Collateralized Loan Obligations

Market Overview and Analysis
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Executive Summary

■ As the low rate environment persists in most major economies, collateralized loan obligations (CLO) offer the potential for income enhancement without materially increasing credit risk.

■ CLO debt tranches exhibit low duration risk due to their floating-rate nature, thereby protecting from mark-to-market losses as the Federal Reserve continues to increase rates. They have shown lower loss rates and more stable ratings than comparable securitized products and corporate bonds.
  – In fact, AAA- and AA-rated CLO tranches have never experienced a default or loss of principal, even during the depths of the financial crisis.

■ We believe these features make the asset class a natural fit for investors who are concerned about rising rates in the near term, but believe we are in the late stages of the credit cycle.

■ While most institutional investors have been quick to embrace private equity, few have considered CLO equity as a viable allocation in their alternative risk budget. We believe CLO equity is, at the very least, a strong complement to private equity in a broader portfolio and in some cases CLO equity may even be an attractive alternative.

■ While CLOs tend to be volatile, through-cycle performance has been robust, and we believe investors can benefit from a strategy that tactically allocates across the different CLO tranches.

■ Given the complexity of the asset class, investors in this type of investment strategy need the appropriate resources and expertise to evaluate:
  1. Collateral
  2. Structure
  3. Investment style of collateral manager

■ Accordingly, we believe investors are best served by seeking managers with the appropriate expertise and resources to properly evaluate CLO opportunities.

■ In this analysis, we take a closer look at the evolution of the market and the compelling reasons why we believe CLOs will become an increasingly important component of institutional investors’ asset allocation strategy.
The Investment Case for CLOs

Collateralized loan obligations (CLO) are a type of collateralized debt obligation (CDO). They evolved from the CDOs of the late 1980s, which banks established to securitize their high-yield bonds, leveraged loans, and emerging market debt exposures for capital efficiency. The CDO market experienced significant growth leading up to the Financial Crisis of 2008. At this point in time, CDO structures encompassed aggressive practices such as the inclusion of swaps, synthetics, asset-backed securities, and CDO tranches as collateral, as well as highly leveraged structures. During the financial crisis, all CDO structures underperformed except for CLOs, which predominantly had leveraged loan collateral and were managed by experienced, active collateral managers. As a result, the CDOs that have been issued following the Financial Crisis have mainly been CLOs. The post-crisis CLOs benefit from many structural and collateral-level requirement changes from rating agencies (see appendix), and we believe this further protects the structure and investors.

Due to both increased issuance in the U.S. and Europe and a robust secondary market, CLOs have become an established asset class, allowing investors to make investment decisions based on their views of the economy, sector, manager, and credit cycle.

Figure 1: CLOs Investment Opportunity Set (in Billions)

As of March 31, 2018. Source: Voya Investment Management and Intex. Trace data is provided by Citi research.
Moreover, CLOs have displayed better default and recovery statistics than similar asset classes. Their performance during volatile market environments has confirmed the resilience of leveraged loan collateral and the CLO structure.

For example, mezzanine CLO debt and CLO equity were tested through a market cycle that included the biggest financial crisis since the Great Depression. Investors who held their CLO investments through the 2008–2010 period were rewarded with strong IRRs. As Figure 2 highlights, equity tranches returned a median IRR in the mid-teens, B-rated tranches returned a median IRR in excess of 10%, and BB-rated tranches returned 6%–10% depending on the vintage.

**Figure 2: Tested “Through-the-Cycle” Performance of CLO Junior Mezzanine Debt and CLO Equity**

<table>
<thead>
<tr>
<th>Year</th>
<th>BB</th>
<th>B</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>7.4%</td>
<td>11.4%</td>
<td>12.6%</td>
</tr>
<tr>
<td>2006</td>
<td>5.3%</td>
<td>11.3%</td>
<td>13.0%</td>
</tr>
<tr>
<td>2007</td>
<td>4.8%</td>
<td>10.5%</td>
<td>5.4%</td>
</tr>
<tr>
<td>2008</td>
<td>9.5%</td>
<td>N/A</td>
<td>12.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>BB</th>
<th>B</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>7.4%</td>
<td>11.4%</td>
<td>13.5%</td>
</tr>
<tr>
<td>2006</td>
<td>5.9%</td>
<td>11.3%</td>
<td>14.3%</td>
</tr>
<tr>
<td>2007</td>
<td>6.2%</td>
<td>10.1%</td>
<td>7.5%</td>
</tr>
<tr>
<td>2008</td>
<td>10.4%</td>
<td>N/A</td>
<td>18.1%</td>
</tr>
</tbody>
</table>

Source: Bank of America CLO Weekly, January 29, 2016. An analysis was performed on the universe of all pre-crisis broadly syndicated loan (BSL) CLO bonds issued between 2005 and 2008 that are now paid off. For equity tranches, some estimates were performed. Frequently, the final cash flows (CF) to these tranches is missing because the CLO is treated as if it’s paid off as soon as all of the debt tranches are paid down. The analysis attempts to correct this through estimating the final CF by evaluating the tranche’s liquidation NAV.

The rare losses in U.S. CLOs were mainly driven by exposure to high-yield (HY) bonds in pre-2002 vintage CLOs, which saw lower recovery and higher default rates than secured loans. Note that very few U.S. CLOs issued after 2014 include HY bond exposure—hence they are 100% loan collateral—leading us to believe that the structure will be even more resilient in the next downturn.
Furthermore, CLO debt and equity have shown comparable Sharpe ratios and low correlations to other asset classes (see Figure 3). In addition to enhancing yields, CLOs can act as diversifiers in a fixed income portfolio.

**Figure 3: Comparable Sharpe Ratio and Low Correlation to Other Assets**

**Attractive Risk Adjusted Returns of CLO 2.0 Tranches**

Source: Citi Research, as of 12/31/2017. Based on CLO tranche monthly total returns since Jan 2013.

**Low Betas Give Diversification Benefit to Credit Portfolios**

Source: Citi Research, as of 12/31/2017. Based on CLO tranche monthly total returns since Jan 2013.

According to Moody’s, U.S. CLO investment grade (IG) tranches have significantly lower loss rate than corporates and other securitized products (ABS, CMBS, RMBS) due to imbedded credit enhancement and better collateral performance.

Of all 11,834 CLO tranches Moody’s rated between 1993-2017, only 100 tranches suffered any loss over a 10-year window. The highest initial rating of principal impaired tranches was Baa. None of Moody’s rated CLO 2.0 have seen any impairments.

**Figure 4: Resilient Performance over Multiple Cycles**

**5 Yr. Cumulative Loss Rate**

Source: Moody’s Annual Default Study 2017 and The Performance of Moody’s Structured Finance Ratings 2018Q1
What is a CLO?

Collateralized loan obligations utilize securitization technology to tranche out claims to an underlying portfolio, creating securities with different risk/return profiles. CLOs are comparable to a finance company that borrows money by issuing debt and equity liabilities to invest in a portfolio of leveraged loans. The CLO equity represents an ownership stake and a first loss position. The CLO equity has a residual claim to the portfolio’s principal and interest after all liabilities have been paid. Figure 5 demonstrates the structure of a typical CLO. The cash flows and losses in the underlying pool are allocated in the structure’s order of seniority, providing each CLO tranche with a unique risk/return profile.

Unlike a typical finance company, 100% of a CLO’s assets are loans (more than 90%-95% of which are senior secured or first lien). CLOs have no short-term financing; they borrow long and lend short. A CLO equity investor has many rights related to repricing, refinancing, and calling the deal. As a result, they are less susceptible to asset-liability mismatches and “run on the bank” scenarios. Additionally, CLOs are not subject to a mark-to-market trigger and can take advantage of volatility during market distress. CLOs also have a definite term and life cycle (figure 6) that consists of a four to twelve months ramp-up period, which is followed by a reinvestment period of three to five years wherein the manager is free to trade within the terms specified in the operating document. This is followed by an amortization period that allows for systematic wind-down of the structure wherein principal proceeds from the underlying portfolio are used to retire debt securities by their seniority.

Figure 5: Cash Flow Waterfall
A CLO can be characterized by its purpose, collateral, turnover, vintage, and geographic exposure. CLOs can be issued for “balance-sheet” or “arbitrage” purposes. Banks and financing companies use balance-sheet CLOs to offload loans originated from their balance sheet for regulatory capital relief, whereas asset managers use arbitrage CLOs to take advantage of an asset-liability funding mismatch to create leveraged exposure for equity investors. The collateral type can be broadly syndicated loans (BSL), or middle market loans (MML), wherein BSL are loans to companies with EBITDA greater than $75-100 million and typical loan size is $200-250 million or more, and MML are loans to companies with EBITDA between $10-20 million to $50-75 million and typical loan size of $25 million to $200 million. CLOs can be “static” or “managed” depending on the manager’s ability to turn over the portfolio. In terms of vintage, people generally refer to CLOs by their origination year and quarter, another vintage demarcation is based on whether a CLO was issued pre-crisis (or, “Generation 1.0”) and post-crisis (or, “Generation 2.0”). Lastly, the collateral can be from companies predominantly based in the U.S., Europe, or another geographic location.

**Figure 6: Lifecycle of a CLO**

<table>
<thead>
<tr>
<th>Deal Marketing and Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typically, 2–3 months for pre-pricing, and 4–5 weeks from pricing date to closing date</td>
</tr>
<tr>
<td>■ Manager and arranger determine key features of deal and begin negotiations with initial investors. Typically, the manager begins to purchase assets in a warehouse facility. The warehouse can last from 2–3 months to 8–9 months, depending on the market conditions. Once sufficient assets are aggregated, the deal is launched to broader market, the arranging bank solicits indication of interests from investors, and prices various debt tranches depending on demand from investors.</td>
</tr>
<tr>
<td>■ Closing typically follows 4–5 weeks later. At this time, warehouse assets are transferred to the CLO and the trade settles. CLO liabilities also start accruing coupon from this date.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reinvestment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typically, 4+ years (including 2 years non-call period)</td>
</tr>
<tr>
<td>■ Soon after the closing date, the manager ramps up the remaining portfolio and the CLO goes effective.</td>
</tr>
<tr>
<td>■ The CLO manager actively manages the portfolio. As long as the CLO is meeting collateral quality and subordination level requirements, the manager is allowed to reinvest principal proceeds to buy new collateral. Reinvestment period consists of Non-Call and Callable periods:</td>
</tr>
<tr>
<td>▪ <strong>Non-Call Period</strong>: Prevents equity investors from exercising the right to call a deal or reprice the debt tranches.</td>
</tr>
<tr>
<td>▪ <strong>Callable Period</strong>: Following the non-call period, equity investors may be incentivized to refinance the debt tranches to lower cost of funding or make additional changes such as extending the length of the reinvestment period.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Amortization</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ At end of reinvestment period, debt tranches are amortized using principal proceeds from collateral pool in sequential order. At some point, equity investors will often choose to call the deal.</td>
</tr>
</tbody>
</table>
Collateral: CLOs Provide Exposure to a Senior-Secured Asset Class

In general, senior loans (or bank loans) are loans made to non-investment-grade businesses to finance acquisitions, refinance existing debt, support business expansion, etc. These loans can range from $50 million to well over $10 billion. Senior loans are primarily originated by money center banks and other major financial institutions that syndicate the loans among a large number of banks and institutional investors.

Senior loans hold the highest rank in a borrower’s capital structure, making them senior to all other debt and stock, both preferred and common. They are typically secured by a first-priority lien on the borrower’s assets. In the event of a borrower’s bankruptcy or other liquidation scenario, senior loan obligations would be paid first, ahead of subordinated loans, bonds, preferred stock, or common equity. Furthermore, senior loans contain contractual provisions, known as covenants, that impose limits on what the borrower may do with the borrowed money. These covenants could be affirmative, negative, and maintenance covenants. The affirmative covenants describe a set of actions or responsibilities on the part of the borrower (e.g., the borrower has to pay taxes, maintain insurance, provide access to information, maintain condition of business, etc.). The negative covenants prohibit borrowers from taking certain actions unless some conditions are satisfied (e.g., the borrower cannot incur additional debt, grant liens or pledge assets, sell or dispose assets, merge or consolidate with other entity, etc.). The maintenance covenants prescribe a set of performance metrics that the borrower has to maintain on a regular basis (e.g., Senior Debt to EBITDA ratio, Total Debt to EBITDA ratio, EBITDA to Total Interest Ratio, Capex Limit, Fixed Charge Coverage Ratio, etc.). The maintenance covenants are typically measured on a quarterly basis; failure to satisfy can trigger the lender’s right to take action against the borrower. The higher rank and contractual provisions result in senior loans having lower default and higher recovery rates compared to other corporate debt securities, especially HY bonds (see Figure 7).

Figure 7: Robust Historical Default and Recovery Experience
Trailing 12-Month Issuer-Weighted U.S. Spec-Grade Default Rates: Bonds vs Loans

[Graph showing default rates for bonds and loans from 2003 to 2017]

Trailing 12-Month Recovery Rates (Per $100 Par): U.S. Senior Unsecured Defaulted Bonds vs U.S. Loans

[Graph showing recovery rates for bonds and loans from 2003 to 2017]

Source Moody’s as of May 10, 2018
Senior loans pay interest at rates that float with changes in market interest rates. Most senior loans pay a fixed spread over LIBOR (London Interbank Offered Rate), and an individual senior loan can have a combination of as many as a dozen different LIBOR rates in place at any one time. Thus, senior loan yields move higher as interest rates rise, but unlike bonds, the underlying value of senior loans is generally not affected by interest rate changes. In fact, the effect of interest rate changes on senior loans is typically the opposite of the effect of interest rate changes on bonds and other fixed-rate investments. With a senior loan, when interest rates rise, the amount of income also rises, but the price of the loans should remain constant.

Senior loans fund a variety of industry sectors. This is unlike trust preferred (TruPS) CDOs, commercial real estate (CRE) CLOs, residential mortgage-backed securities (RMBS), and commercial mortgage-backed securities (CMBS), which have exposure to a select few sectors. Therefore, senior loans allow managers to build a well-diversified portfolio. The senior loan market has also gradually grown into a mainstream asset class that exceeds $1 trillion in size, which improves the collateral manager’s ability to source and actively trade these portfolios.

The large market size and diversified nature of the senior loan asset class, along with the robust default and recovery rates due to senior secured claims on the underlying companies, are the primary reasons for CLOs’ resilient performance over multiple credit cycles.

**Structure: Offers Robust Protections That Have Been Tested Through Time**

Like any debt security, CLO debt tranches are protected by excess collateral (or, equivalently, by subordinated debt or equity). This provides the debt tranches cushion from losses in the underlying portfolio. Typical excess collateral levels for tranches rated AAA and AA, A, BBB, BB, and B are 132%, 122%, 114%, 109%, and 107%, respectively, allowing them to withstand the default and recovery experience of past credit cycles (see Figure 8).

**Figure 8: Impact of Subordination on Debt Tranches**

Source: Voya Investment Management as of 12/31/2017. Analysis uses default rates (by issuer count) as reported by S&P LCD.

An additional layer of protection is provided by a cash diversion mechanism of the CLOs. This mechanism is governed by Overcollateralization (OC) and Interest Coverage (IC) Tests, and is triggered if there is meaningful deterioration in collateral performance from levels set at inception of the CLO.

Conceptually, Overcollateralization Tests require that the amount of senior secured loans held in the underlying collateral pool of a CLO has to exceed the amount promised to investors who purchase the debt tranches of the CLO by a certain percentage. For example, Overcollateralization Tests for AAA and AA, A, BBB, BB tranches are
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typically set at 122%, 114%, 108%, 105%, and 103%. Similarly, Interest Coverage requires that the amount of excess interest generated by the collateral (measured by dividing the available interest proceeds by the interest payable on the respective CLO Notes) exceed a certain predetermined threshold. For example, Interest Coverage Tests for AAA and AA, A, BBB, and BB tranches are typically set at 120%, 115%, 110%, and 105%, respectively. Note that Interest Coverage tests are typically not set for B-rated tranches.

If any OC or IC Tests are failing, the CLO waterfall diverts interest and principal due to junior tranches to pay down senior tranches (or, purchase more collateral in certain cases) until such time that the covenants are back in compliance (see Figure 9). These protections improve the resiliency of the CLO debt tranches to default experience that is several multiples of historical averages (see Figure 10).

Figure 9: Cash Flow Diversion/Self Correcting Mechanism in CLO Structure

<table>
<thead>
<tr>
<th>Tranche</th>
<th>Multiple of 2000 Cycle for first $ loss</th>
<th>Multiple of 2008 Cycle for first $ loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>AA</td>
<td>8.6</td>
<td>NA</td>
</tr>
<tr>
<td>A</td>
<td>5.3</td>
<td>6.6</td>
</tr>
<tr>
<td>BBB</td>
<td>3.1</td>
<td>4.1</td>
</tr>
<tr>
<td>BB</td>
<td>1.8</td>
<td>2.4</td>
</tr>
<tr>
<td>B</td>
<td>1.3</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: Voya Investment Management
Analysis is run on a benchmark CLO structure issued in Q1 2018 using 70% recovery rate, which is somewhat conservative given historical realized recovery rates of 75%-80% for leveraged loans, and actual default and prepayment rates experienced during this period.
Additionally, various collateral quality covenants—which are based on industry/issuer concentrations and average collateral quality (rating, life, spread, recovery rating, diversity score, etc.)—provide an early warning of collateral quality deterioration. They also serve as a correcting mechanism to bring the CLO back into compliance by:

- Setting limits on portfolio quality and limiting concentrated exposures to industries and issues
- Restricting investments to assets that either improve or maintain the portfolio’s collateral quality
- Restricting the manager’s ability to reinvest assets, allowing any proceeds from pay down/amortization of collateral to pay down senior tranches until the covenants are in compliance

**Investment Style: Managers Matter, Especially in Distressed Markets**

CLOs are actively managed vehicles; i.e., they have a reinvestment period during which the manager can reposition the portfolio within the parameters set forth by the governing documents. Managers add value by reinvesting and repositioning portfolios to increase returns in benign economic environments and protect against downside risk during weaker economic times. On average, CLO managers have been able to add value by avoiding defaults and managing around portfolio constraints to keep the cash fully invested, thereby increasing the return on equity. (See Figure 11 for performance of CLOs during the Financial Crisis).

**Figure 11: Average CLO Default rates have been lower than Index**

Subordination Levels Designed to Withstand Historical Default and Recovery Experiences
—Cash Flow Diversion Mechanism Further Protect the Debt Tranches

Source: Credit Suisse, “The CDO Strategist” October 27, 2011.

Also, research has shown that the overall credit performance in actively managed CLOs has outperformed static transactions, especially during periods of volatility. For example, S&P Global Market Intelligence showed that manager trades during the 2008–2009 credit crisis reduced potential losses by 10% on average (S&P CLO Spotlight: How Do CLO Managers Perform in Times of Stress, September 6, 2016). S&P also found that manager trades avoided potential losses amounting to just under 2% of US CLO 2.0 portfolios during the oil- and gas-related stress in Q4 2015 and Q1 2016.
Even though CLO managers tend to add value, the variability in their performance, especially during periods of distress, is significant (Figures 12 and 13). Therefore, in addition to analyzing collateral and structure, it is important to analyze manager’s credit expertise and investment style, and to select managers with a proven record of improving the risk/return profile, building par and loss mitigation, and maintaining stable collateral metrics/equity distributions over multiple credit cycles.

**Figure 12: Dispersion in Cash-on-Cash and Default Performance Among Established Managers**

![Graph showing dispersion in cash-on-cash and default performance among established managers](image_url)

Source: Credit Suisse, The CDO Strategist October 27, 2011. Cash-on-cash return is calculated by quarterly cash flows to the equity tranche divided by the outstanding balance of equity tranche; all returns are annualized. Statistics based on average of top and bottom 5 managers among managers with more than 5 CLOs in management.

**Figure 13: Manager Selection is Key to Outperformance**

IRR by Year of Issue

![Graph showing IRR by year of issue](image_url)

Risks and Opportunities for CLO Securities in Broader Portfolio Strategy

CLO Debt
Each rated class of CLO debt has a different risk/return profile based on its priority in the payment waterfall. Understanding the nuances of each class, along with its market sensitivities and behavior, can help investors to identify favorable market opportunities.

Senior Tranches: AAA to AA
Credit risk for AAA and AA notes is low, primarily due to subordination and the CLO’s cash flow redirection feature, which prioritizes cash flows to pay down senior tranches in the event of an overcollateralization breach. This provides senior tranches with significant protection from distress in the underlying collateral pool.

Senior debt tranches do, however, bear a risk of refinancing. These tranches are typically issued at par. This means that if a majority of equity investors elect to call the deal—either to redeem or to refinance the debt tranches into a lower spread following the non-call period—it will typically result in a lower yield and shorter weighted average life for the refinanced tranches.

Investment-Grade Tranches: A to BBB
A CLO’s investment-grade mezzanine tranches have relatively low credit risk. For these tranches to experience principal losses, a substantial portion of the CLO’s underlying collateral needs to default. Additionally, these tranches typically offer a more attractive yield to maturity relative to corporate credit bonds with the same rating.

These tranches may be subject to the risk of payment in kind (PIK), which results if interest due to the tranches is deferred when cash flow is unavailable, such as in the case of failing an overcollateralization test. Additionally, there is slightly more risk for the weighted average life of these tranches to be extended, and some risk if the underlying collateral pool becomes distressed, which can cause the rating agencies to downgrade the tranches. The risk of a downgrade may prove challenging for investors who are only able to hold investment-grade bonds, as a downgrade to non-investment grade could force them to sell.

Junior Mezzanine Tranches: BB and B
Junior mezzanine tranches are more likely to be priced below par, which means they feature a higher likelihood of call upside in the event that the equity holders exercise their call option and redeem the debt at par. Additionally, these tranches demonstrate much higher sensitivity to movements in credit spreads when compared to the senior CLO tranches and their corporate credit equivalents.

The primary risk associated with these debt tranches is higher credit risk relative to the senior investment-grade tranches. The junior tranches have fewer structural protections, which can result in some principal loss over the life of the CLO. As a result, these tranches are subject to more uncertain return profiles when compared to the senior tranches.

Junior mezzanine tranches are more vulnerable to PIK than the A through BBB tranches, and they are also more illiquid. To offset some of these risks, however, the junior mezzanine tranches provide meaningful yield pickup as compared to other similarly rated assets, such as unsecured high yield bonds.
CLO Equity

CLO equity delivers non-mark-to-market term leverage on a diversified senior secured loan portfolio.

As shown earlier, cash flows from the CLO’s underlying collateral pool are first distributed to the CLO’s debt tranches in the order of their seniority, and the residual cash flow is paid to the equity tranche. CLO equity represents leveraged exposure (typically 10–12x) to the underlying collateral pool. Accordingly, CLO equity targets a level of return that is not only a strong complement to private equity in a broader portfolio but may also offer an attractive substitute in some cases (Figure 14).

Figure 14: CLO Equity versus Comparable Asset Classes

Most private equity strategies do not start realizing gains (or losses) on the underlying portfolio companies until after the capital drawdown and investment period, which typically lasts up to four years. On the other hand, CLO equity has a “front loaded” return profile, meaning that investors can expect cash flows right away.

Additionally, most private equity strategies tend to be very concentrated, whereas CLO equity provides much more diversified exposure. A CLO’s underlying collateral pool is subject to industry concentration limits, which minimize each CLO’s exposure to any one industry. In fact, the underlying CLO collateral pool typically consists of loans from 150–200 issuers, offering exposure to companies that span a wide variety of industries and geographies.

CLO equity investors also benefit from another unique feature of most CLOs: the underlying collateral pool is actively managed. In an environment of spread widening, collateral managers can acquire cheaper assets with previously locked-in, non-recourse, non-mark-to-market financing. This creates additional opportunities to build par purchasing collateral at a discount through trading and through reinvesting prepayments and amortizations.
Considerations for Potential CLO Investors

In the current low-yield environment, we believe that a strategy that tactically invests across mezzanine CLO debt and CLO equity is an attractive way for investors to increase risk-adjusted return potential. However, given the complexity of the asset class, investors should consider using a structured credit manager with expertise and resources to research the following three components of CLOs:

1. Collateral
2. Structure
3. Investment style of collateral manager

Analyzing the risk/reward trade-off of each CLO opportunity in the context of these three components is critical to the success of a CLO strategy. No two CLOs are exactly alike. Each CLO indenture is the result of detailed negotiations between the manager, debt investors, and equity investors, and these parties often have conflicting views and preferences. Terms can vary depending on the investor base, manager’s reputation, and market environment at the time of origination.

Accordingly, maintenance levels for a CLO’s collateral quality, coverage tests, and concentration limitations will vary. Provisions for manager replacement and amendments to the indenture, the terms of note redemption, restricted trading periods, refinancing, and repricing will also differ. These differences can impact the cash flow profile of each CLO tranche and need to be analyzed in the context of macroeconomic trends. Additionally, corporate credit markets are dynamic because industry and borrower attributes change through time. Risk evolves along with the corporate credit market and borrower level attributes, necessitating that CLO strategy managers have the resources necessary to maintain ongoing dialogue regarding various industries and particular borrowers.

Investment managers with dedicated credit research teams are equipped to evaluate the underlying portfolio to formulate default and recovery assumptions at individual asset levels. This allows them to find the best relative value opportunities, especially during periods of distress when CLO tranches can be volatile.

Understanding the investment style of collateral managers is another key component of evaluating CLO opportunities. The active management of a CLO’s underlying collateral pool can make or break CLO tranche performance. This is especially true for junior tranches. Accordingly, assessing how active management is likely to affect a CLO’s performance provides a more comprehensive view of the risk/return profile for each CLO tranche.

A combination of structuring, credit research, and macroeconomic expertise can help an investment manager build a portfolio of attractive CLO opportunities and tactically adjust portfolio positions to capitalize on the relative value and market volatility.
Conclusion

With robust structural protections and historically low default rates, CLO debt allows investors the potential to increase yield and total return without increasing underlying credit risk—particularly for mezzanine tranches. We believe CLO equity should be considered a viable “through-cycle” allocation in investors’ alternative risk budgets. In addition to complementing private equity, CLO equity has historically delivered strong IRRs, even through the financial crisis.

Given the somewhat volatile nature of the asset class, especially equity, we believe a strategy that tactically allocates across CLO mezzanine debt and CLO equity opportunities represents an attractive way for investors to increase risk-adjusted returns.
Appendix

CLO Market Evolution Since the 2008 Financial Crisis

Before the 2008 financial crisis, highly leveraged investors were commonplace in the world of structured credit, and the CLO market was no different. At that time, structured investment vehicles and hedge funds were the dominant investors in this asset class. For pre-crisis CLO market participants, the combination of high leverage and a short-term investment horizon created a volatile environment. During the height of the financial crisis, spreads for AAA- and AA-rated CLOs blew out to levels usually associated with distressed sectors. However, despite this volatility, AAA- and AA-rated CLO tranches did not experience any losses from 1993 through 2016, a period that includes the Long Term Capital Management (LTCM) fund crisis, the dot-com bubble, and the 2008 financial crisis. Lower-rated CLO tranches fared equally well, posting only small cumulative loss rates over the same period.

Figure 15: The Impressive Track Record of CLOs: Historically Low Default and Loss Rates (1994–2013)

<table>
<thead>
<tr>
<th>Original Rating</th>
<th>Total Tranches</th>
<th>Defaulted Tranches</th>
<th>Defaulted Rate</th>
<th>Loss Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>1,992</td>
<td>0</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>AA</td>
<td>1,005</td>
<td>0</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>A</td>
<td>1,119</td>
<td>5</td>
<td>0.45%</td>
<td>0.08%</td>
</tr>
<tr>
<td>BBB</td>
<td>1,069</td>
<td>3</td>
<td>0.28%</td>
<td>0.21%</td>
</tr>
<tr>
<td>BB</td>
<td>841</td>
<td>14</td>
<td>1.66%</td>
<td>0.78%</td>
</tr>
<tr>
<td>B</td>
<td>115</td>
<td>3</td>
<td>2.61%</td>
<td>1.13%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,141</strong></td>
<td><strong>25</strong></td>
<td><strong>0.41%</strong></td>
<td><strong>0.04%</strong></td>
</tr>
</tbody>
</table>


This favorable track record is a testament to the strong structural protections previously outlined. Over the last several years, the following developments in the CLO market have made the asset class even more attractive:

- New U.S. regulations imposed after the financial crisis have effectively forced highly leveraged short-term investors out of the CLO market. Asset managers and insurance companies have emerged in their place as significant buyers and sellers of CLOs. Real money investors such as pension funds, asset managers, and insurance companies, especially those from Asia, are gradually increasing their exposure to the asset class. Stable long-term investors currently represent a significant portion of CLO market participants.

- The structural protections for CLOs have been enhanced since the financial crisis (Figure 16). Post-crisis CLOs have extra par subordination, which means the CLOs’ mezzanine tranches have even more protection from credit deterioration in the underlying collateral pool of senior-secured loans than they did pre-crisis. Additionally, whereas the underlying collateral pools of pre-crisis CLOs contained riskier assets such as high yield bonds and structured products, collateral pools for CLOs issued after the crisis primarily consist of senior secured loans.
### Figure 16: Then and Now: CLOs Have Become Even More Attractive Since 2008

**Improved Structure and Collateral Quality in Post-Crisis CLOs**

<table>
<thead>
<tr>
<th>Par Subordination</th>
<th>Pre-Crisis</th>
<th>Post-Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA: 24bps</td>
<td></td>
<td>35% AAA: 105bps</td>
</tr>
<tr>
<td>AA: 35bps</td>
<td>24%</td>
<td>24% A: 190bps</td>
</tr>
<tr>
<td>A: 60bps</td>
<td>19%</td>
<td>19% BBB: 290bps</td>
</tr>
<tr>
<td>BBB: 150bps</td>
<td>13%</td>
<td>13% BB: 575bps</td>
</tr>
<tr>
<td>BB: 340bps</td>
<td>9%</td>
<td>Equity</td>
</tr>
<tr>
<td>Equity</td>
<td>7%</td>
<td>8% Equity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deal Term</th>
<th>Pre-Crisis</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA Subordination (par basis)</td>
<td>23%</td>
<td>34-38%</td>
</tr>
<tr>
<td>AAA par coverage</td>
<td>130%</td>
<td>151-161%</td>
</tr>
<tr>
<td>AAA pricing</td>
<td>LIBOR+22-25bps</td>
<td>LIBOR+ 120-150bps</td>
</tr>
<tr>
<td>Mezz./Sub tranches</td>
<td>Distributed via capital markets; little manager retention</td>
<td>Portion of Equity tranche likely retained by manager</td>
</tr>
<tr>
<td>Reinvestment Period</td>
<td>6-7 years</td>
<td>4-5 years</td>
</tr>
<tr>
<td>Non-call Period</td>
<td>3 years</td>
<td>2-3 years</td>
</tr>
<tr>
<td>Min. 1st lien assets</td>
<td>80-85%</td>
<td>90%</td>
</tr>
<tr>
<td>Max. non 1st lien assets</td>
<td>10-20%</td>
<td>&lt;10%</td>
</tr>
<tr>
<td>Caa/CCC assets</td>
<td>10-15%</td>
<td>7.5%</td>
</tr>
<tr>
<td>High Yield Bonds</td>
<td>10-20%</td>
<td>0%</td>
</tr>
<tr>
<td>Structured Products</td>
<td>35%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: Citi Research, as of February 2016. The AAA pricing information has been updated to reflect latest levels as of June 2018.
Risk Disclosures

The following are the principal risks associated with investing in CLOs. This is not, and is not intended to be, a description of all risks of investing in CLOs.

Credit Risk—The portfolio investments in which the Fund will invest are subject to changes in the financial condition of an obligor of the collateral underlying such CLO, or in general economic conditions or both. These adverse changes may impair the ability of such obligor to make payments of principal or interest, and negative developments on rated portfolio investments may not be promptly reflected in such ratings.

Liquidity Risk and Interest Rate Risk—CLO securities are generally illiquid and dealer marks may not represent prices where assets can actually be purchased or sold in the market from time to time. Accordingly, the mark-to-market value of CLOs may be volatile and the value of the Shares in the Fund could likewise be volatile. The value of the CLO securities owned by the Fund generally will fluctuate with, among other things, the financial condition of the obligors or issuers of the underlying collateral, general economic conditions, the condition of certain financial markets, political events, developments or trends in any particular industry and changes in prevailing interest rates.

Deferred Payment of Interest—Mezzanine Tranches are “Pik’able” (i.e., “payment in kind” where interest accrues until maturity or refinancing). This allows for a portion, or the entire amount, of the relevant Tranche’s scheduled interest payment to be deferred and added to the principal balance of the outstanding amount for that specific Tranche. The failure by the CLO Issuer to pay interest in cash does not constitute an event of default as long as a more senior class of securities of such CLO Issuer is outstanding.

Interest Rate Risk; Floating/Fixed Rate or Basis Mismatch—While the assets underlying CLOs are typically floating rate, a portion of the assets of CLO Issuers whose securities are held by the Fund may be fixed rate assets. On the other hand, the securities issued by CLO Issuers are typically floating rate notes that bear interest at rates based on the London interbank offer rate (“LIBOR”) for specified periods. As a result, there may be a mismatch between a CLO Issuer’s issued securities and its underlying fixed rate assets.

Prepayment of Loans Underlying CLOs—Loans, the primary assets underlying CLOs, are generally pre-payable, in whole or in part, at any time at the option of the obligor thereof at par plus accrued and unpaid interest thereon. Prepayments on loans held by a CLO Issuer may be caused by a variety of factors which are difficult to predict.

Credit Risk—Below investment grade loans involve a greater risk that borrowers may not make timely payment of the interest and principal due on their loans. They also involve a greater risk that the value of such loans could decline significantly. If borrowers do not make timely payments of the interest due on their loans, the yield on a portfolio of such loans will decrease. If borrowers do not make timely payment of the principal due on their loans, or if the value of such loans decreases, the value of a portfolio invested in such loans will decrease.

Interest Rate Risk—The yield on senior loans is directly affected by changes in market interest rates. If such rates fall, the yield may fall. Also, if overall interest rates on loans decline, the yield may fall and the value of the loans may decrease. When market interest rates rise, there may be a delay in the rise in the yield on loans due to a lag between changes in such rates and the resetting of the floating rates on the loans. There may also be a delay due to the effect of LIBOR floors, which establish a lower limit on the LIBOR portion of a loan’s yield. Rises in market interest rates must exceed applicable LIBOR floors before such rises will affect the yield on a loan with a LIBOR floor.

Limited secondary market for loans—Because of the limited secondary market for loans, a portfolio may be limited in its ability to sell loans in a timely fashion and/or at a favorable price.

Demand for loans—An increase in demand for loans may adversely affect the rate of interest payable on new loans acquired by a portfolio, and it may also increase the price of loans in the secondary market. A decrease in the demand for loans may adversely affect the price of loans in a portfolio, which could cause such portfolio’s value to decline.
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