Collateralized Loan Obligations – Stress Testing U.S. Insurers' Year-End 2018 Exposure

Authors

Azar Abramov, Jean-Baptiste Carelus, Jennifer Johnson, Eric Kolchinsky, Hankook Lee, and Elizabeth Muroski

Email: CapitalMarkets@naic.org

Executive Summary

- Collateralized Loan Obligations (CLOs) are structured finance securities collateralized predominantly by a pool of below investment grade leveraged bank loans. CLOs are a growing asset class for U.S. insurers and the focus of regulatory concern.
- The NAIC completed a series of stress tests of insurer owned CLOs. The Stress Thesis for the NAIC's stress testing U.S. insurer CLO exposure is that the consequences of less stringent underwriting on the underlying bank loan collateral will result in substantially lower recovery rates during the next recession.
- Results showed that:
  - Losses on "normal" CLO tranches—those with regular promises of principal and interest—only reached BBB-rated tranches, even under the worst-case scenario.
  - For "atypical" CLO tranches—those that have unusual payment promises, such as equity tranches and Combo Notes—losses reached AA-rated securities.
- U.S. insurer investments in CLOs as a whole do not appear to be a significant risk.

About CLOs

CLOs are structured finance securities collateralized predominantly by a pool of below investment grade, first lien, senior secured, syndicated bank loans, with smaller allocations to other types of investments, such as middle market loans and second lien loans. CLO debt issued to investors consists of several tranches, or layers, with different/sequential payment priorities and, in turn, differing credit quality and credit ratings. The senior-most tranche is the most protected and, therefore, has the highest credit quality (and highest rating) and generally the lowest coupon. CLOs have structural features that serve as protection for the debt investors, such as overcollateralization (O/C)—i.e., assets to liabilities ratio, O/C—and interest coverage tests.

Most CLO portfolios are actively managed by an investment management firm (the CLO manager), which can buy and sell bank loans and other permissible asset types for the underlying portfolio, during a pre-defined reinvestment period (typically the first four to five years post-inception, or "closing," of the transaction). Due in part to sound structural features, a low default rate environment for bank loans and prudent investment management, CLOs were considered "survivors" of the financial crisis, and CLOs outstanding have been steadily increasing in recent years (See Chart 1).

Chart 1: Historical CLOs Outstanding in the U.S. ($bil), 2010–2018
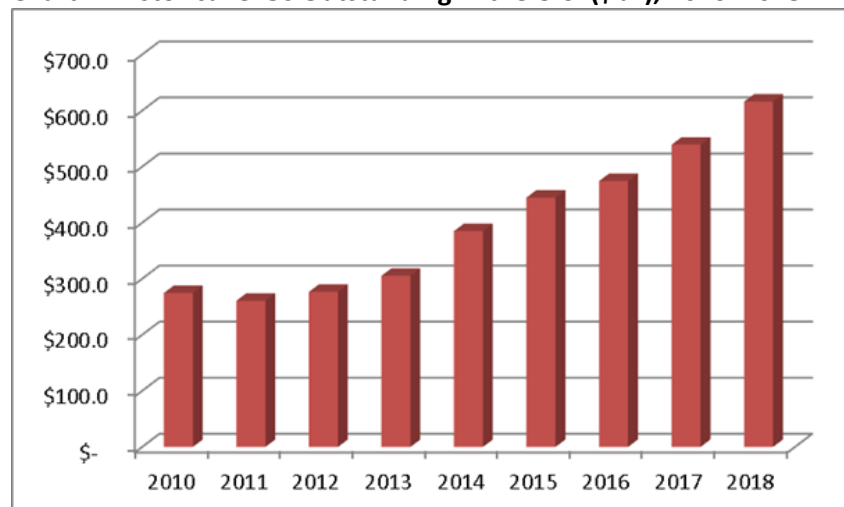
Source: SIFMA

While they are historically a very small portion of total U.S. insurer cash and invested assets, CLOs offer an attractive yield alternative to traditional bond investments. U.S. insurer exposure to CLOs at year-end 2018 was about $130 billion.[1]

Bank Loan Collateral

The credit risk of a CLO is dependent on the underlying assets within the portfolio. For "traditional" CLOs, the collateral pool primarily consists of below investment grade, first lien, senior secured, broadly

---

[1] This is an update from our Special Report "U.S. Insurers' Exposure to Collateralized Loan Obligations (CLOs) as of Year-End 2018" published June 2019. We have added another $8.6 billion of CLO-related investments—primarily CLO Combo Notes.

syndicated bank loans (usually at least 90% of the total portfolio); and it may include a pre-determined allowable portion of other asset types, such as second lien bank loans (which are highly leveraged) and unsecured debt, as well as middle market loans. Some CLOs consist predominantly of middle market loans as the underlying collateral.

The average rating of the underlying collateral is typically about single-B, and the leveraged bank loans are typically floating rate, based on London Inter-bank Offered Rate (LIBOR). In addition, there is also an allowance for leveraged bank loans that are "covenant-lite" (cov-lite)—that is, those that do not have as many restrictions relative to the borrower's debt-service ability as typical bank loans.

Cov-lite loans with "loose" or no financial maintenance covenants have been on the rise in recent years, peaking at $742 billion outstanding in 2017 (double the amount in 2016), according to FitchRatings research. By the end of 2018, cov-lite represented about 80% of all leveraged loans according to S&P Global Market Intelligence's Leveraged Data & Commentary unit, and there were about $922 billion in cov-lite loans as of January 2019.

CLO Stress Methodology

Because of recent regulatory interest in leveraged bank loans and CLOs—due in part to the loosened underwriting standards on the underlying leveraged bank loans (such as the increase in cov-lite, along with a lack of subordination and weaker earnings-before-interest-tax-deprecation-and-amortization (EBITDA) multiples with leveraged bank loans)—the NAIC Structured Securities Group (SSG), along with the Capital Markets Bureau (CMB) performed a series of stress tests on U.S. insurer holdings of CLOs as of year-end 2018. Three scenarios were formed, each with increasing conservatism. Note that a probability of occurrence was not assigned to any of the stress test scenarios—these scenarios are not meant to value the securities. The goal was to measure the potential impact of CLO distress on insurance company balance sheets.

The NAIC endeavored to model all tranches of broadly syndicated CLOs held by U.S. insurers at year-end 2018. Excluded were CLOs securitized by middle market loans and commercial real estate; collateralized debt obligations (CDOs) collateralized by asset-backed securities (ABS) and trust preferred securities (TruPs); and collateralized bond obligations (CBOs) and resecuritizations. It is, however, the NAIC's intention to stress test middle market CLOs at a later date.

Stress Thesis

Our Stress Thesis is that **the consequences of less stringent underwriting on the underlying bank loan collateral will result in substantially lower recovery rates during the next recession**. Specifically, the stress tests aim to show how CLOs would fare if bank loan recoveries deteriorated from historical norms as compared to unsecured debt recoveries. In addition, the recovery stress scenario was run under both a historical and a moderately stressful default environment.

Stress Tests Methodology

The following summarizes the NAIC's stress tests methodology. A full report on the CLO stress tests methodology may be found on the NAIC's CMB webpage via the link: CLO Stress Tests Methodology.

Default Rates:

Base default rate data was obtained from Moody's Annual Default Study published in 2019 (Moody's Study).[2] The stress tests used 10-year cohort data for all cohorts with at least 10 years (1970–2009), and an issuer-weighted average term structure of default rates was calculated for each broad rating category (e.g., Baa, Ba, etc.). In addition, a weighted average standard deviation (σ) was also calculated for each tenor.

Two default scenarios were used in the stress tests: "Historical" and "Historical + 1σ." Rating category default rates were scaled by historical ratios to produce rating-specific default vectors as shown in Table 1 and Table 2.

Table 1: "Historical" Default Vectors

	1	2	3	4	5	6	7	8	9	10
Ba1	0.6%	1.8%	3.1%	4.4%	5.8%	7.2%	8.2%	9.0%	9.8%	10.7%
Ba2	1.0%	2.4%	3.9%	5.4%	6.8%	8.0%	9.1%	10.4%	11.8%	13.4%
Ba3	1.8%	4.8%	8.0%	11.6%	14.6%	17.5%	20.0%	22.4%	24.7%	26.7%
B1	2.7%	6.7%	10.9%	14.7%	18.5%	21.9%	25.3%	28.2%	30.8%	32.9%
B2	4.0%	9.8%	15.1%	19.7%	23.4%	26.8%	29.7%	32.1%	34.3%	36.4%
B3	6.5%	13.6%	20.2%	25.7%	30.4%	34.4%	37.9%	40.9%	43.5%	45.5%
Caa	12.8%	23.1%	30.9%	37.1%	41.7%	45.4%	48.2%	51.0%	53.6%	55.8%
Ca-C	49.8%	61.5%	67.6%	70.8%	71.5%	71.5%	72.5%	73.4%	73.4%	73.4%

Table 2: "Historical + 1σ" Default Vectors

	1	2	3	4	5	6	7	8	9	10
Ba1	1.1%	3.4%	5.4%	7.4%	9.5%	11.3%	12.5%	13.3%	14.1%	15.0%
Ba2	1.9%	4.5%	6.8%	9.0%	11.2%	12.6%	13.9%	15.4%	17.1%	18.7%
Ba3	3.5%	9.0%	14.0%	19.4%	23.8%	27.5%	30.6%	33.4%	35.6%	37.4%
B1	4.7%	10.7%	16.4%	21.1%	25.3%	28.8%	32.1%	35.2%	38.3%	40.9%
B2	7.1%	15.6%	22.7%	28.3%	32.0%	35.2%	37.7%	40.0%	42.7%	45.3%
B3	11.5%	21.7%	30.4%	36.8%	41.5%	45.2%	48.1%	51.1%	54.1%	56.5%
Caa	20.1%	32.7%	41.7%	47.3%	51.3%	53.7%	55.7%	58.2%	60.2%	62.5%
Ca-C	77.9%	87.3%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%

---

[2] Moody's, Corporates – Global Annual Default Study: Defaults Will Rise Modestly in 2019 Amid Higher Volatility, Excel Supplement, 2019.

Certain Ca-C default rates (as highlighted in yellow in Table 1 and Table 2) were adjusted to ensure that marginal defaults rates remained non-negative.

Recovery Rates:

Recovery rate data was obtained from Exhibit 7 of the Moody's Study, which provides historical recovery rates for nine categories of corporate debt recoveries, ranging from first lien bank loans down to junior subordinated bonds. A portion of the defaulted amount of underlying bank loan collateral was modeled to recover at a set of recovery rate assumptions. The NAIC Stress Thesis expects the underlying bank loans to perform similar to unsecured debt in the next market downturn; other asset types in the portfolio were assumed to perform similar to their next worse category—the "stepdown" scenario.

The third-party software used by the NAIC provided inputs for three primary debt categories: senior secured bank loan, second lien bank loan, and senior unsecured bond. We also added an "other" category for any debt not covered by the three aforementioned categories. (see Table 3).

Table 3: Mapping Recovery Rates

Collateral Label	Historical Priority Position	Stepdown Priority Position	Notes
Senior Secured Loan	1st Lien Bank Loan	Sr. Unsecured Bank Loan	Consistent with our Stress Thesis
Second Lien Loan	2nd Lien Bank Loan	Sr. Subordinated Bond	Lowest recovery avail.
Senior Unsecured Bond	Sr. Unsecured Bond	Subordinated Bond	Consistent with the Stress Thesis
Other	Jr. Subordinated Bond	Sr. Subordinated Bond	Lowest recovery avail.

Since the bulk of CLO collateral are classified as senior secured loans, the assumed recovery rate was reduced from 64% to 40% in the Stepdown scenario.

Stress Test Scenarios:

Three scenarios were run: A, B and C as shown in Table 4:

Table 4: Scenarios of Stress Testing

Scenario	Default Rate	Recovery Rate
A	Historical	Historical
B	Historical	Stepdown
C	Historical + 1σ	Stepdown

What Was Not Modeled

Correlations were not explicitly modeled, as each CLO has a unique underlying portfolio, which can be diversified across a number of issuers and industries, and advanced correlation analysis is beyond the scope of this project.

CLO managers were also not factored into the stress testing, given the difficulty of this task. There are limited purchases and sales permitted after the reinvestment period; and while CLO managers intend to improve the credit quality of the portfolio, sometimes they do not. Historical performance is indicative, but no guarantee of future returns and given the dominant position of CLOs in the leveraged bank loan market, CLO manager trading decisions may be a 'zero-sum game' for the CLO market in general.

Stress Test Results

At the deal level, over 900 unique transactions (and over 7,600 tranches) were analyzed using a third-party vendor waterfall model, totaling about $527 billion par value (85% of total U.S. CLOs outstanding at year-end 2018). The portfolios were run as of June 30, 2019, with results as shown in Table 5. In Scenario A, which used a base default rate and historical recovery rate, the mean expected portfolio loss was the lowest at 9.7%, compared to Scenario C, where a stressed default rate and "stepdown" recovery rate generated an expected portfolio loss that was more than double, or 19.11%.

Table 5: Underlying Portfolio Losses by Scenario

	Mean Loss (%)	Std Dev (%)
Scen. A	9.70	1.63
Scen. B	14.35	1.61
Scen. C	19.11	1.63

Industry Results

Our analysis of the U.S. insurance industry's total CLO exposure resulted in five categories for the purposes of this report, as shown in Table 6.

Table 6: CLO Categories

Category	Description	Total $bil BACV
Mapped and Modeled "Normal"	Security mapped and modeled; pays normal principal and interest.	$95.9
Mapped and Modeled "Atypical"	Security mapped and modeled; atypical promises: primarily equity and Combo Notes.	$1.0
Ready to Map	Security linked to a specific CLO, but up-to-date CUSIP required	$6.0
Out of scope	Security can be modeled but is out of scope for our current project.	$12.2
Need Information	More information is needed; includes CLO tickers and Combo Notes	$15.1

Mapped and Modeled

We were able to model $96.9 billion of insurance company CLO exposure, which was separated into two categories: Normal and Atypical. There were $95.9 billion of Normal tranches, which pay regular promises

of principal and interest, and $1 billion of Atypical tranches. Atypical tranches have unusual payment promises, and they consist of mostly equity and Combo Note tranches.

<u>Mapped and Modeled – Normal</u>

Our analysis showed that losses on Normal tranches only reached BBB-rated (investment grade) tranches, even in Scenario C. Table 7 shows the losses by broad rating category, where only missed principal payments were counted as losses.

Table 7: Principal Losses on Normal Tranches ($mil.)

Lowest Rating	Mapped Exposure	Scenario A Loss	Loss %	Scenario B Loss	Loss %	Scenario C Loss	Loss %
AAA	43,729	-	0.0%	-	0.0%	-	0.0%
AA	22,701	-	0.0%	-	0.0%	-	0.0%
A	15,204	-	0.0%	-	0.0%	-	0.0%
BBB	11,525	-	0.0%	-	0.0%	1,942	16.9%
BB	2,465	7	0.3%	1,126	45.7%	2,344	95.1%
B	174	74	42.5%	169	97.0%	171	98.6%
CCC	11	10	89.1%	11	100.0%	11	100.0%
Total	95,808	91	0.1%	1,305	1.4%	4,469	4.7%

During periods of credit stress, some mezzanine tranches may not receive interest payments if a senior O/C test was triggered. This would not constitute a default; rather, the missed interest is capitalized. If the capitalized interest is not subsequently paid back to the mezzanine tranche, then the total loss may be greater than the book/adjusted carrying value (BACV) of the tranche. Table 8 presents the losses across the three scenarios when considering both missed principal and interest payments.

Table 8: Principal and Interest Losses on Normal Tranches ($ mil.)

Lowest Rating	Mapped Exposure	Scenario A Loss	Loss %	Scenario B Loss	Loss %	Scenario C Loss	Loss %
AAA	43,768	-	0.0%	-	0.0%	-	0.0%
AA	22,684	-	0.0%	-	0.0%	-	0.0%
A	15,202	-	0.0%	-	0.0%	-	0.0%
BBB	11,525	-	0.0%	-	0.0%	3,040	26.4%
BB	2,487	12	0.5%	1,612	64.8%	3,584	144.1%
B	174	132	75.9%	265	152.6%	275	158.0%
CCC	11	11	101.8%	13	116.3%	13	118.6%
Total	95,852	155	0.2%	1,890	2.0%	6,912	7.2%

<u>Mapped and Modeled – Atypical</u>

We grouped a number of obligations into the Atypical category. These include securities that do not have a standard principal balance (e.g., Equity) or have components which do not have a standard principal balance (e.g., Combo Notes).

Equity tranches have a notional balance and are not entitled to receive principal payments. In stressed environments, O/C tests cut off cash payments to equity holders. As a result, it is not possible to calculate a principal loss on these tranches. Combo Notes are a combination of equity tranches and other tranches within a capital structure, typically rated to a return of principal only. Combo Notes do have a principal balance, and all cash flows from the underlying securities are directed to their repayment.

Combo Notes losses to principal averaged 28% in Scenario A and increased to 30% in Scenario C. This performance was mostly driven by the equity tranche component, whose payments were stopped (due to the O/C test trigger). We found that the risk on **rated** Combo Notes is not comparable with similarly rated Normal tranches. Among the modeled Combo Notes, losses reached AA-rated tranches.

Atypical tranches are particularly concerning, as they are susceptible to high losses in stress scenarios; however, they are concentrated in only a few companies.

Ready to Map

"Ready to Map" tranches include those where the reported Committee on Uniform Securities Identification Procedures (CUSIP) number could be mapped to a tranche that has since been paid in full. The mismatch is due to a timing issue—that is, running the stress test model as of June 30, 2019, with CLO exposure reported by U.S. insurers as of Dec. 31, 2018. The total amount of CLO exposure affected by this phenomenon is $6 billion. This issue will rectify itself when we perform the stress tests with year-end 2019 reported data.

Almost $5 billion of this total was rated single-A or higher at year-end 2018; results for Ready to Map tranches are expected to be similar to the aforementioned Mapped and Modeled tranches. We do not believe that this sector presents a qualitatively different risk from the modeled securities.

Out of Scope

Tranches that were deemed "Out of Scope" for this project totaled $12.2 billion, as shown in Table 9.

Table 9: Out of Scope Categories

Category	Description	Total $bil BACV
Collateralized Bond Obligations	Transactions classified as backed primarily by bonds – likely to include in the future	$1.4
Middle Market CLO	Transactions backed by middle market companies, with little available data. Will seek to find a data source for analysis.	$10.0
TruPS	Backed by subordinated debt of financial institutions.	$0.5
Other	Misc. categories, including resecuritizations.	$0.3

Middle market CLOs are backed by loans to small and medium sized companies. These loans have less publicly available information and may have materially different performance. For example, middle

market loans have less liquidity, which may have a negative impact on recovery rates. Nevertheless, we are seeking a data source which will allow us to analyze these CLOs.

Need Information

Tranches in this category totaled about $15.1 billion and included those for which we do not have a CLO model available from our vendor, a Combo Note where the underlying CLO is modeled but terms and conditions of the transaction are unknown, or the filer identified the investment as a CLO but did not identify the relevant tranche.

A brief review of these securities showed that more than half were Atypical, primarily Combo Notes.

Analysis

Of the losses on the Mapped and Modeled, Normal are relatively small compared to the total capital and surplus of the U.S. insurance industry. Furthermore, they are concentrated within a small number of companies.

Starting with all U.S. insurers with any CLO exposure as of year-end 2018, we divided the Principal Loss (compare with Table 7) by each company's 2018 total capital and surplus for each scenario. These results were bucketed by U.S. insurer asset size, and the median, average and maximum was calculated. These results are presented in Table 10.

Table 10: Ratio of Principal Loss to Total Capital and Surplus

Asset Size	Med. A	Med. B	Med. C	Avg. A	Avg. B	Avg. C	Max. A	Max. B	Max. C
> $50B	-	-	-	-	-	2%	-	6%	26%
$10B to $50B	-	-	-	-	-	2%	1%	9%	28%
$5B to $10B	-	-	-	-	-	-	1%	3%	5%
$2.5B to $5B	-	-	-	-	1%	2%	-	14%	52%
$1B to $2.5B	-	-	-	-	2%	4%	37%	96%	157%
$500mm to $1B	-	-	-	-	-	2%	1%	6%	44%
$250mm to $500 mm	-	-	-	-	-	-	-	4%	17%
< $250mm	-	-	-	-	-	-	-	3%	7%

It is worth noting that the median loss ratios for all three scenarios is zero. Furthermore, it is clear that average losses in Scenario B and C are driven primarily by their respective outliers.

We also observed a concentration of Atypical securities in a small number of insurers. To demonstrate this, we combined the Mapped and Modeled; i.e., Atypical with likely Atypical tranches from Ready to Map and Need Information. Again, starting with the set of U.S. insurers with any CLO exposure, we calculated a ratio of Atypical tranches and likely Atypical tranches to total capital and surplus (See Table 11). Please note that these are not losses, but exposures only.

Table 11: Ratio of Atypical Exposure to Total Capital and Surplus

Asset Size	Median	Average	Max
> $50B	-	-	26%
$10B to $50B	-	6%	282%
$5B to $10B	-	1%	26%
$2.5B to $5B	-	1%	22%
$1B to $2.5B	-	-	25%
$500mm to $1B	-	-	10%
$250mm to $500mm	-	2%	68%
< $250mm	-	1%	8%

Once again, the median exposure to Atypical tranches (out of all companies with CLO exposure) is zero, while averages are skewed by a small number of companies.

Conclusion

The Stress Thesis for the NAIC's modeling of U.S. insurer CLO investments states that lower recovery rates are expected on the underlying bank loan portfolios in the next recession due to less stringent underwriting terms. As the NAIC SSG and CMB performed stress testing on U.S. insurer CLO investments— the majority of which are high credit quality based on credit ratings—**results showed that Normal tranches that rated A and higher did not experience any losses under the three different scenarios tested**. In the most stressful scenario, losses only reached BBB-rated notes for Normal tranches.

Since U.S. insurer exposure to CLOs is relatively small, at less than 2% of total cash and invested assets as of year-end 2018 and the vast bulk of these investments are rated single A or above, we do not believe that the CLO asset class currently presents a risk to the industry as a whole.

Nevertheless, our analysis also showed that a few insurers have concentrated investments in Combo Notes and low rated tranches. Even though they tend to perform well during stable market conditions, Combo Notes experience significant losses when the environment is stressed. Given the complexity and volatility of CLO investments in general, however, their exposure as a percent of total capital and surplus is worth identifying, particularly for insurers with large exposures as a percentage of their total asset size.

The NAIC will continue to monitor U.S. insurer investments in CLOs and report as deemed appropriate.

Useful Links:

NAIC Capital Markets Special Report – U.S. Insurance Industry Exposure to Collateralized Loan Obligations as of Year-End 2018, June 2018

NAIC Capital Markets Primer – Leveraged Bank Loans, November 2018

NAIC Capital Markets Primer—Collateralized Loan Obligations, July 2018

NAIC Capital Markets Primer – Combo Notes, October 2019