Introduction

• Collateralized Loan Obligations (CLOs) are structured finance instruments which use the proceeds of the sale of notes with various repayment priorities (“tranches”) to buy a pool of leveraged loans with approximately single-B ratings.

• The CLO structure is related to the infamous Structured Finance CDO (“SF CDO”). However, CLOs performed very well during both the financial crisis and the 2001-02 recession.
Notable features of CLOs

There are notable differences with other structured finance products.

- **Most CLO portfolios are actively managed** - a “Collateral Manager” can buy and sell loans during a pre-defined re-investment period (4-5 years).

- **Over-Collateralization ("O/C") tests** (Assets / Liabilities) can divert interest and principal from junior notes to pay down senior notes.
  
  - Arguably, the functioning of the O/C tests, combined with high excess spread (e.g. 1.5% p.a.), is responsible for CLOs’ solid historical credit performance.

- **The Equity tranche** (often called “Subordinated Notes”) receives excess interest every payment period (so long as the O/C tests have not been triggered).
NAIC Stress Methodology
Stress Thesis

• 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, lack 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 expect that loan recoveries deteriorate from the historical norms to levels comparable with unsecured debt.
  • Additionally, recovery stresses were run in both historical and moderately stressful default environments.
Default Probabilities

- Base data used was Moody’s Annual Default Study published in 2019 (Corporates - Global: Annual default study: Defaults will rise modestly in 2019 amid higher volatility, Excel Supplement. “Moody’s Study”).
  - Specifically, 10-year cohort data (Exhibit 53. Cumulative issuer-weighted default rates by annual cohort) for all cohorts with at least 10 years (1970-2009).
  - Issuer weighted average term structures of default rates were calculated for each broad rating category (e.g. Ba, B).
    - The weighted average standard deviation (σ) was also calculated in a similar manner for each tenor.
  - Two default scenarios were used: “Historical” and “Historical + 1σ”.

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Recovery Rates

- The Stress Thesis envisions that underlying leveraged loans will perform like unsecured assets during the next downturn (the “Stepdown” scenario).
  - Furthermore, it was assumed that the other assets in the CLO would perform similarly to their next worst category.
  - Exhibit 7 of the Moody’s Study was used to model recovery rates.
- Since the bulk of CLO collateral are classified as senior secured loans, the assumed recovery was reduced from 64% to 40% in the Stepdown scenario.

<table>
<thead>
<tr>
<th>Collateral Label</th>
<th>Historical Priority Position</th>
<th>Stepdown Priority Position</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Secured Loan</td>
<td>1st Lien Bank Loan</td>
<td>Sr. Unsecured Bank Loan</td>
<td>Consistent with our Stress Thesis</td>
</tr>
<tr>
<td>Second Lien Loan</td>
<td>2nd Lien Bank Loan</td>
<td>Sr. Subordinated Bond</td>
<td>Lowest recovery avail.</td>
</tr>
<tr>
<td>Senior Unsecured Bond</td>
<td>Sr. Unsecured Bond</td>
<td>Subordinated Bond</td>
<td>Consistent with the Stress Thesis</td>
</tr>
<tr>
<td>Other</td>
<td>Jr. Subordinated Bond</td>
<td>Sr. Subordinated Bond</td>
<td>Lowest recovery avail.</td>
</tr>
</tbody>
</table>
Scenarios

- The combination resulted in the following 3 scenarios:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Default Rate</th>
<th>Recovery Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Historical</td>
<td>Historical</td>
</tr>
<tr>
<td>B</td>
<td>Historical</td>
<td>Stepdown</td>
</tr>
<tr>
<td>C</td>
<td>Historical + 1σ</td>
<td>Stepdown</td>
</tr>
</tbody>
</table>

- Since this is a stress test, we are not assigning a probability to any of the scenarios.
What was not modeled

- Excluded types: CRE CLO, MM CLO and TruPS; non-US.
- No explicit correlation model.
- No differentiation of loans other than rating and obligation type.
- Manager Choice
  - Account for manager’s historical performance.
  - Par Trading / Ineffectual Overcollateralization Tests.
  - Potential conflicts of interest between the CLO manager and the private equity owners of the defaulted companies.
- May include some of these later.
Results
CLO Universe Deal Level Results

- Analyzed 919 unique transactions and 7,633 tranches available through a third-party waterfall model vendor.
  - All deals where an insurer held any investment.
  - Approx. $527 Billion par and (or notional) which is approx. 85% of all US CLO outstanding.
- Portfolios were run as of 6/30/19.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Mean Loss (%)</th>
<th>Std Dev (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scen. A</td>
<td>9.70</td>
<td>1.63</td>
</tr>
<tr>
<td>Scen. B</td>
<td>14.35</td>
<td>1.61</td>
</tr>
<tr>
<td>Scen. C</td>
<td>19.11</td>
<td>1.63</td>
</tr>
</tbody>
</table>

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Insurance Company Exposure - Update

- Insurance companies hold a total of $130.2 billion of CLOs.
  - 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.
- These exposures have been classified into five categories based on our ability to map and model the security.
## CLO Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Total $bil BACV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mapped and Modeled “Normal”</td>
<td>Security mapped and modeled; pays normal principal and interest.</td>
<td>$95.9</td>
</tr>
<tr>
<td>Mapped and Modeled “Atypical”</td>
<td>Security mapped and modeled; atypical promises: primarily equity and Combo Notes.</td>
<td>$1.0</td>
</tr>
<tr>
<td>Ready to Map</td>
<td>Security linked to a specific CLO, but up-to-date CUSIP required</td>
<td>$6.0</td>
</tr>
<tr>
<td>Out of scope</td>
<td>Security can be modeled but is out of scope for our current project.</td>
<td>$12.2</td>
</tr>
<tr>
<td>Need Information</td>
<td>More information is needed; includes CLO tickers and Combo Notes</td>
<td>$15.1</td>
</tr>
</tbody>
</table>
Our results included $96.9 billion of mapped insurance company CLO exposure. These were classified into two categories based on the type of promise.

- $95.9 Billion of “Normal” tranches;
  - Normal tranches have regular promises of principal and interest.

- $1 Billion of “Atypical” tranches.
  - Atypical tranches have unusual payment promises and include Equity, Combo Note, and “X”-tranches.

“Lowest Rating” is the lowest rating for the tranche from our ratings feeds and the waterfall model vendor.
**"Mapped and Modeled" - Normal**

- Principal Losses on Normal tranches only reach BBB tranches even in Scenario C.

<table>
<thead>
<tr>
<th>Lowest Rating</th>
<th>Mapped Exp ($ mil)</th>
<th>Scen. A Loss ($ mil)</th>
<th>as %</th>
<th>Scen. B Loss ($ mil)</th>
<th>as %</th>
<th>Scen. C Loss ($ mil)</th>
<th>as %</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>43,768</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>AA</td>
<td>22,684</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>A</td>
<td>15,202</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>BBB</td>
<td>11,525</td>
<td>-</td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
<td>1,942</td>
<td>16.9%</td>
</tr>
<tr>
<td>BB</td>
<td>2,487</td>
<td>7</td>
<td>0.3%</td>
<td>1,134</td>
<td>45.6%</td>
<td>2,367</td>
<td>95.2%</td>
</tr>
<tr>
<td>B</td>
<td>174</td>
<td>74</td>
<td>42.5%</td>
<td>169</td>
<td>97.0%</td>
<td>171</td>
<td>98.6%</td>
</tr>
<tr>
<td>CCC</td>
<td>11</td>
<td>10</td>
<td>89.1%</td>
<td>11</td>
<td>100.0%</td>
<td>11</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>95,852</strong></td>
<td><strong>91</strong></td>
<td><strong>0.1%</strong></td>
<td><strong>1,314</strong></td>
<td><strong>1.4%</strong></td>
<td><strong>4,492</strong></td>
<td><strong>4.7%</strong></td>
</tr>
</tbody>
</table>

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Of the approximately $1 billion in Mapped Atypical tranches, the vast majority were either Equity or Combo Notes.

Equity tranches have notional balances, do not pay principal and are often undercollateralized. In stressed environments, O/C tests cut-off payments of cash to Equity.

Combo Notes are combination of Equity and other tranches which are typically rated to a return of principal only.

- Losses on principal balance of Combo Notes average 28% in Scen. A to 30% in Scen. C. This performance is driven by the Equity tranche portion which stops receiving payments in all of our scenarios.

We found that the risk on rated Combo Notes is not comparable with similarly rated Normal tranches.

- Among the modeled Combo Notes, losses reach AA-rated securities.
Ready to Map

- Ready to Map are tranches for which we can map the reported CUSIP to a tranche which has been paid-off.
  - This mismatch is primarily due to timing: 12/31/2018 insurance company reporting versus the 6/30/2019 CLO run date. CLOs can be refinanced, as a result of which new liabilities are issued with new CUSIPs.
  - We just need an updated CUSIP; alternately this issue should be solved with 2019 year-end data.
- Totals are approximately $6.2 billion. Of this amount $4.8 billion were rated single-A or above at year end 2018.
- We expect results for this group to be similar to Mapped Securities.
Out of Scope

- Approximately $12.2 billion in investments are out of scope for this project

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

- Tranches classified as “Info Needed” are CLOs for which we do not have a CLO model. Reasons for this discrepancy:
  1. The CLO is modeled, but the security is a Combo Note which was not issued in conjunction with the CLO and the portfolio / terms and conditions are not known.
  2. Model for the CLO is not available from the vendor.
- Totals: $15.1 billion.
- A brief review of the investments in this group indicated that over half of this amount are atypical, primarily Combo Note, securities.
- Atypical securities are of concern because they are susceptible to high losses in stress scenarios and are concentrated within a few companies.
Conclusion

• CLOs do not appear to be a significant risk to the insurance companies as a whole.
  • In our most stressful scenario, tranche losses only reach BBB-rated “Normal” liabilities on balance-sheet CLOs.
  • These results rely on the adequacy of our Stress Thesis and manager behavior.

• However, a few companies have concentrated investments in Combo Notes.
  • These securities pay off quickly in good times but take significant losses in stressed environments.
  • Staff is requesting VOS (E) TF exclude Combo Notes from FE treatment because their risk is not captured by ratings.
Next Steps

• Publications
  • Special Report
  • Methodology

• Outreach to Regulators
  • We will reach out to domestic regulators via FRS in the cases of the “Need Info Securities”.

• Updates
  • Q2 2020 with updated YE 2020 portfolios