss from bond/loan issuers and 1st Lien recovery with 1983-2023 long-term average recovery rate

Based on the simplified and approximate analysis above, no historical single-year loan losses – assuming no prior losses incurred on the CLO – would have resulted in credit losses to the investment grade rated tranches⁵¹ of the representative example CLO structure (even excluding cash flow diversion), given the assumptions employed (e.g., the single-B credit quality of the underlying loans and 1st lien bank loan recovery rates being representative). However, it is critical to note that the simplified historical analysis in the above two graphs is shown against a representative CLO structure with no existing losses. In cases of existing (cumulative) losses, the incremental losses required to breach a given tranche (in general or over the next year) are obviously lower – and could be much lower. To adapt the above presentation for actual CLO structures, the attachment points of the tranches should be adjusted for any prior losses to account for the par value/principal already lost. Note that this limitation does not apply to the first part of the example, which simply considers unconditional cumulative losses over the lifetime of the transaction (assumed seven years in the illustrative example).

Furthermore, it should be noted that all the above historical losses represent overall loss rates across all corporates (in the relevant rated universes). In case of any adverse concentrations – whether sector, industry, or name – the worst-case losses could be higher. As noted in the section on CLOs, investors (unsurprisingly) expect CLO structures to maintain a high level of corporate sector diversity, and adequate diversification is a prerequisite for good ratings of the CLO tranches; as such, the CLO indenture rules generally include formal limits to manage excessive concentration. Regardless, risk analysis of the CLO structures should consider concentration risk, and detailed bottom-up stress testing could take into account the industry and sector composition of the actual CLO structures (as well as single-name exposures where relevant).

⁵¹ And indeed, not even in losses to the BB-rated tranche in the example, though in particular the estimated 1970 loan loss experience comes close and could have caused a loss depending on the actual recovery rate observed during that year (relative to the long-term average recovery rate used) which was not available.