NAIC Collateralized Loan Obligation (CLO) Stress Tests
(May 2020 Update)

Introduction

The NAIC has performed a series of stress tests on the CLO holdings of insurance companies as of year-end 2019. There has been a great deal of regulatory interest in leveraged loans and CLOs as the current credit cycle matures. We ran five scenarios — A, B, C, D and E — with increasing conservatism. This memo lists and describes the assumptions used in our scenarios.

> Please note that these are intended to be stress tests — we have not assigned any probability of occurrence to any of the scenarios described within.

We welcome regulatory and industry feedback on this project.

May 2020 Update Summary

We added two new COVID-19 scenarios: D and E. These two scenarios differ from the earlier scenarios (A, B and C) in terms of the shape of the default curve.
We added 2010 default experience data to our Q1 2020 runs.

Table 1: May 2020 Update Summary

	Initial Runs	Year-End 2019 Runs	May 2020 Runs
Scenarios	A, B, C	A, B, C	C, D, E
CLOs Analyzed	Held at YE2018	Held at YE2019	Held at YE2019
Underlying Portfolio	As of June 2019	As of December 2019	As of March 2020

Concern about U.S. insurer holdings of CLOs stems from loosened underwriting on the underlying leveraged loans. The loosening underwriting falls into three areas: covenant-lite, absence of subordination and weaker EBITDA multiples.

Our Stress Thesis is that these developments will result in substantially lower recovery rates on leveraged loans during the next recession. Specifically, we wanted to see how CLOs would perform if the loan recoveries deteriorated from the historical norms to levels comparable with unsecured debt.

Additionally, we wanted to run our recovery stress in both a historical and a moderately stressful default environment.

Scope

We endeavored to model all tranches of broadly syndicated loan CLOs held by U.S. insurance companies.

We tried to exclude:
- o CRE CLOs – the risk is commercial real estate and different assumptions are required.
- o Re-securitizations, ABS CDOs and TruPS CDOs – as they are out of scope.
- o Middle market CLOs – temporarily excluded, as the asset class requires specialized assumptions. We hope to return to these assets shortly.

Another limitation was the availability of the specific CLO via our third-party software vendor.

Default Rate (For Scenarios A, B and C)

Annual Default Study, published in 2019 [1]

We used 10-year cohort data (Exhibit 53. Cumulative issuer-weighted default rates by annual cohort) for all cohorts with at least 10 years (1970-2009)[2].

We calculated an issuer weighted average term structure of default rates for each broad rating category (e.g. Baa, Ba).

Certain Ca-C-rating default rates (highlighted in yellow) were adjusted to ensure that marginal defaults rates remained non-negative. We believe that this data anomaly was due to scaling so closely to a boundary (100% default).

Default Rate (for Scenarios D and E)

In this CLO Stress Test update, we also introduce two new COVID-19 scenarios D and E.
                                        .S   , and Scenario E is based on
        .S   [3]

First, sinc   forecasts covered only 12 months, our first task was to extend these to 10 years. Since the timing of the default spike is implicit in the forecast, we do not have to make simplifying assumptions regarding the default path. For example, the averaging of default rates (as done with Scenarios A, B and C) is not required.

- o   We had two constraints in generating the whole 10-year curve. The first-year default rate must equal   , and the 10-year cumulative defaults should be about +   for Scenario D and about +2   for Scenario E.
- o   The severity of the end points as well as the shape of the intermediate curve were subjectively constructed. However, we believe that for the purposes of our stress tests, they capture the potential pressure on CLOs.

                                                          , or Ba1-C credit ratings) as a whole and our 10-year default curve needed to be extended to specific ratings. We followed the same ratio methodology described above (for Scenarios A, B and C) to map SG defaults to individual ratings.

Table 4: "2008" Default Vectors

1	2	3	4	5	6	7	8	9	10

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[3]   Default Trends   Global Default scenarios as coronavirus-induced economic turmoil intensifies, 27 March 2020.

Our Stress Thesis envisions that underlying leveraged loans will perform like unsecured assets during the next downturn. Furthermore, we assumed that the other assets in the CLO would perform similarly to their next

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given point in the capital structure. Often, there are a number of O/C tests conventionally beginning below the single-A tranche. The asset side counts performing loans at par, but defaulted loans are counted at the lower of market price and assumed recovery rate.

As the portfolio experiences defaults, the O/C numerator decreases which may cause the O/C test to breach its test level. A breach acts to divert interest and / or principal to purchase additional collateral (increasing the numerator) or to pay down senior liabilities (decreasing the denominator). These tests provide a substantial amount of subordination and are responsible for CLOs solid performance to-date.

However, manger actions can undermine this mechanic through

collateralized bond obligation (CBO) managers purchased deeply discounted, but not yet defaulted assets to bolster their struggling O/C ratios. For example, a bond purchased at a $0.50 price which has not yet technically defaulted, would double the impact on the numerator of the O/C ratio. Of course, the bond was trading at a discount for a reason and would quickly default.

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