OFR FRAC Working Group: Leveraged Lending & CLOs

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Table of Contents

Leveraged Lending & CLOs Charge

- OFR is requesting the FRAC to consider questions regarding potential systemic vulnerabilities related to the U.S. leveraged loan market, and associated markets such as the market for collateralized loan obligations (CLOs). Further, the OFR seeks input on data gaps that affect monitoring of these markets.
- Questions:
  - How should the OFR evaluate and monitor risks related to leveraged lending?
  - Does leveraged lending pose any threat to financial stability? If not, what are the mitigants?
  - How are the risks different for bank versus institutional leveraged loans?
  - How do the above risks and mitigants vary and interact with specific risks associated with different types of institutional investors (e.g. liquidity mismatch for loan mutual funds)? Please include comments on CLO managers, hedge funds (including distressed funds), mutual funds, exchange-traded funds, pension funds, and insurers.
  - Are there risks from the securitization of leveraged loans into CLOs? How can the OFR effectively monitor these risks?
  - What are the similarities and differences between leveraged loan markets today versus those pre-crisis? With respect to CLOs, how are these similar or different from subprime mortgage securities in the pre-crisis era?
  - What other sources of data would enhance the OFR's market monitoring efforts?
  - What are the risks from covenant-lite loans? What are the risks from earnings before interest, taxes, depreciation, and amortization adjustments, and other loan document modifications?

Leveraged Loans & CLOs Introduction

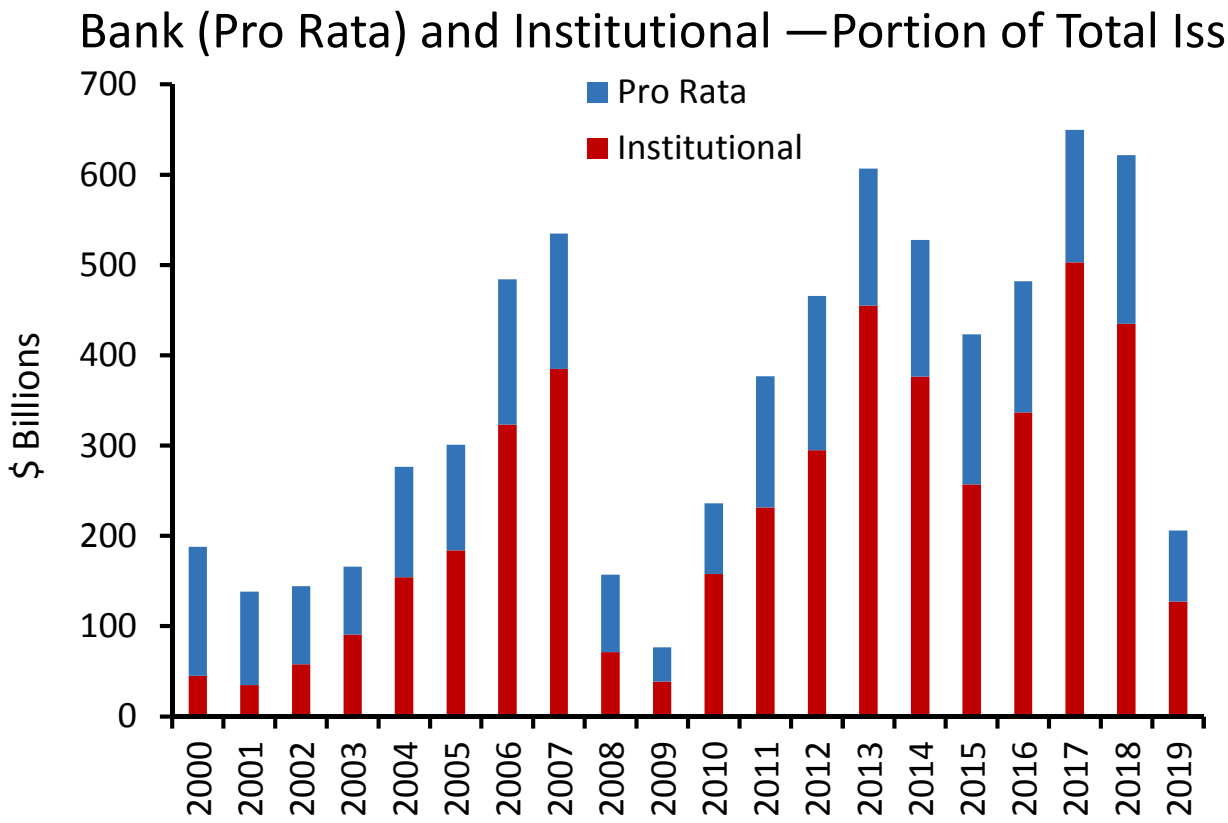
Leveraged Loans - Introduction

- Leveraged loans are a source of debt financing for leveraged high yield rated corporate issuers.
- There are four typical purposes of leveraged loan proceeds:
  - M&A activity, LBOs
  - Balance sheet recapitalizations (buy back equity, pay dividends)
  - Refinance other debt
  - General corporate purposes and build-outs
- Leveraged loans for LBOs are typically backed by a financial sponsor, such as a private equity firm.
- Banks arrange issuance of leveraged loans, syndicating loans to institutional investors. Banks receive fees for providing this service.

Leveraged Loans - Introduction

- **“Bank”** loans (TLAs): Also called “pro rata” loans, a revolver and an amortizing Term Loan. Large corporate borrowers, senior claims, generally syndicated to banks, held on bank balance sheets. Typically highest credit quality and least likely to pose systemic risk to the financial system. There is no broad re-distribution of TLAs to non-bank investors.
- **“Institutional”** loans (TLBs) Large corporate borrowers, senior claims, typically distributed to non-bank institutions: CLOs, mutual funds, ETFs, asset managers, SMAs. Typically lower credit quality. The S&P/LSTA index is the most commonly referenced index for institutional loans. Inclusion criteria for the index: Senior, secured, USD, term loans, acquisition loans or bridge loans, minimum term of 1yr (typically 7-8yrs), minimum spread L+125 initially (typically >=L+225), $50m initially funded size, must be held by at least one institutional investor. This market has potential to pose systemic risk, as buyer strikes can make it impossible for borrowers to source or roll over debt. Forced selling by loan investors can also drive up spreads and drive down prices.
- **Middle market loans:** Made to smaller companies, typical loan size < $150 million. Middle market loans are unlikely to pose systemic risk, usually held by banks, direct lending funds, or BDCs and do not involve large corporate borrowers. LCD definition: Deal size < $200mm as traditional middle market, $200-$350mm as larger middle market.

Leveraged Loans – Bank vs. Institutional



Bank (Pro Rata, TLA): The revolving credit and amortizing term loans that are packaged together and usually syndicated to banks.

Institutional (TLB): Term loans structured for non-bank institutional investors; tranches include first- and second-lien loans and pre-funded letters of credit, but are predominantly first-lien senior loans.

Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data as of May 31.

CLOs – Introduction

- CLOs are funds that invest in leveraged loans and issue debt and equity to finance their portfolios.
- Rating agencies impose a variety of requirements on CLO structures including minimal levels of subordination, diversification, credit rating quality, etc. in order for CLO liabilities to receive specific ratings.
- CLOs represent a form of credit rating transformation, as they convert portfolios of predominantly sub-investment grade rated loans into predominantly investment grade rated bonds. CLOs do not represent maturity transformation, as they typically have maturities consistent with the maturities of the loans they invest in.
- CLO structures do not require forced liquidations under any circumstance, so are unlikely to contribute to firesale type financial market disruptions.

Leveraged Loans - Introduction

Leveraged Lending Risk Spectrum for Banks

Less → More

	Traditional C&I Lending	CLO Holdings	BSLs	"Lending to Lenders"	Middle Market
Size (est.)	$2.3T	$590B	$1.2T	$525B	$1.0-1.5T
(Amt on Bank B/S)	($2.3T)	($90B)	(?)	($525B)	(within C&I)
Form of Risk	**Direct lending:** [1] • Revolvers • TLAs	• Investment securities	• TLBs	**Direct lending:** [1] • Revolvers • TLAs	**Direct lending:** [1] • Revolvers • TLAs • TLBs
Source	• Company reports • Industry-wide data (e.g. Fed H.8) • SNC exams	• Company reports • Regulatory filings	• League tables	• Regulatory filings (loans to non-depository FIs) • Company reports	• SNC exams • League tables • Company disclosures (limited)
What could go wrong	• Recession • Spike in LIBOR • Sector/geographic headwinds	• Trading losses in P&L • AFS securities losses to AOCI	• Warehousing / market illiquidity • Drop in loan prices causes trading losses	• Commitments drawn • Collateral underperforms	• Recession • Spike in LIBOR • Sector/geographic headwinds
Mitigants	This is the bread & butter for large banks; avg. C&I loan growth <5% for past four years	Bank investments stay in the AAA, AA tranches	Fees serve to partially offset any losses to the banks, while pricing contains flex provisions	Commitments can be secured, which carry appropriate advance rates; ongoing monitoring; SPV structures	Ceding market share to non-bank lenders
Warning Signs	Outsized late cycle growth, concentrations to particular industries (i.e. energy, retail)	Large holdings relative to the bank's balance sheet, equity	League table rankings not commensurate to size	High percentage of NDFI loans to total loans; notable underperformance of underlying assets	Outsized late cycle growth, concentrations to particular industries (i.e. energy, retail)

Source: Wells Fargo Securities

[1] Includes both larger and smaller scale lending and syndicated and/or bilateral commitments; Middle Market lending leans toward smaller commitments and bilateral relationships.

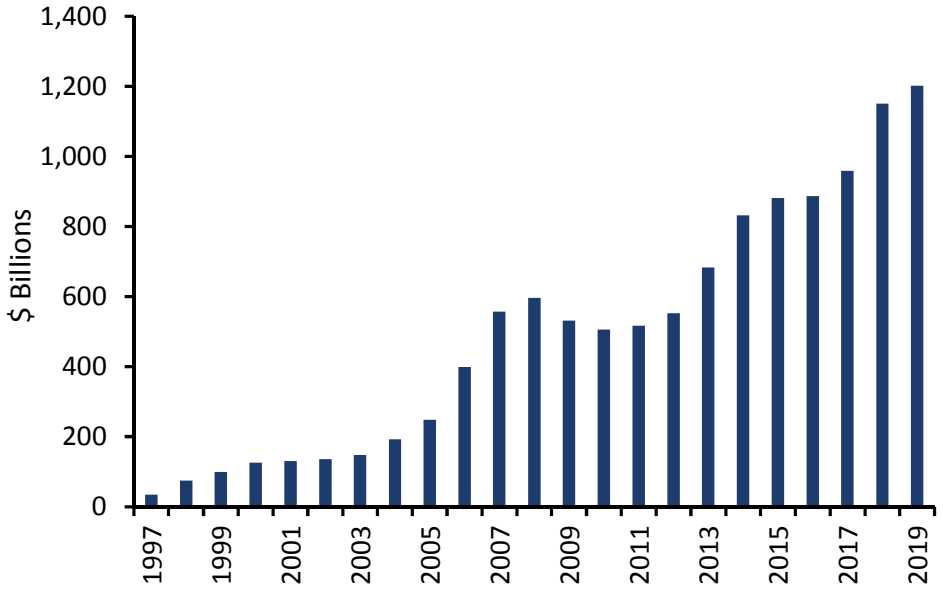
- Concern is focused on the Broadly Syndicated Loan market (97% TLBs) and CLOs, which tend to absorb about 50% of TLBs.
- Traditional C&I lending is held directly on bank balance sheets; so long as the banking system is functioning normally, this market tends to be stable.

Leveraged Loans Market Composition, Credit Quality & Investors

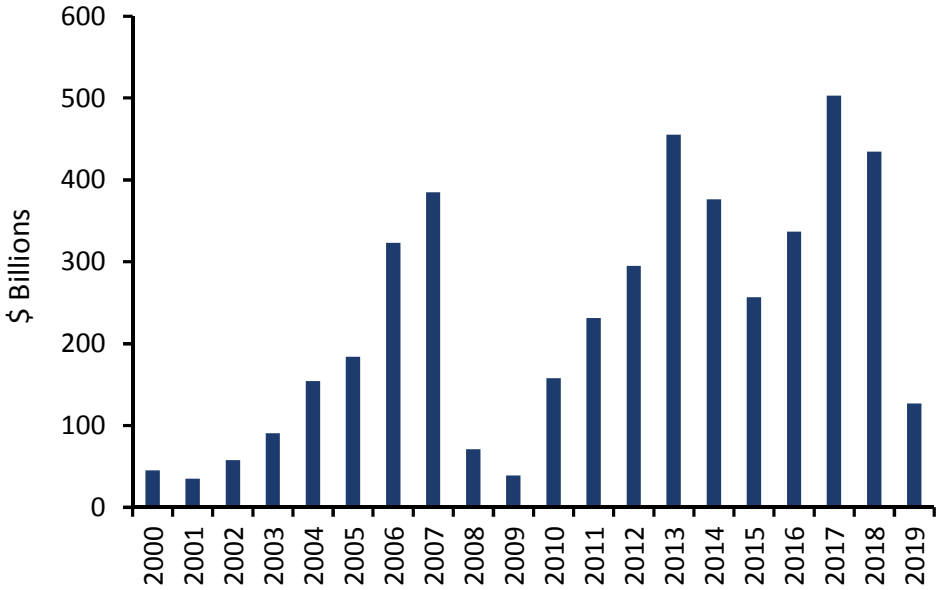
Leveraged Loans - Market Composition

- The Institutional Loan market is what is usually referred to as “highly leveraged loans,” or broadly syndicated bank loans. Currently 97% TLB, 3% TLA in the S&P/LSTA index.

Total Leveraged Loans Outstanding



TLB Annual Issuance

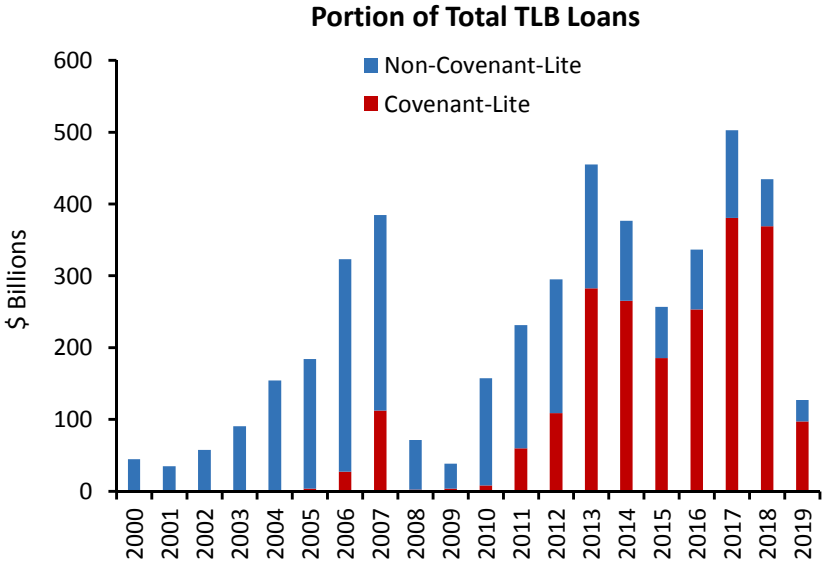


Source: LCD, an offering of S&P Global Market Intelligence.
Note: In 2019, TLBs constituted 97 percent of the S&P/LSTA Leveraged Loan Index; 2019 data as of May 31.

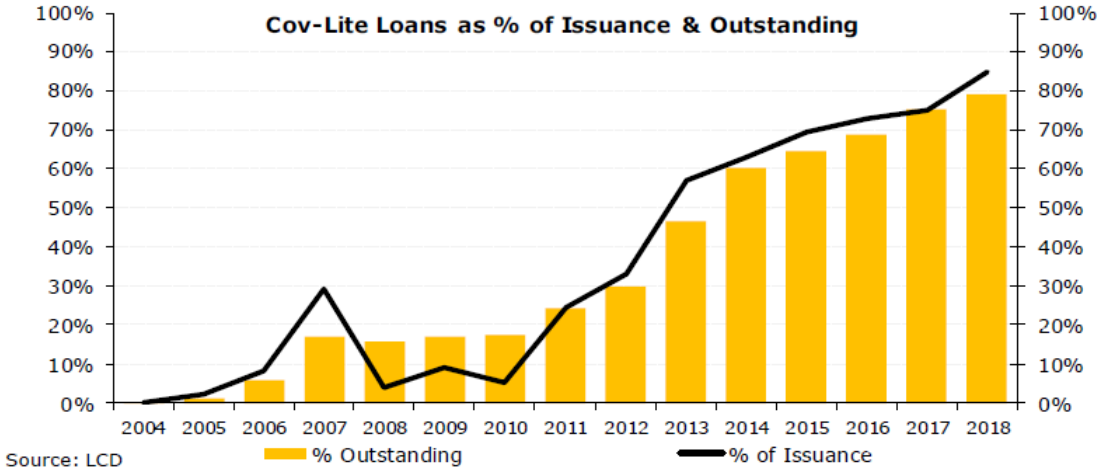
Leveraged Loans Credit Quality — Covenants

Covenant – Heavy: Loans that have *maintenance* covenants, such as remaining in good financial standing, restrictions on new investments or debt, meeting minimum financial hurdles, maintaining a debt/EBITDA ratio below a certain level, etc. Covenants must be maintained quarterly and are checked accordingly.

Covenant – Lite: Loans that have no *maintenance* covenants, just *incurrence-based* covenants. So covenants must be maintained only if taking an action to change the capital structure by issuing more debt, paying a dividend, etc. These comprise the vast majority of new TLB issuance.

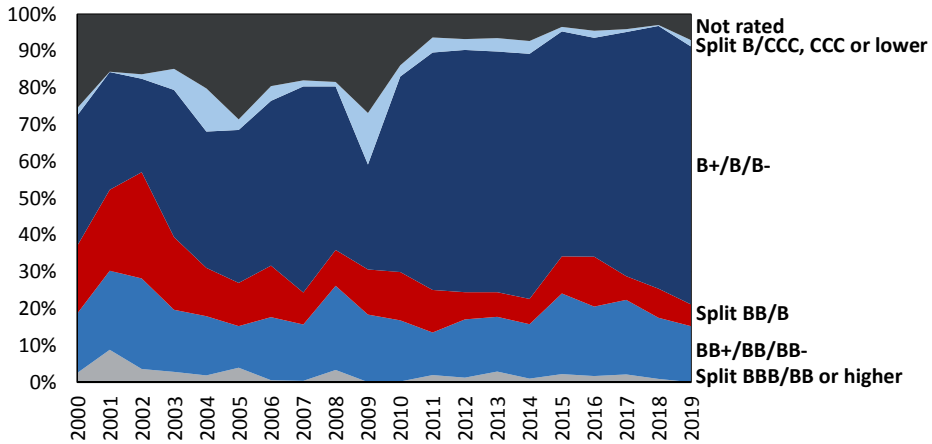


Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data as of May 31.

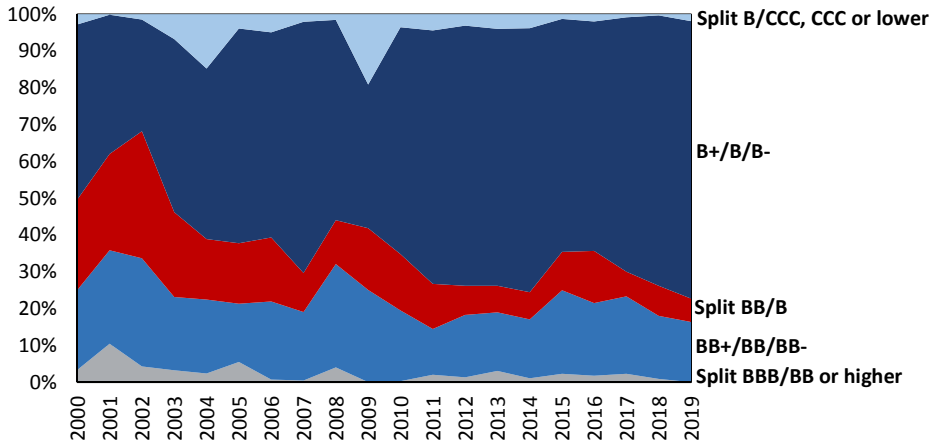


Leveraged Loans Credit Quality: S&P Ratings

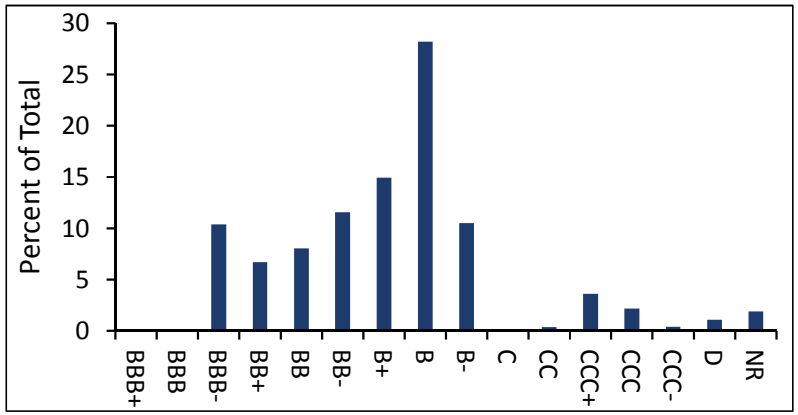
Issuance Including Loans That Are Not Rated



Issuance Excluding Loans That Are Not Rated



Total Par Outstanding, 3/31/2019



Source: LCD, an offering of S&P Global Market Intelligence.
Note: Issuance reflects S&P corporate credit ratings and total par outstanding reflects S&P loan ratings; 2019 issuance data as of early June.

Leveraged Loans Credit Quality: S&P Ratings

- Proportion of loan issuance rated below BB at record levels and still rising.

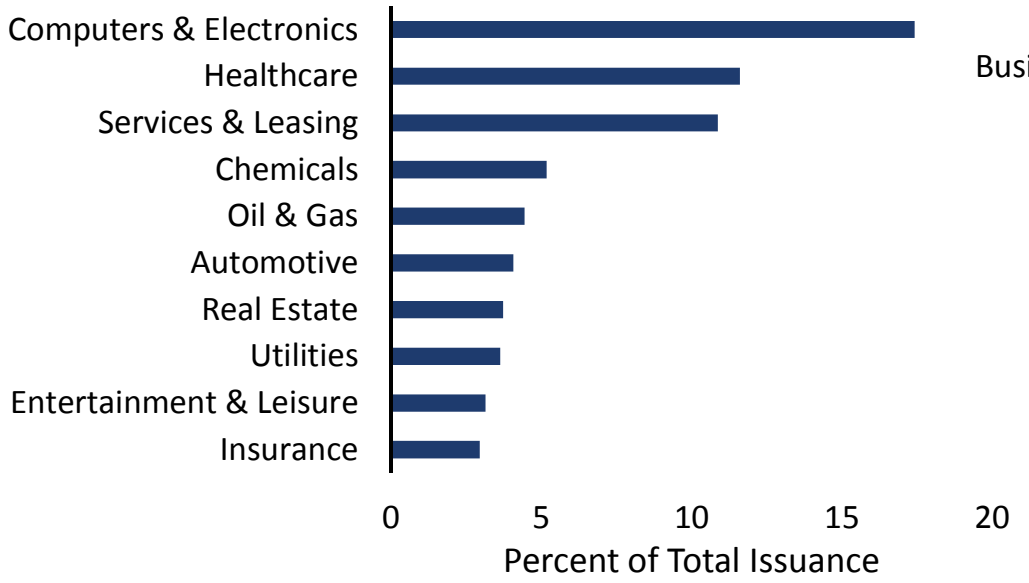
Institutional loan volume											
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Split BBB/BB or higher	2.5%	4.8%	9.1%	11.6%	3.8%	0.6%	1.2%	3.0%	4.1%	9.4%	2.5%
BB+/BB/BB-	39.8%	44.9%	46.3%	53.0%	37.9%	25.9%	20.9%	26.7%	23.9%	31.8%	28.9%
Split BB/B	6.1%	14.0%	18.3%	11.1%	17.2%	11.6%	15.4%	15.4%	23.7%	16.6%	11.9%
B+/B/B-	18.0%	11.5%	10.8%	11.3%	27.2%	44.1%	37.8%	33.0%	22.6%	13.8%	10.5%
Split B/CCC, CCC		0.3%	0.7%	0.3%	1.4%	0.8%	2.0%	2.8%	6.1%	1.3%	2.1%
NR	33.6%	24.5%	14.7%	12.6%	12.6%	17.0%	22.6%	19.0%	19.6%	27.0%	44.0%
Total volume	$60B	$46B	$34B	$59B	$91B	$153B	$183B	$321B	$394B	$387B	$38B
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2019 Q1**
Split BBB/BB or higher	5.6%	1.2%	5.6%	7.4%	3.7%	12.4%	9.6%	9.6%	5.2%	**2.8%**	**2.8%**
BB+/BB/BB-	35.9%	33.1%	26.6%	24.5%	23.7%	28.3%	24.1%	25.3%	21.0%	**16.2%**	**16.2%**
Split BB/B	20.0%	18.1%	19.3%	15.6%	12.0%	15.9%	18.0%	12.1%	[illegible]	**9.9%**	[illegible]
B+/B/B-	21.4%	33.1%	36.0%	43.0%	46.5%	36.4%	39.9%	44.7%	58.0%	**61.2%**	**61.2%**
Split B/CCC, CCC	1.6%	6.5%	4.3%	5.2%	8.9%	4.4%	4.2%	4.6%	[illegible]	**1.6%**	[illegible]
NR	15.5%	7.9%	8.0%	4.4%	5.2%	2.6%	4.2%	3.5%	2.0%	**8.3%**	**8.3%**
Total volume	$158B	$231B	$295B	$455B	$377B	$257B	$336B	$503B	$436B	**$78B**	**$78B**

Source: LCD, an offering of S&P Global Market Intelligence.
Note: Reflects S&P loan ratings.

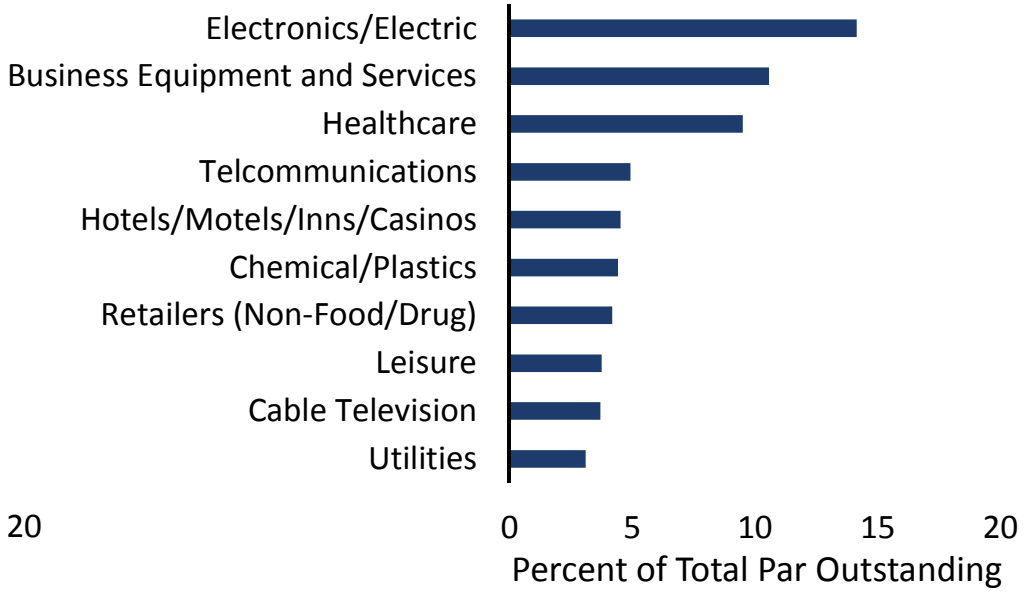
Leveraged Loans Credit Quality — Industry Concentration

The top 10 Industries represent 67% of total issuance and 63% of total par outstanding, as of Q1 2019.

Top 10 Industries by Issuance



Top 10 Industries by Par Outstanding

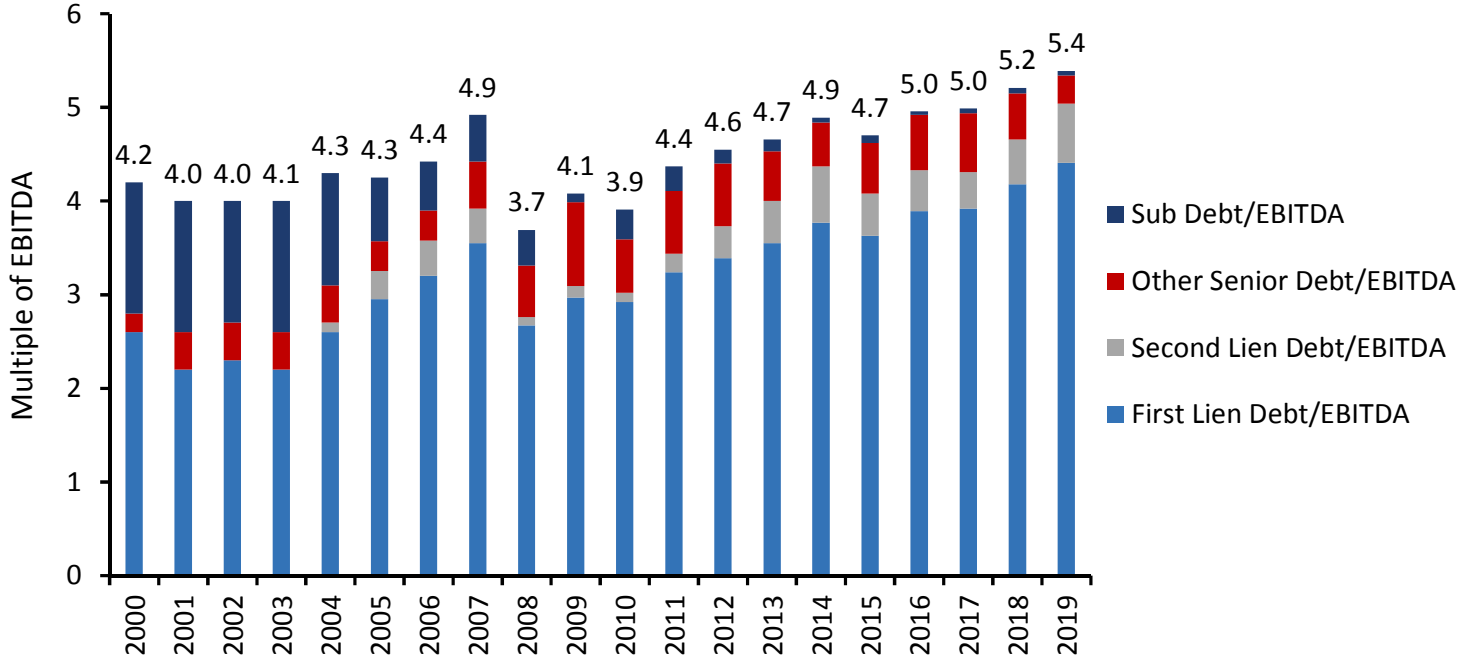


Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data is last 12 months as of Q1 2019.

Leveraged Loans Credit Quality — Multiples

- More recent reported leverage numbers also reflect higher incidence of “add-backs” by corporate issuers, especially LBOs factoring in expected cost-saving synergies in estimating future EBITDA.

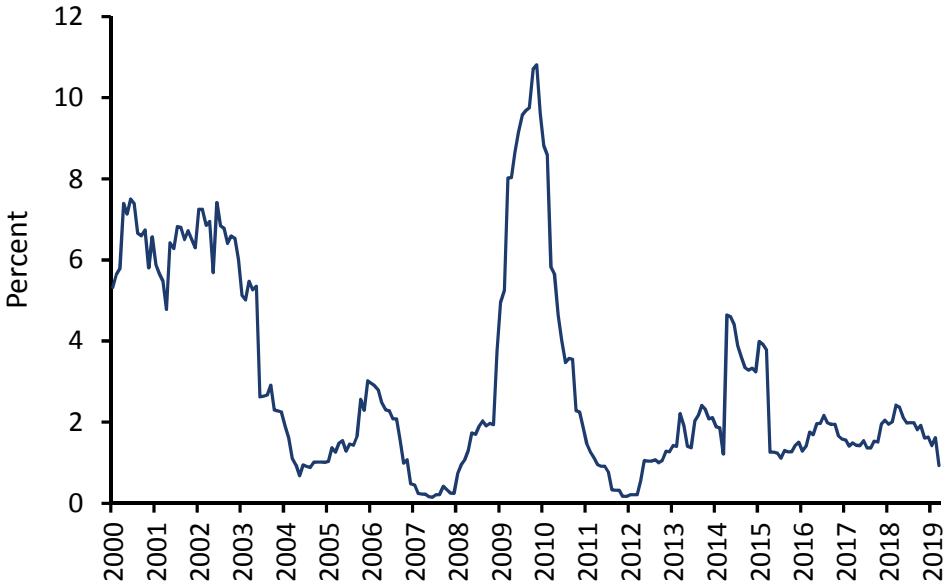
Average Debt Multiples of Large Leveraged Corporate Loans



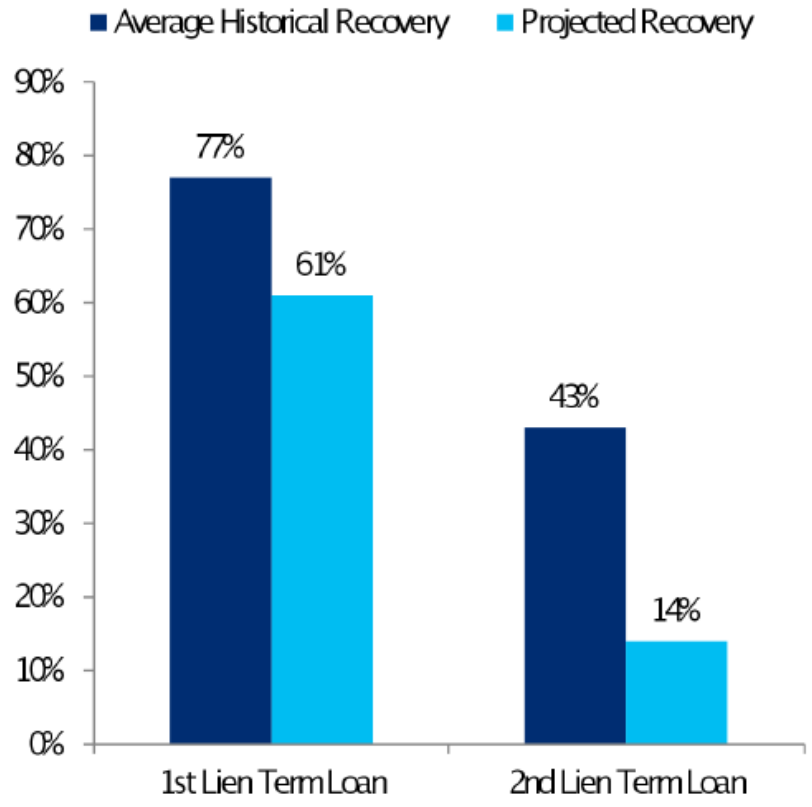
Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data through Q1; Large = Issuers with EBITDA of more than $50M.

Leveraged Loans Credit Quality — Defaults, Recoveries

Lagging 12-Month Default Rate of S&P/LSTA Index by Principal Amount



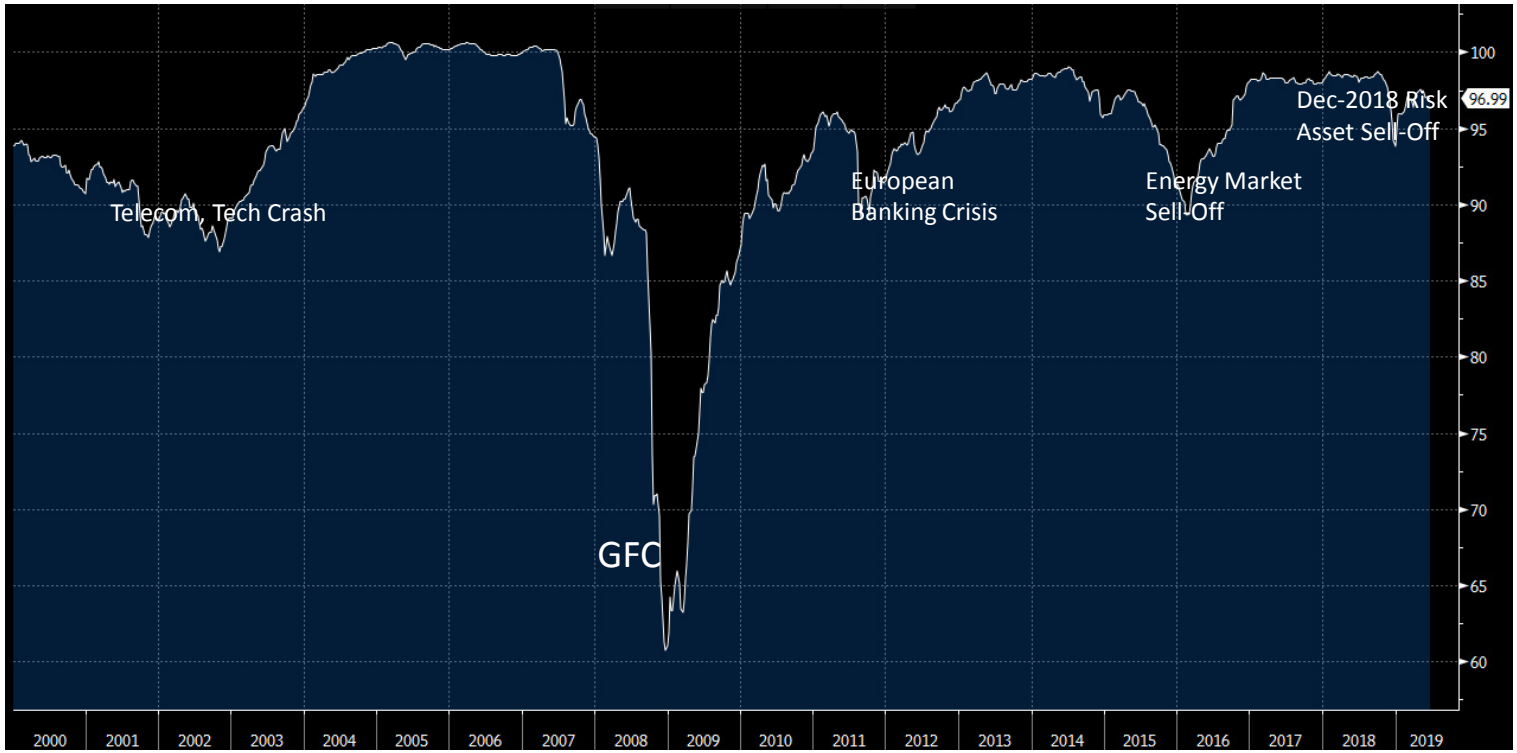
Source: LCD, an offering of S&P Global Market Intelligence.



Source: Citi Research, Moody's as of 06/30/2018.

Leveraged Loans Credit Quality — Prices

- Average loan prices typically oscillate between 90 and 100, but collapsed to the low 60s during the GFC.



Source: Bloomberg, S&P/LSTA Leveraged Loan Price Index.

Leveraged Loans - Investors

- Leveraged loan ownership is dominated by non-bank investors, including CLOs, insurance companies, and loan ETFs and mutual funds.
- Breakdown of non-bank holders of leveraged loans on next slide…

Primary Market for Highly Leveraged Loans

Year	Asian Bank	Canadian Bank	European Bank	U.S. Bank	Finance Company	Securities Firm	CLO, Insurance Co', and Loan, Hedge, and High-Yield Funds
1994	17.2%	5.3%	18.6%	29.5%	4.9%	1.1%	23.5%
1995	14.1%	4.7%	19.1%	33.1%	5.1%	1.4%	22.6%
1996	11.0%	5.9%	17.4%	29.7%	3.1%	2.9%	30.0%
1997	11.1%	3.5%	15.8%	29.3%	4.1%	3.8%	32.4%
1998	7.1%	7.3%	21.0%	27.8%	4.5%	1.8%	30.6%
1999	3.7%	4.6%	14.7%	28.3%	6.5%	0.5%	41.7%
2000	4.3%	5.0%	10.1%	25.4%	4.3%	1.6%	49.3%
2001	1.5%	2.6%	8.4%	23.6%	9.2%	2.2%	52.4%
2002	1.7%	2.2%	9.1%	17.5%	7.6%	2.0%	59.9%
2003	1.1%	1.6%	6.5%	14.4%	9.2%	0.6%	66.6%
2004	3.8%	1.5%	11.4%	12.0%	6.4%	1.4%	63.6%
2005	3.1%	1.2%	8.5%	12.3%	7.0%	1.1%	66.9%
2006	2.3%	0.9%	7.5%	7.5%	5.9%	2.0%	73.9%
2007	2.2%	1.2%	5.8%	5.5%	3.8%	2.3%	79.2%
2008	2.3%	2.3%	9.0%	10.8%	6.9%	3.5%	65.2%
2009	0.6%	3.4%	7.2%	14.3%	4.6%	4.7%	65.1%
2010	1.6%	1.6%	4.6%	8.3%	4.6%	1.9%	77.4%
2011	2.1%	1.9%	5.1%	8.5%	4.2%	1.3%	77.0%
2012	1.3%	0.9%	3.2%	6.3%	2.3%	1.2%	84.8%
2013	1.1%	0.9%	3.4%	7.0%	2.3%	1.7%	83.6%
2014	0.8%	0.8%	2.9%	4.4%	1.5%	1.5%	88.2%
2015	1.7%	1.1%	2.5%	6.9%	1.4%	1.6%	84.8%
2016	1.3%	1.2%	2.7%	5.0%	1.2%	1.9%	86.8%
2017	1.5%	1.0%	2.4%	4.3%	0.9%	1.2%	88.6%
2018	0.8%	0.6%	2.5%	3.9%	1.5%	1.0%	89.8%
2019	0.9%	0.5%	2.7%	4.9%	1.8%	1.0%	88.3%

Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data is last 12 months as of Q1 2019; Highly leveraged loans: 1994-1996: LIBOR+250 basis points or more; 1996-2019: LIBOR+225 basis points or more.

Leveraged Loans - Investors

Primary Market for Highly Leveraged Loans—Non-Bank

CLOs comprise about 50% of leveraged loan ownership, or about 65% of non-bank leveraged loan ownership.

Year	Finance Company	Insurance Company	Hedge, Distressed, and High-Yield Funds	Loan Mutual Fund	CLO
2002	7.6%	4.4%	1.1%	20.2%	66.7%
2003	6.1%	6.9%	9.8%	15.3%	61.9%
2004	5.5%	5.8%	9.2%	17.7%	61.8%
2005	5.3%	3.4%	11.7%	16.9%	62.7%
2006	6.8%	2.8%	16.9%	12.8%	60.6%
2007	3.6%	3.8%	26.8%	8.4%	57.4%
2008	8.1%	1.9%	32.0%	5.7%	52.2%
2009	3.1%	5.8%	31.8%	9.3%	50.0%
2010	4.8%	5.0%	32.6%	14.2%	43.4%
2011	4.8%	5.7%	30.1%	18.7%	40.6%
2012	2.3%	4.4%	22.7%	15.4%	55.2%
2013	1.5%	5.1%	8.8%	31.5%	53.2%
2014	0.9%	5.3%	9.8%	21.8%	62.2%
2015	1.2%	5.3%	10.9%	21.3%	61.2%
2016	1.1%	6.0%	6.9%	23.7%	62.3%
2017	0.8%	6.3%	5.6%	23.2%	64.2%
2018	1.3%	6.2%	3.4%	21.4%	67.8%
2019	1.8%	5.8%	7.9%	20.0%	64.5%

Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data is last 12 months as of Q1 2019; Highly leveraged loans: 1994-1996: LIBOR+250 basis points or more; 1996-2019: LIBOR+225 basis points or more.

High Yield Bonds – Leveraged Loans Alternative

High Yield Bonds - Leveraged Loans Alternative

- High Yield bonds are a substitute for leveraged loans
- Issuers choose to issue leveraged loans or high yield bonds as a function of relative spreads, fixed versus floating preference, etc.
- High Yield bonds generally require SEC registration

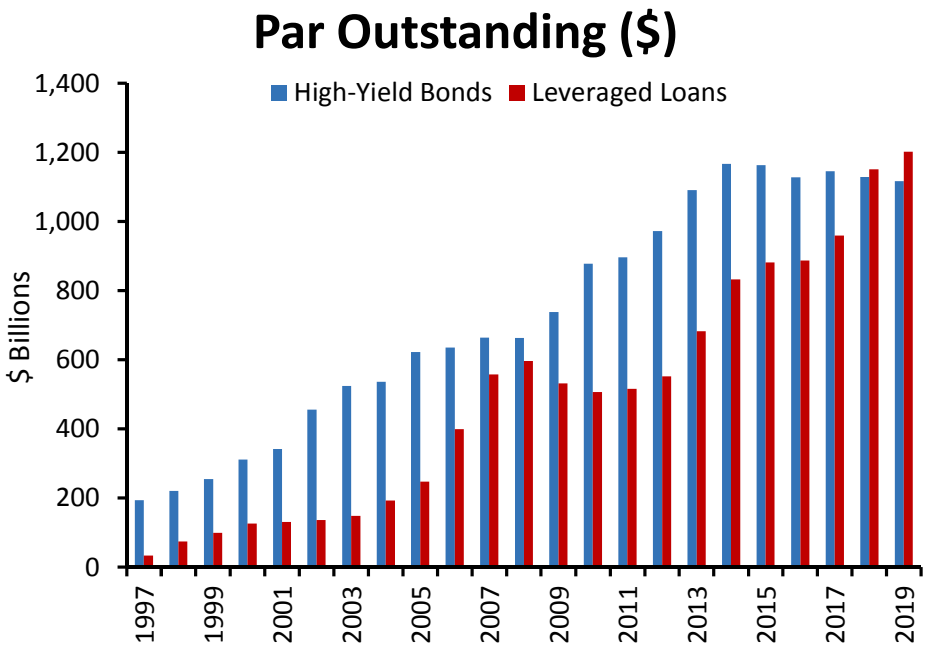
Exhibit 5: Comparison of Leveraged Loans and High Yield Bonds

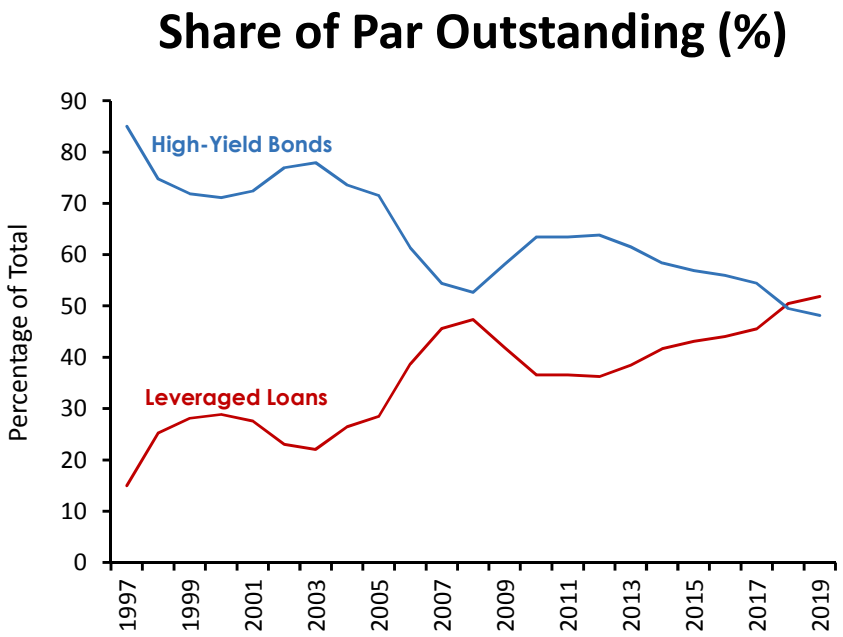
	Leveraged Loans	High Yield Bonds
Interest Rate/Coupon	Floating Rate	Fixed rate
Rating	Below investment grade	Below investment grade
Security	Typically senior secured	Generally unsecured
Priority	Senior	Subordinate
Callability	Generally no, pre-payable at par without penalty	Usually call protected
Term	5-9 years	7-10 years
Amortization	Required quarterly principal payments	Bullet payment at maturity

Source: Wells Capital Management

High Yield Bonds - Leveraged Loans Alternative

The leveraged loan market has recently overtaken the High Yield bond market in par outstanding.

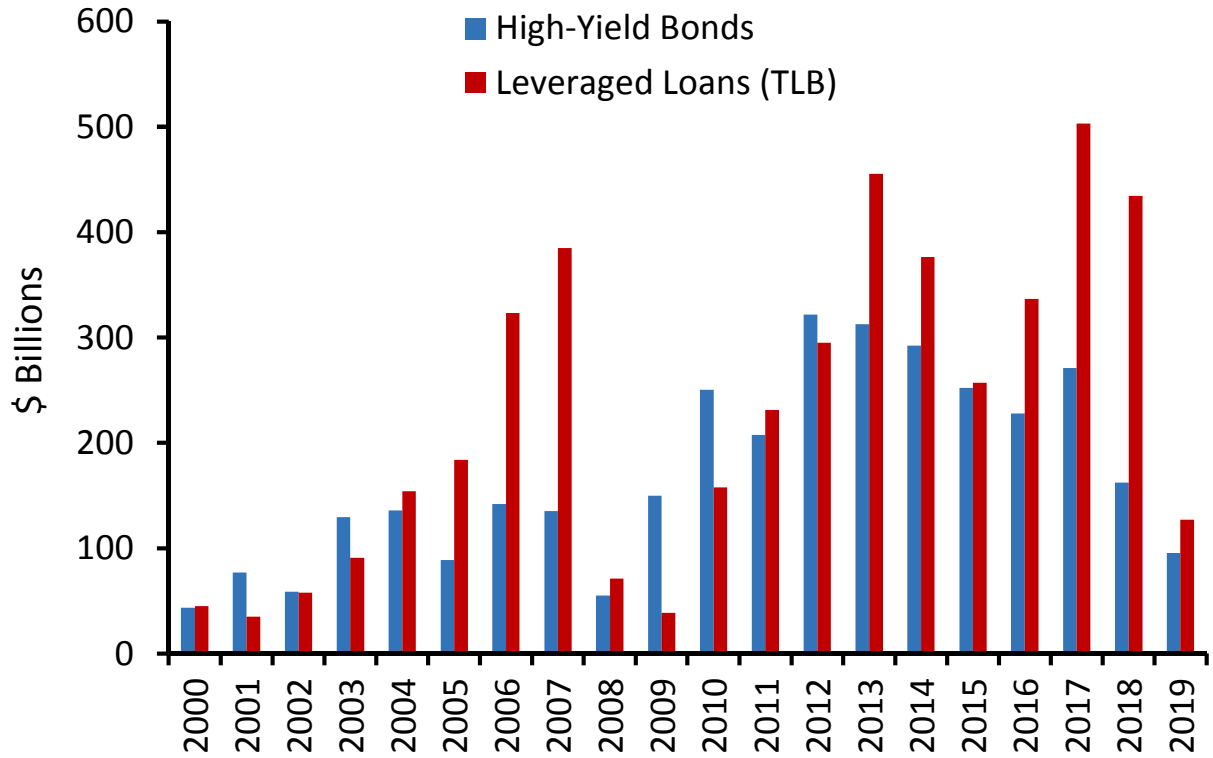




Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data as of May 31.

High Yield Bonds - Leveraged Loans Alternative

High-Yield Bond and Leveraged Loan Markets—Issuance

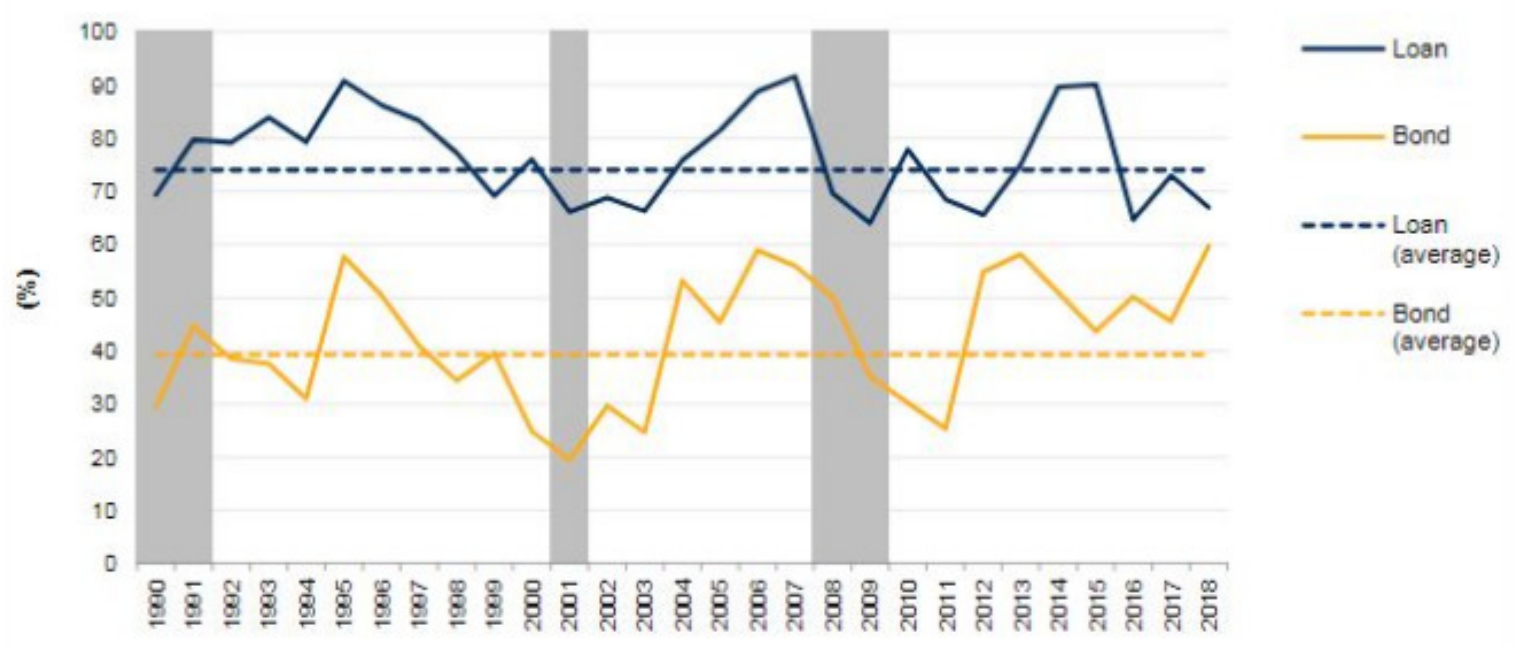


Source: LCD, an offering of S&P Global Market Intelligence.
Note: 2019 data as of May 31.

High Yield Bonds - Leveraged Loans Alternative

Historically, defaulted leveraged loans exhibited significantly higher recovery values than defaulted high yield bonds. As capital structures include less subordination and leveraged loans increasingly are cov-lite, leveraged loan recovery rates will likely deteriorate, but are not expected to be as low as HY bonds.

Recovery Rates by Emergence Year: Leveraged Loans versus HY Bonds

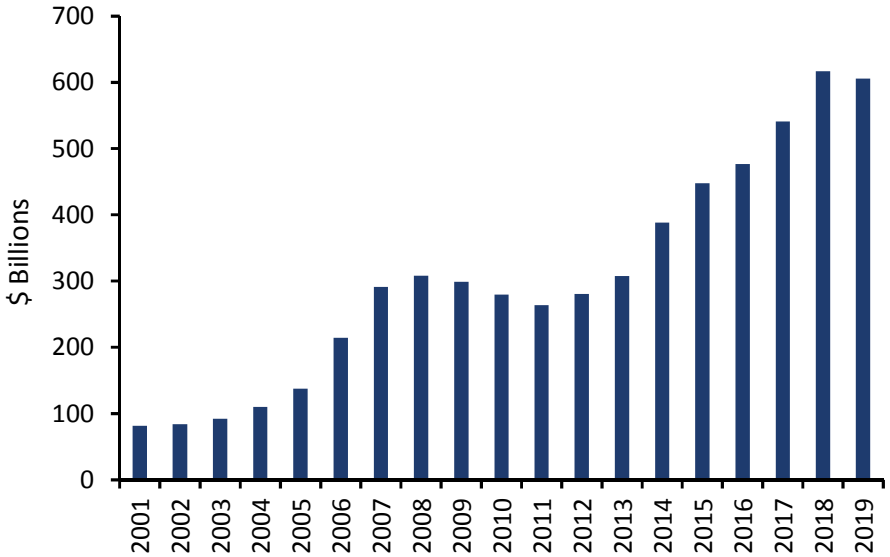


Source: S&P Global Market Intelligence CreditPro and S&P Global Fixed Income Research.

Collateralized Loan Obligations (CLOs)

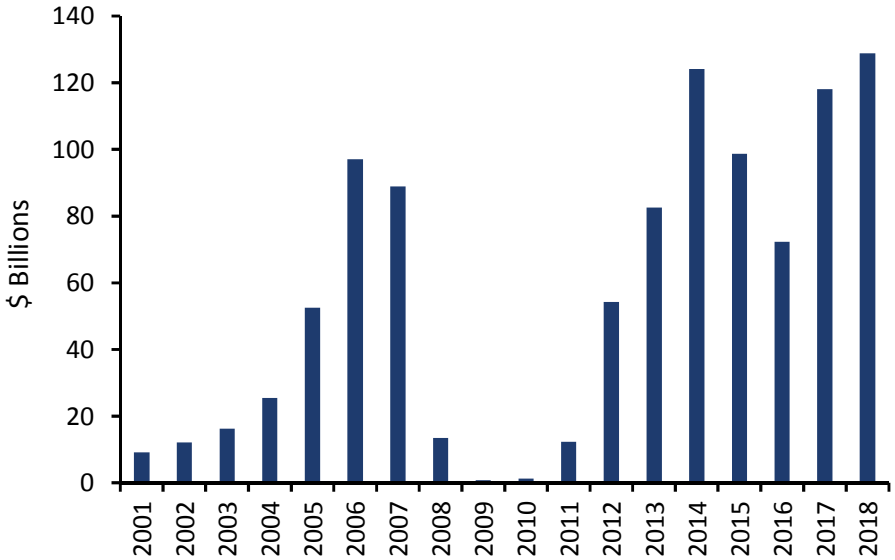
CLOs – Market Size

Total Outstanding



Source: SIFMA.
Note: 2019 data through Q1.

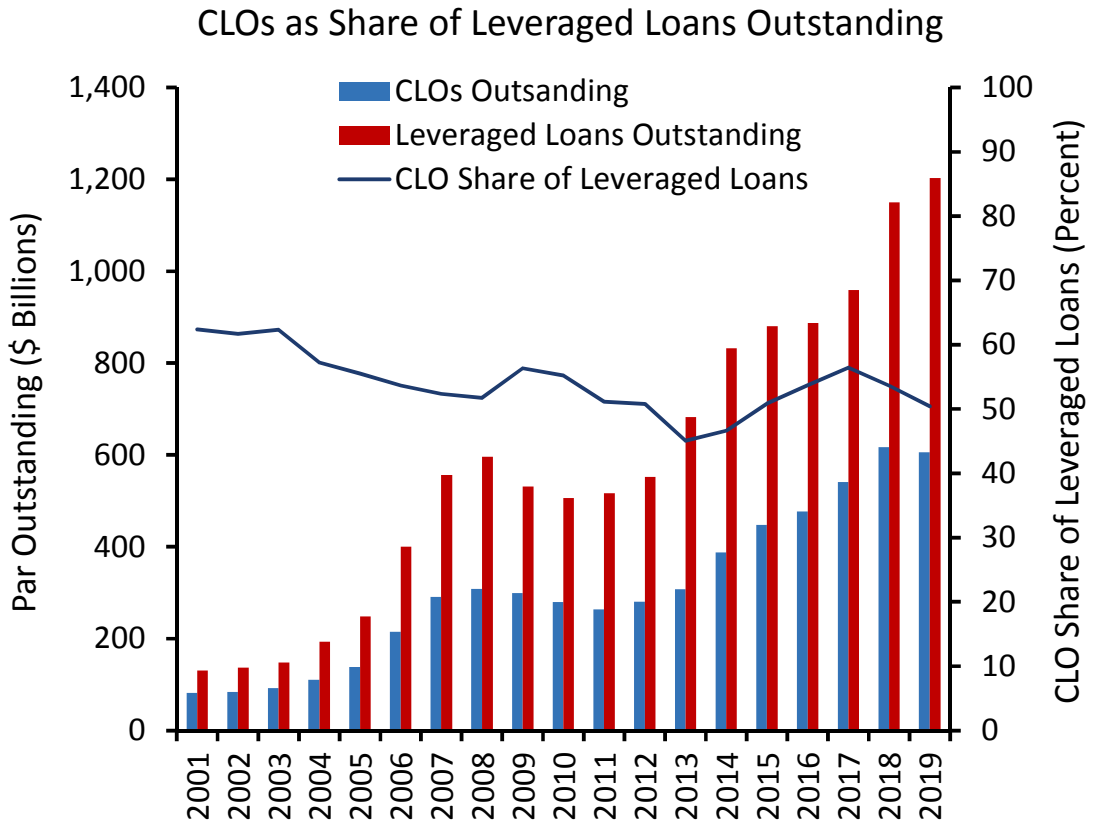
Annual Issuance



Source: LCD, an offering of S&P Global Market Intelligence.

CLOs – Leveraged Loan Demand

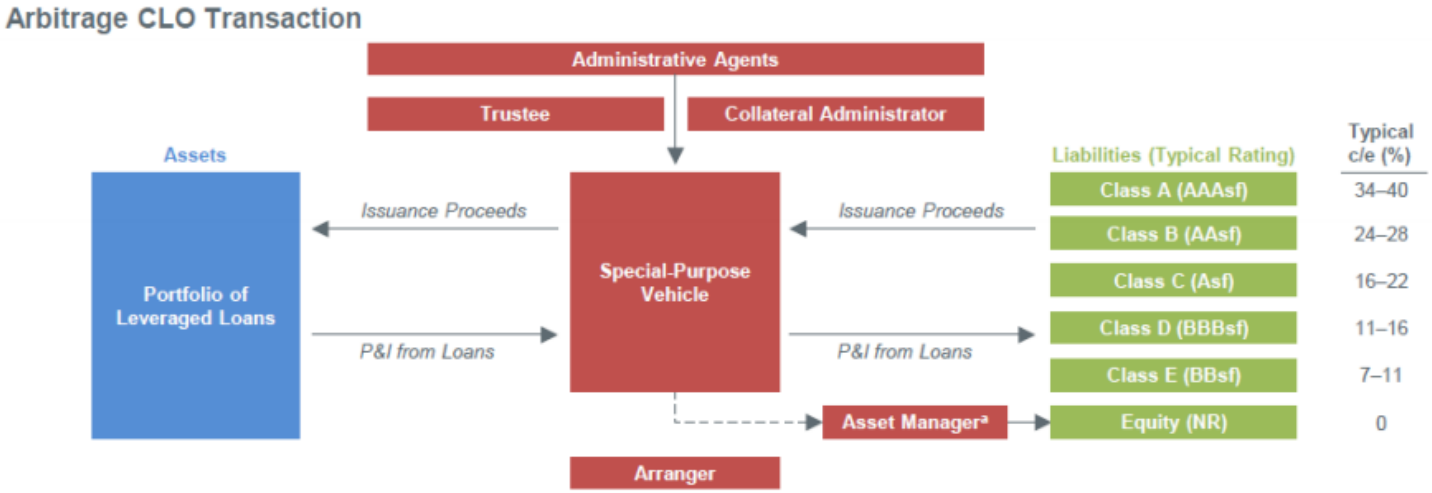
The CLO market has consistently absorbed about 50% of the leveraged loans market.



Source: SIFMA.
Note: 2019 data through Q1.

CLOs - Capital Structure

- CLOs are loan funds, which issue liabilities with ratings from AAA to BB/B, and lever equity 10x to 11x.
- When underlying loans get downgraded or default, CLO managers may choose to sell and replace with different loans.
- While nearly 100% of loans held by the CLO structure are rated BB or below, approximately 85% of the cashflows issued by the CLO are rated BBB or higher.



[a]Asset manager typically contributes a portion of equity. P&I – Principal and interest. C/e – Credit enhancement (based on subordination). NR – Not rated.
Source: Fitch Ratings.

CLOs: Lifecycle of a CLO

LIFE STORY OF A CLO

The lifecycle of a CLO includes several phases from cradle to grave (from the purchase of the first asset to the repayment of all assets and all tranches). These phases are defined by key dates spread throughout the life of the product.

- **Pricing date** often four weeks before the closing date, on which the arranger prices the notes by computing the issuance spreads and prices.
- **Closing date** is the date on which the CLO transaction comes into legal existence, the tranches are issued and their interests start to accrue and the assets are transferred to the SPV.
- **Effective date** is the date on which the portfolio of assets is 100% ramped-up, generally 3 to 6 months after the closing date.
- **Legal maturity date** displays the date at which the notes reach their contractual maturity, although the actual expected repayment date of the notes is often much shorter. The legal maturity date is dictated by the assets underlying the structure.
- **Call date** is a date on which the CLO is called before its legal maturity date at the option of the "equity" investors by vote.
- **Warehouse phase:** a period during which the manager purchases the loans several months before the launching of the transaction until purchasing at least 50% of total collateral amount. The manager often arranges a credit facility with an investment bank (generally the arranger) to finance the acquisition of the first loans of the collateral. The warehouse is securitized by issuing two tranches: a senior tranche paid a defined spread and an equity tranche paid the excess of interest. This securitization is a means of financing the ramp-up of the portfolio before launching the CLO transaction and gives more flexibility in the timing and the speed of the ramp-up process. The warehousing lasts between six months and two years and allows the manager to purchase loans in the primary market where it is more likely that the assets offer an original issue discount than in the secondary market.
- **Ramp-up:** is the period subsequent to the warehouse phase during which the manager purchases the remainder of the loans portfolio after the issuance of the CLO (the closing date) and until the full ramp-up of the portfolio (the effective date).
- **Non-call period:** typically lasts two years, during which the equity holders cannot direct the issuer to ask for liquidation of the portfolio and total redemption of the tranches nor for the reset or the refinancing of the structure.
- **Reinvestment period:** begins on the effective date once the portfolio of loans is fully ramped-up and typically lasts 4 years. During this period the manager can reinvest in new assets principal repayments and recoveries collected from the pool of loans and potentially some of the excess of interest (in the case of breaches on the interest diversion test).
- **Amortization period:** commences at the end of the reinvestment period if the CLO is not called by the majority of the equity holders and therefore the transaction is still in use. During the amortization period the manager uses the cash of prepayments and recoveries and the diverted interest to repay the tranches subsequently instead of reinvesting into the collateral. This period lasts until the legal maturity of the deal even though the deal is generally called six or seven years after its effective date.

Source: Natixis Asset Management, CLO 2.0 Mechanism, modelling and management

CLOs: Internal Tests

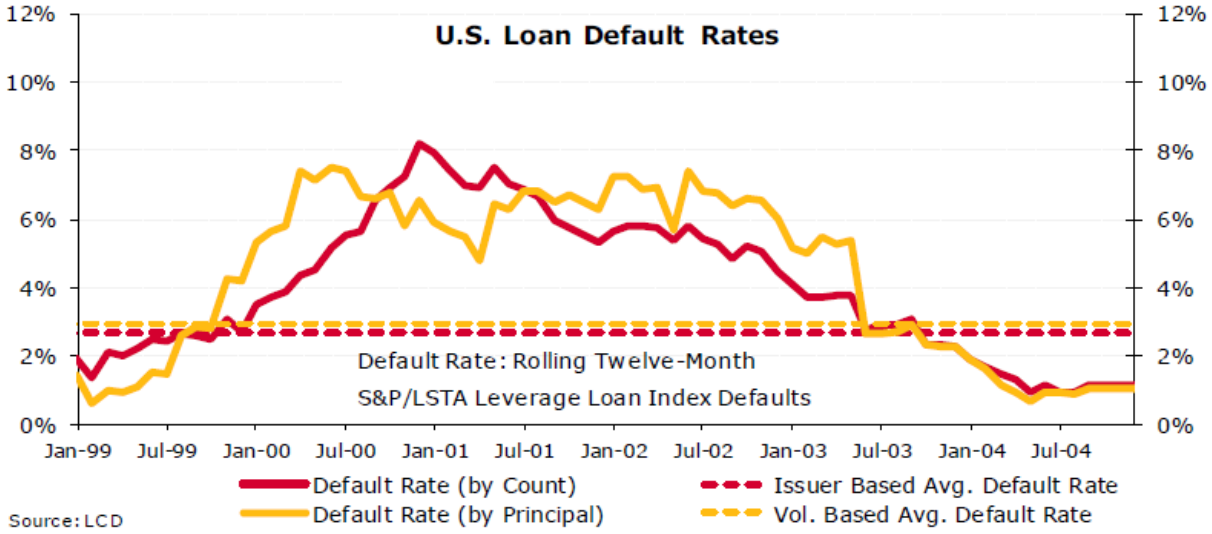
CLO internal tests can change the order of prioritization of cashflows away from CLO Equity and toward CLO liabilities. But they don't create forced liquidations.

Test	Description
Over Collateralisation (OC)	The OC tests protect noteholders against a deterioration in the value of the portfolio collateral. This is tested by comparing the value of outstanding notes versus collateral and ensuring it is sufficiently over collateralised.
Interest Coverage (IC)	The IC tests protect noteholders against a deterioration in interest income from the portfolio. This is tested by comparing the interest income received versus the liabilities due to ensure there is sufficient coverage.
Weighted Average Life (WAL)	The weighted average life of all the loans in the portfolio. Designed to prevent the total risk horizon of the portfolio from exceeding a covenanted level.
Weighted Average Spread (WAS)	The average effective interest rate spread for the loan portfolio over an index rate such as LIBOR. This test ensures a minimum level of income from the underlying portfolio that should be sufficient to pay interest on the liabilities.
Weighted Average Rating	A measure of the average credit rating of the portfolio, which is an indicator of the portfolio's average credit risk.

CLO: Event-of-Default

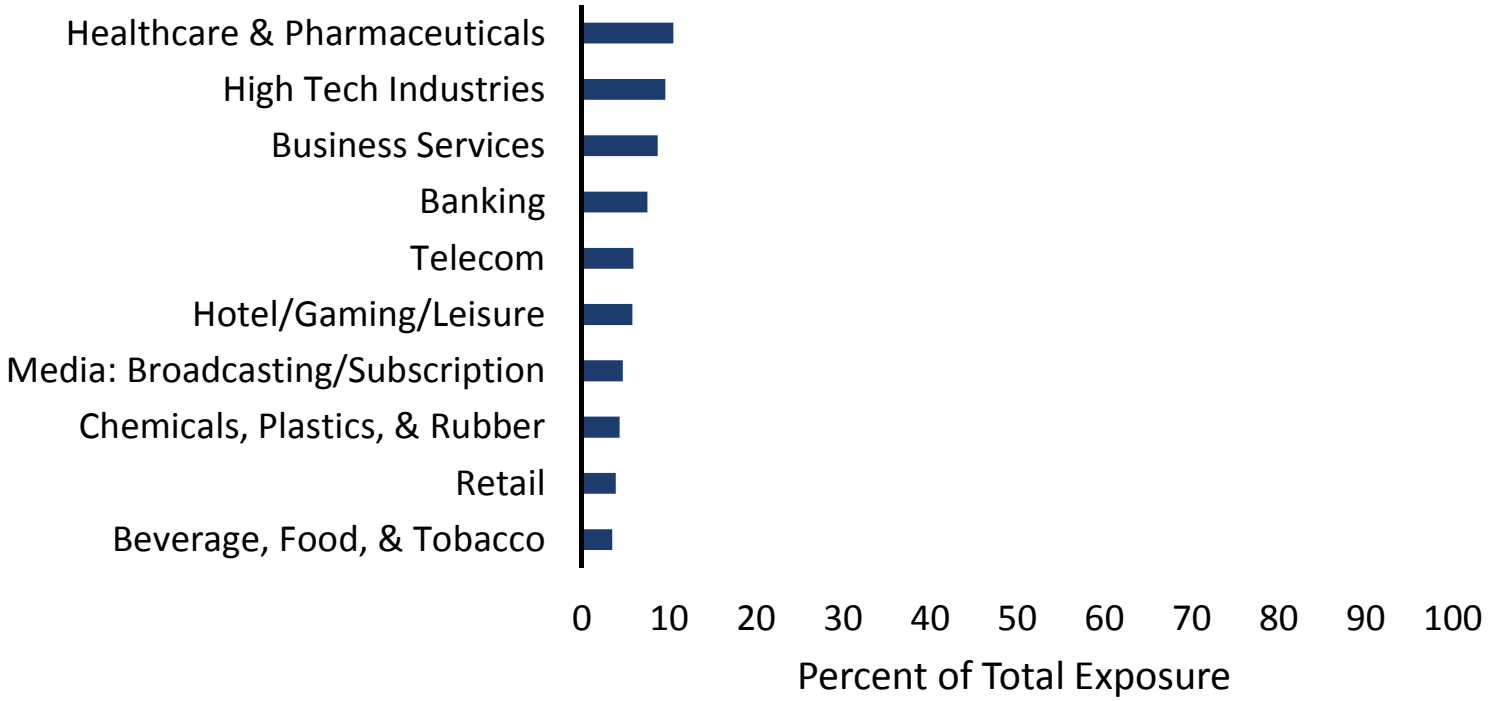
- If a CLO deal fails an “Event-of-Default” (EOD) test, then the AAA tranche assumes control of the deal and can dictate a deleveraging of the structure, liquidating assets and paying down liabilities, in order of seniority.
- The probability of triggering an EOD test is extremely remote, implying default rates and recovery values at levels vastly worse than any realized experience.

	Recovery Value
% Defaulted	Threshold
40	3.0%
50	22.4%
60	35.3%
70	44.6%
80	51.5%
90	56.9%
100	61.2%



CLOs – Industry Concentration

Top 10 Industries—Represent 64% of Total as of January 2019



Source: Wells Fargo Securities.
Note: Based on U.S. 2.0 CLOs (2.0 = Post-Financial Crisis)

CLOs – Credit Quality

Pre-Financial Crisis (1.0) and Post-Financial Crisis (2.0)

Characteristics

Characteristic	1.0 CLOs	2.0 CLOs
Coupons	Lower	Higher
Credit Support	Lower	Higher
Weighted Average Cost of Debt	50-70 basis points	150-225 basis points
Reinvestment Period	5-7 years	4-5 years
Non-Call Period	3-5 years	2 years
CLOs as Collateral Assets	5-10%	No
Bonds as Collateral Assets	5-10%	No
Tranche Refinancing	N/A	After non-call period, refinance tranches at par
CLO "Reset"	N/A	After non-call period, tranches can be reset at par
Maturity	12-14 years	12 years

Credit Support Based on Asset Par Coverage

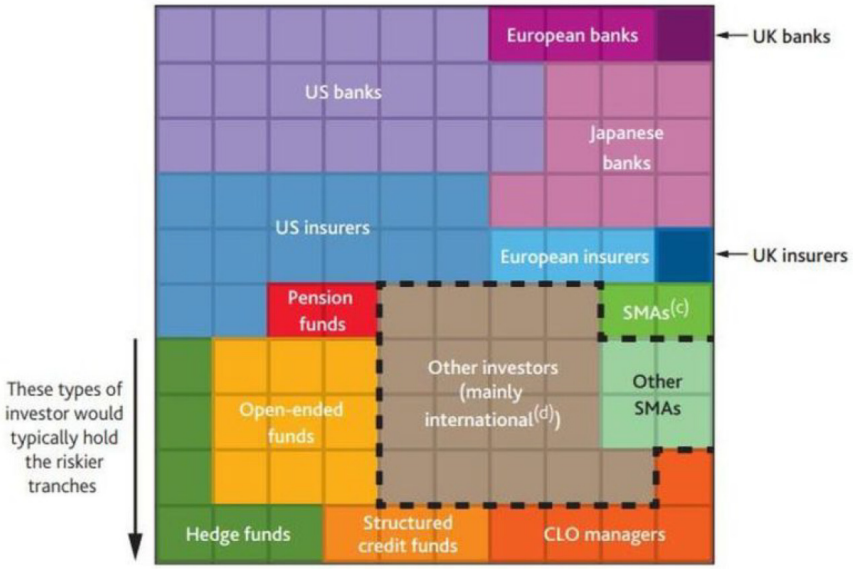
Original Rating	1.0 CLOs	2.0 CLOs
AAA	25.0	35.1
AA	18.6	23.6
A	12.8	17.3
BBB	8.1	11.9
BB	5.6	7.8

Source: Wells Fargo Securities.

CLOs – Investors

"SIFMA data show that as of end of May 2019, there is $600bn in US CLOs outstanding. US banks own $87bn of these CLOs, 14% of total. Wells Fargo, Citibank, and JP Morgan own 81% of the bank-held CLOs in the US." – ("Non-Banks Are the Largest Holders of CLOs Globally" –Mayra Rodriguez Valladares, TABB Forum 6/19/2019)

Holders of CLOs Globally (Year-End 2017)



Senior Tranches (Rated AAA and AA)	Mezzanine Tranches (Rated A/BBB/BB)	Equity Tranches
▪ Banks ▪ Institutional asset managers ▪ Insurance companies ▪ Pension funds and endowments	▪ Insurance companies ▪ Institutional asset managers ▪ Banks ▪ Hedge funds ▪ Pension funds and endowments ▪ Structured credit funds ▪ Permanent-capital vehicles*	▪ CLO managers ▪ Institutional asset managers ▪ Structured credit funds ▪ Insurance companies ▪ Hedge funds ▪ Pension funds and endowments ▪ Banks ▪ Sovereign wealth funds/Family offices ▪ Private equity funds ▪ Permanent-capital vehicles*

* Permanent-capital vehicles are real estate investment trusts, business development companies and closed-end funds.

	CLO Holdings ($bn)		CLO as % of Total Assets		as % of Total CLO AAA Outstanding	
Nochu	66.8		7.0%		18.3%	
Wells Fargo	34.8		2.0%		9.5%	
JP Morgan	19.0	$150bn	0.8%		5.2%	41%
Citi	18.6		1.0%		5.1%	
Japan Post	10.6		0.4%		2.9%	
Bank of NY Mellon	3.7		1.3%		1.0%	
PNC	2.4		0.7%		0.7%	
Bank of America	2.2		0.1%		0.6%	
State Street	1.2		0.7%		0.3%	
Northern Trust	1.1		0.9%		0.3%	
Capital One	0.1		0.0%		0.0%	

Source: Bank of England; Citi Research; Company public filings.

CLOs – 2021 LIBOR Transition

- If one or more of the following Benchmark Transition Events occur, CLOs will start the transition away from LIBOR:

  1.) When a public statement by a LIBOR administrator or regulatory supervisor announces that LIBOR will not be provided permanently or indefinitely; or

  2.)When a public statement announces that LIBOR is no longer representative; or

  3.) The asset replacement percentage is greater than 50%, as reported in the most recent servicer report.

- In its published Paced Transition Plan to adopt the alternative rate SOFR, ARRC provides a clear waterfall for selecting a replacement benchmark and spread adjustment:

Step 1.) Term SOFR + Adjustment

Step 2.) Option 1: Compounded SOFR + Adjustment Option 2: Simple Average SOFR + Adjustment

Step 3.) Relevant Governmental Body Selected Rate + Adjustment

Step 4.) ISDA Fallback Rate + Adjustment

Step 5.) Transition Specific Fallback Rate + Adjustment

Source: Citi Research.

Leveraged Loans – Risks to Financial Stability?

Leveraged Loans Risks – Does leveraged lending pose any threat to financial stability?

- **Credit cycle deterioration:** Credit cycle cyclicality is an expected risk of credit investing. In economic downturns, credit risk appetite diminishes, credit spreads widen, and the incidence of defaults or restructurings increases. ("It'll be ugly for those companies if the economy slows down and they can't carry the debt and then restructure it, and then the usual carnage goes on." – Brian Moynihan, Bank of America Corp CEO, 6/4/2019 Bloomberg News)
- **Institutional** leveraged loans pose more systemic risk than **bank** leveraged loans: By their nature, institutional loans need to be broadly syndicated to non-bank buyers. When those investors pull back from the market, corporations must find other sources of financing or face default.
- **Reduced subordinated debt in capital structure:** Historically, leveraged loans were supported by a thick layer of sub debt (25% or more). Sub debt has virtually disappeared from the capital structure of most leveraged loan borrowers. This reduces recovery rates on senior loans.
- **Increased corporate leverage:** Average leverage on senior secured debt has increased from ~2.0x to above 4.0x. ("Companies are borrowing higher levels of debt compared to their earnings…" – Comptroller of the Currency Joseph Otting, in written testimony to the Senate Committee on Banking, Housing, and Urban Affairs (5/15/2019 Reuters)
- **Industry concentration:** Leveraged loan issuance demonstrates modest concentration risk, top three sectors (electronics, business equipment, healthcare) = 34.2% of total. If concentrations increase, the broader market becomes more susceptible to sector issues, rising correlations.

Leveraged Loans Risks – Does leveraged lending pose any threat to financial stability?

- **Ratings Deterioration:** Downward credit rating migration in leveraged loan issuance makes leveraged loans more vulnerable to economic downturns.
- **Cov-Lite Lending:** Fewer constraints on borrowers makes it harder for investors to anticipate credit weakening. Borrowers have more opportunity to take more risk when covenants are not in place. ("You had no real signal with regard to the covenants warning us as investors that something serious was going wrong and that they should have been restructuring earlier." – Anne Walsh, CIO Fixed Income, Guggenheim, in reference to Toys "R" Us 5/7/2019 Bloomberg)
- **Recovery value deterioration:** Investors expect relatively high recovery values on leveraged loans in the event of default, compared to high yield bonds. In the next credit downturn, recoveries will be lower due to higher leverage, less sub-debt, and in some industries, less tangible collateral.
- **Firesales, potential for forced selling:** Open-ended mutual funds and ETFs could be forced sellers of leveraged loans due to redemptions by retail or institutional investors. Current data suggests that these investors comprise 15-20% of the TLB market.
- **Investor Concentration:** CLOs represent about 50% of demand for leveraged loans, which is historically about average.
- **Fraudulent accounting:** Corporate credit losses in 2001-2002 (Enron, Worldcom) and subprime mortgage losses in the GFC were attributable in part to fraudulent accounting and data. If these risks materialize in leveraged loans, losses could rise considerably.

How do leveraged loan risks interact with different types of institutional investors?

- CLO Managers: CLO managers often retain CLO equity issued in their own deals. This typically means that the CLO manager is holding this CLO equity in a hedge fund or other vehicle funded by LPs. So long as the investment vehicles controlled by the CLO manager have appropriate liquidity terms and do not use excessive leverage. CLO Managers also use warehouse financing facilities to ramp up new deals, which pose risk if loan prices fall before CLO liabilities and equity can be sold. Investors in CLO liabilities and equity will be addressed in a separate section.
- Loan Mutual Funds: Open-end mutual funds pose risk if investor redemptions outpace the ability of fund managers to access liquidity in the secondary market. Funds can be gated, but this is likely disruptive to markets and investor confidence. Closed-end mutual funds do not pose this risk.
- ETFs: Bank loan ETFs comprise only a small amount of assets, so are not currently systemically important. If this sector were to grow, under illiquid conditions ETFs could be gated like open-end funds, and could also continue to trade in the secondary market like closed-end funds.

How do leveraged loan risks interact with different types of institutional investors?

- Hedge Funds, including Distressed Funds: Hedge/distressed funds invest in leveraged loans, sometimes directly, sometimes through utilizing total return swaps with banks. Funds can use leverage on these assets, but haircuts tend to be large and funding spreads wide. In a credit downturn, hedge/distressed funds will incur losses on these positions. But this does not inherently pose systemic risk. If hedge/distressed funds have liquidity mismatches, they could be forced sellers of leveraged loans in an illiquid market if they suffer redemptions.

How do leveraged loan risks interact with different types of institutional investors?

- Pension Funds: Pension funds generally have long dated capital and are well positioned to take risk in leveraged loans. But pension funds don't tend to be large investors in the leveraged loan market.
- Insurers: Insurers constitute a modest portion of demand for the leveraged loan market and are well situated to take that risk, usually holding appropriate capital as a function of the credit rating of the loans they own. Insurers are more active investors in the CLO market than the leveraged loan market.

CLOs – Risks to Financial Stability

Are there risks from the securitization of leveraged loans into CLOs?

- Credit Ratings Arbitrage: CLOs represent a form of credit ratings transformation. Underlying collateral is nearly all sub-investment grade rated. But the resulting CLO structure is ~85% investment grade rated. In extreme tail scenarios, CLO tranches can be wiped out entirely, while similarly rated portfolios of leveraged loans or high yield bonds would suffer only partial losses.
- Defaults: CLO equity and lower rated CLO tranches have meaningful risk of loss during credit downturns. This is theoretically true of higher rated CLO tranches as well, but would require unprecedentedly high default rates and unprecedentedly low recovery rates to manifest.
- CLO capital structure subordination: Rating agencies have changed the required amount of subordination for CLO liabilities to receive specific ratings. The changes are more conservative, making CLO structures more resilient, other things being equal.

Are there risks from the securitization of leveraged loans into CLOs?

- CLO Warehouses: As previously mentioned, CLO managers and their warehouse financing providers can get stuck with underwater leveraged loan positions if they are unable to issue CLO liabilities and equity prior to a market downturn.
- Investor concentration: There are concentrations of investors in each portion of the CLO capital structure. If domestic and international (Japanese) banks stop buying AAA/AA CLOs, or if insurance companies and asset managers stop buying AA/A/BBB CLOs, or if hedge funds and other aggressive credit investors stop buying CLO equity or lower rated mezzanine bonds, then the CLO market will close until new buyers can be found. This in turn could cause the leveraged loan market to close as well, as CLOs absorb ~50% of leveraged loan issuance.

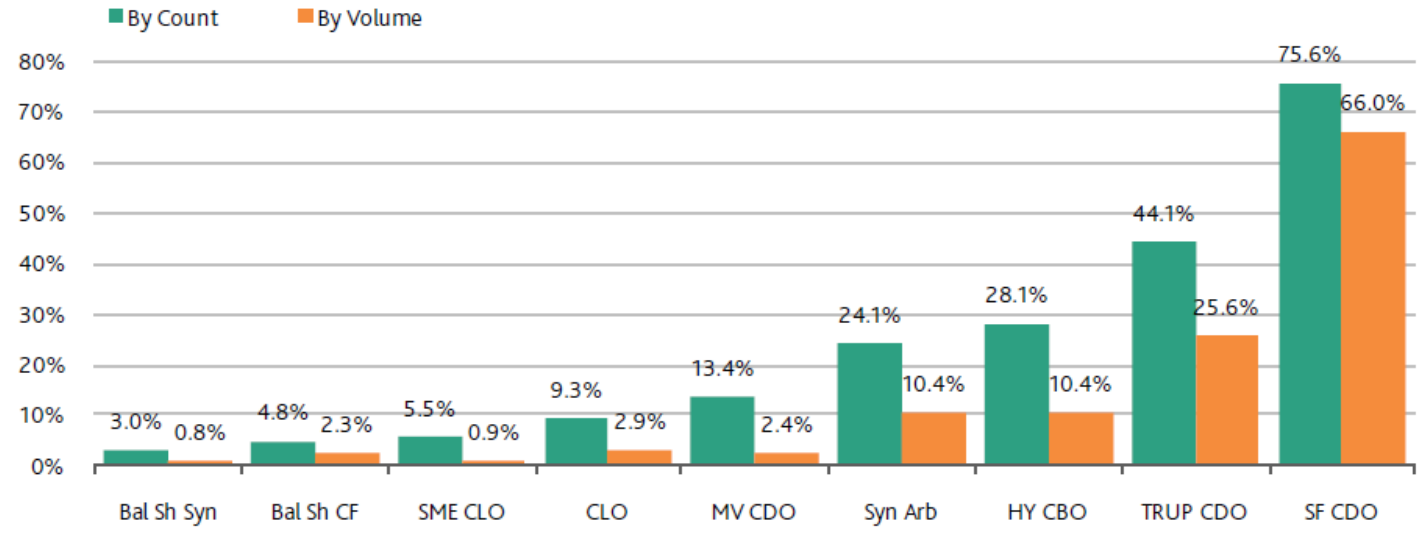
CLOs – How Do They Compare to Subprime CDOs? How Have CLOs Evolved Since Pre-GFC?

CLO impairment rates compared to other structured credit products

- Some argue that CLO ratings are too stringent, BB/BBB rated CLOs have default rates that are much lower than rating agency expectations for those ratings classes.

EXHIBIT 28

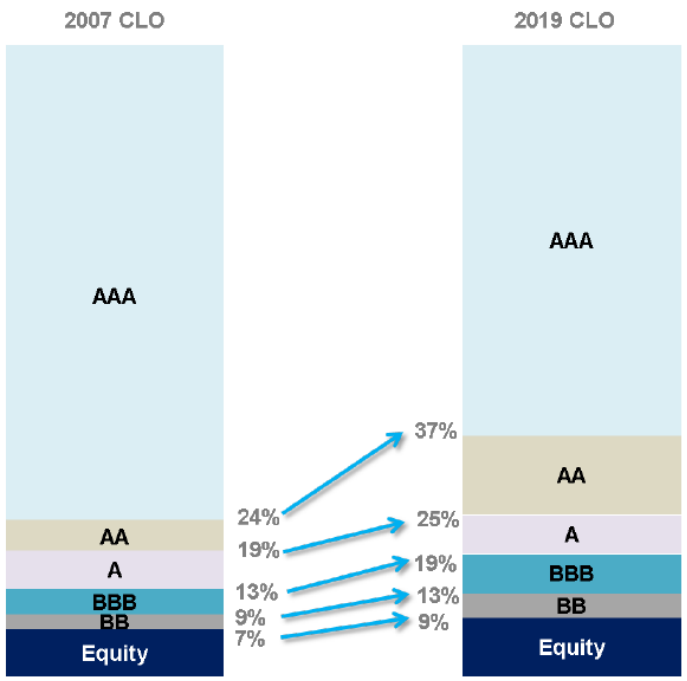
Cumulative Impairment Rates for Global CDOs by Deal Type, 1993-2009



Source: Moody's.

CLO structural support has been enhanced following GFC

Typical Capital Structure and Credit Enhancement



CLO Structure Changes

Feature	Description
Subordination	▪ Aaa's currently have 33-36% of structural support compared to 22-25% pre-crisis
New Portfolio Restrictions	▪ CLO tranches are not permitted in the portfolio ▪ High Yield (HY) bonds[1] are restricted ▪ Currently 90-95% of portfolio consists of senior secured loans
Documentation	▪ Significant standardization across deals
Limited Extension Risk	▪ Eliminated ability to reinvest post Reinvestment Period
Reinvestment	▪ Short Reinvestment Period: 4-5 years vs. 7 years in 2006-2007 deals

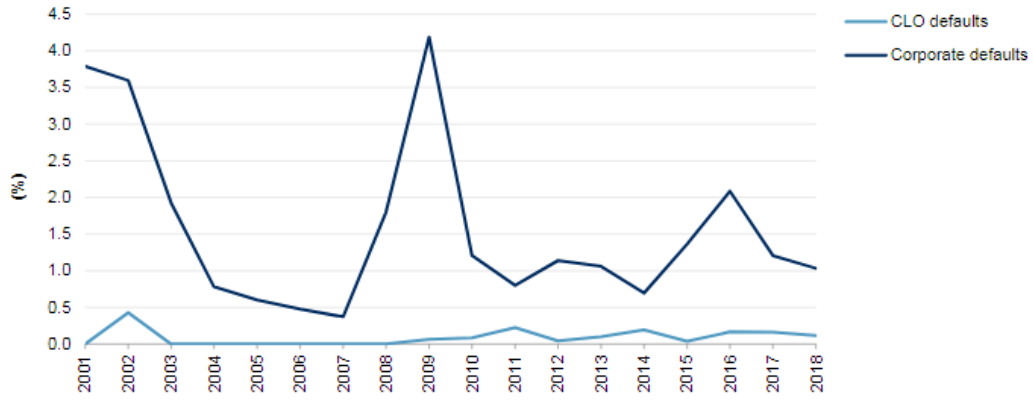
1. After the Volcker rule went into effect in Q4 2013, CLO collateral pools no longer permit High Yield (HY) bonds in order to comply with Volcker.

Source: Citi Research as of 4/31/2019.

CLO defaults low, even when corporate default rates spike

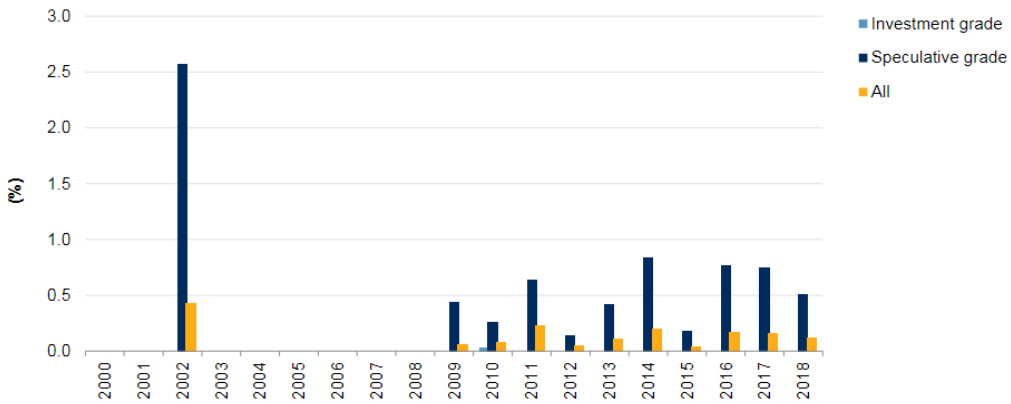
- Aggregate CLO default rates have never exceeded 0.5% in a year. Investment grade rated CLO tranches have almost never defaulted.

Annual Global Default Rates For CLOs And Corporate Issuers



Sources: S&P Global Fixed Income Research and S&P Global Market Intelligence's CreditPro®.

Global CLO Default Rates



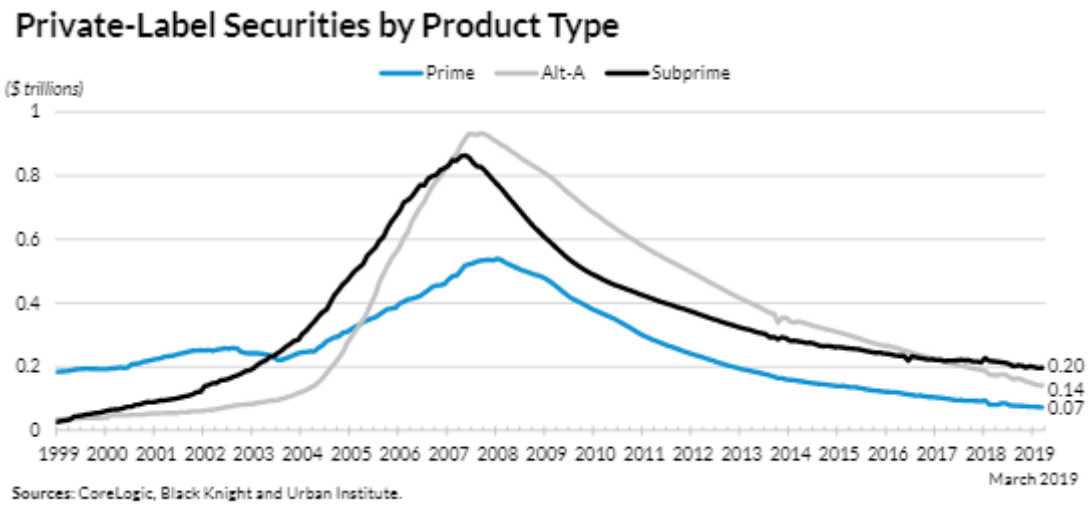
Source: S&P Global Fixed Income Research.

How are CLOs similar or different from subprime mortgage securities in the pre-crisis era?

- "We are concerned just because the pace of growth has been quite rapid for some time. The subprime analogy isn't perfect, but it's on the road to 'no doc' underwriting which happened 11 years ago." – Mark Carney 1/16/2019 (Reuters)
- "I have expressed concerns about leveraged lending. I do think non-financial corporations have run up, really, quite a lot of debt." – Janet Yellen 2/27/2019 (Reuters)
- "The most serious threat to the current cycle is lending to highly leveraged nonfinancial businesses. …while there are significant differences between leveraged lending and subprime mortgage lending, the similarities are eerie." – Mark Zandi, Chief Economist, Moody's 8/23/2018 (Moody's Analytics Weekly Outlook)

How are CLOs similar or different from subprime mortgage securities in the pre-crisis era?

- Scale: The leveraged loan market at ~$1.2trln is smaller than the non-agency MBS market, which peaked at $2.2trln in 2007. The single-family cash + synthetic CDO market totaled $641bn, similar in size to the CLO market in 2019.



SF ABS CDO Cash and Synthetic Collateral by Vintage 1999-2007				
Year	Cash	Synthetic	Total	% Synthetic
1999	304	-	304	0%
2000	6,391	600	6,991	9%
2001	14,891	-	14,891	0%
2002	13,456	3,000	16,456	18%
2003	25,431	-	25,431	0%
2004	52,327	6,186	58,513	11%
2005H1	25,808	3,827	29,636	13%
2005H2	65,071	15,346	80,416	19%
2006H1	52,608	18,501	71,109	26%
2006H2	83,287	77,315	160,602	48%
2007H1	73,948	49,065	123,013	40%
2007H2	26,230	27,516	53,746	51%
Total	**439,751**	**201,356**	**641,107**	**31%**

Notes: This table breaks out SF ABS CDO issuance between cash and synthetic by year through 2004, then semi-annually from 2005. SF ABS CDOs = Structured Finance Asset-Backed Securities CDOs.
Source: Intex

Collateral Damage: Sizing and Assessing the Subprime CDO Crisis, Federal Reserve Bank of Philadelphia

How are CLOs similar or different from subprime mortgage securities in the pre-crisis era?

Summary Expected Losses for All SF ABS CDOs by Issuance Year				
Vintage	# Deals	Deal Balance ($ million)	Deal Loss ($ million)	Total Loss %
1999	1	304	60	20%
2000	19	6,991	1,847	26%
2001	34	14,891	3,132	21%
2002	37	17,456	3,604	21%
2003	45	25,561	7,481	29%
2004	81	58,558	25,822	44%
2005	124	108,877	61,627	57%
2006	223	231,711	167,402	72%
2007	163	176,759	148,836	84%
Grand Total	**727**	**641,107**	**419,812**	**65%**
Notes: This table summarizes expected losses on all active SF ABS CDOs (as of March 2011) by vintage. SF ABS CDOs = Structured Finance CDOs.				
Source: Intex, Bloomberg, RBS (2011)				

Source: "Collateral Damage: Sizing and Assessing the Subprime CDO Crisis," *Federal Reserve Bank of Philadelphia,* May 2012.

Global CLO Tranche Cumulative Loss Rates (1993 -2015)

	Cohort Size	5 Years	10 Years
US CLO Aaa	2,208	0.0%	0.0%
US CLO Aa	1,071	0.0%	0.0%
US CLO A	1,068	0.0%	0.0%
US CLO Baa	1,197	0.7%	2.8%
US CLO Ba	877	1.3%	8.0%
US CLO B	184	16.1%	33.1%
EUR CLO Aaa	530	0.0%	0.0%
EUR CLO Aa	348	0.0%	0.0%
EUR CLO A	315	0.0%	0.0%
EUR CLO Baa	389	0.3%	0.3%
EUR CLO Ba	258	2.7%	5.4%
EUR CLO B	74	0.0%	2.8%
US Investment Grade		0.6%	
US Speculative Grade		12.0%	
U.S. ABS (IG)	18541	1.6%	3.9%
U.S. ABS (SG)	365	20.3%	38.0%
U.S. Subprime RMBS (IG)	22842	42.5%	54.4%
U.S. Subprime RMBS (SG)	1108	91.6%	95.5%
US CMBS (IG)	12525	8.9%	14.8%
US CMBS (SG)	2772	32.3%	57.4%

Source: Citi Research, Moody's as of 12/31/2015.

How are CLOs similar or different from subprime mortgage securities in the pre-crisis era?

- Key driver of subprime MBS losses was fraudulent underwriting, e.g. no-doc NINJA loans. Additional driver of losses was rating agency underestimate of correlation of nationwide home prices and defaults. Cumulative losses for IG tranches of subprime CDOs exceeded 50%, for sub-IG tranches, exceeded 95%.
- Concentrated or leveraged holders of subprime CDOs included banks, hedge funds, and other leveraged investment vehicles. Concentrated, leveraged losses wrought havoc on the financial system.
- Leveraged loans, high yield debt, and CLOs are exposed to business cycle risk. In a cyclical downturn, these markets are likely to see spread widening, and could close to new issuance for prolonged periods. But this is different from posing systemic risk either to financial markets or the economy.
- There is no evidence that the leveraged loan market is exposed to significant fraudulent underwriting. There is focus on cov-lite lending, but this is different from fraudulent or no-doc underwriting. Major rating agencies have historically tended to be most accurate when rating corporate credit.
- A broad-based economic downturn would likely be bad for many sectors of the economy. But correlations are unlikely to be as high as experienced by the nationwide boom and bust of the housing market.
- For loss rates in the CLO market to remotely approach loss rates in the subprime CDO market, default rates would need to soar to multiples of the highest ever experienced levels, while recovery rates would need to collapse to a fraction of historical levels.

How have leveraged loans and CLOs changed since the GFC?

- Leveraged loans have generally become riskier since the GFC:
  1. Leverage ratios are significantly higher and incorporate more aggressive assumptions on the part of corporate issuers
  2. Credit ratings of new issue loans have trended steadily lower
  3. “Loan only” capital structures are more common, subordinated debt has virtually disappeared from capital structures
  4. Cov-lite %age has increased significantly
  5. Market size has steadily increased
  6. In the next credit downturn default rates will likely be higher and recoveries will almost certainly be lower than in previous cycles
  7. But those worse outcomes do not in turn imply “systemic” risk for financial markets broadly or the real economy
- CLO structures have become more robust since the GFC:
  1. CLO 2.0 structure requires more structural subordination at every credit rating.
  2. CLO 1.0 structure held up well throughout GFC (~1% of BBB tranches defaulted, ~4% of BB tranches defaulted).
  3. CLOs are exposed to the deteriorating characteristics of underlying loan collateral. CLO equity and lowest rated tranches are most exposed to that deterioration.

Survey of Academics, Asset Managers and Broker Dealers

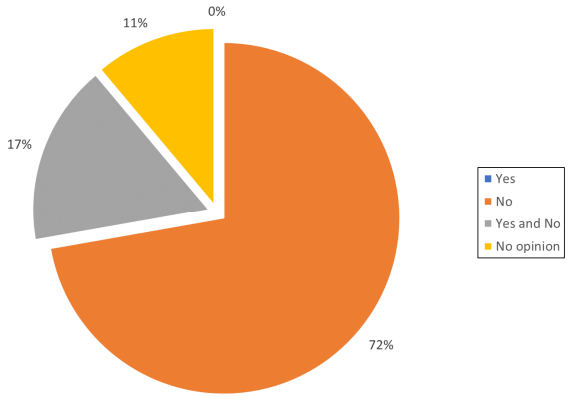
Survey of academics, asset managers, and broker dealers on a confidential basis

Summarized survey participant views are:

- The overwhelming majority of survey participants (72%) do not believe the CLO market is reminiscent of the subprime CDO market in the mid-2000s.
- More than half of the respondents (56%) believed that recovery values would be lower during an adverse credit event relative to history.
- More than 50% of survey participants believe the rating agencies are doing a better job today.
- A wide dispersion exists regarding fear and / or complacency in individual markets – with risk seemingly concentrated in the high yield market.
- Regulatory recommendations are minimal – but views to strengthen the system and surveillance are strong.
- Participants graciously offered ideas regarding sources of data, metrics of CLOs, and further issues and ideas.
- Meaningful pockets of uncertainty exist in the market. A large number of knowledgeable participants responded with 'no opinion'.

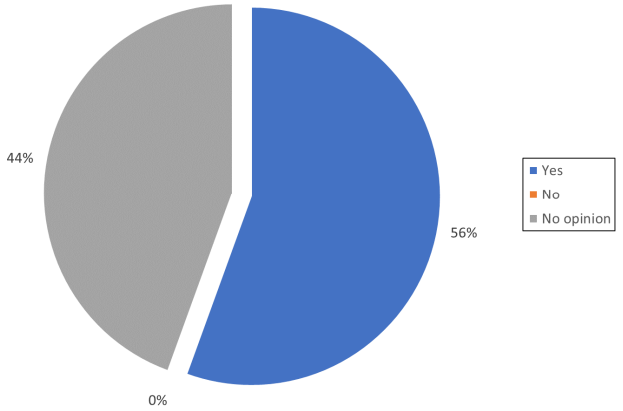
1. Is the CLO market today reminiscent of the subprime CDO market in the mid-2000s?

- The overwhelming majority of survey participants (72%) do not believe the CLO market is reminiscent of the subprime CDO market in the mid-2000s.
- Positive factors cited include greater transparency into the portfolios, CLO structures have worked as advertised, regular reporting, diverse corporate debts issued by firms in varying sectors, no synthetics, and less leverage.
- Some (17%) believed there were similarities and differences. Risky similarities include easy money fueling underlying leverage and yield chasing private equity deals - now done at 11x EBITDA up from 6.4x in 2009.
- None of the participants believed that a full comparison with the subprime market in the mid-2000s was relevant.



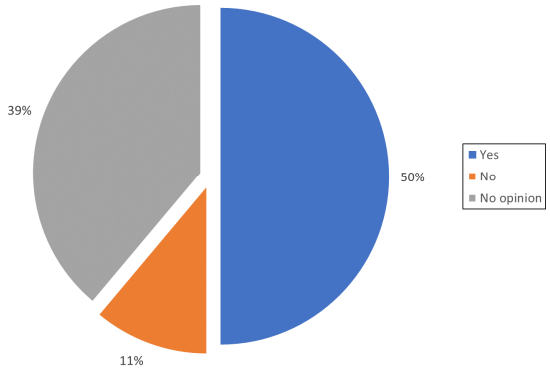
2. Will recovery values for recently issued leveraged loans will be different from historical experience?

- More than half of the respondents (56%) believed that recovery values would be different during an adverse credit event relative to history. In contrast, a shockingly large (44%) number of participants had no opinion with no responders believing that history would repeat.
- All participants responding "yes" believe that recovery values will be lower in the future by 10 to 15 or in the 50 to 60 range. Second lien may be '0'.
- Many highlighted the role of private equity sponsors delaying default – due to the ability of sponsors to extract cash while the deal is ongoing. Similarly, sponsors are participating in technology businesses now in contrast to old economy industrials in the past – where underlying businesses probably had a long-term "reason to exist."



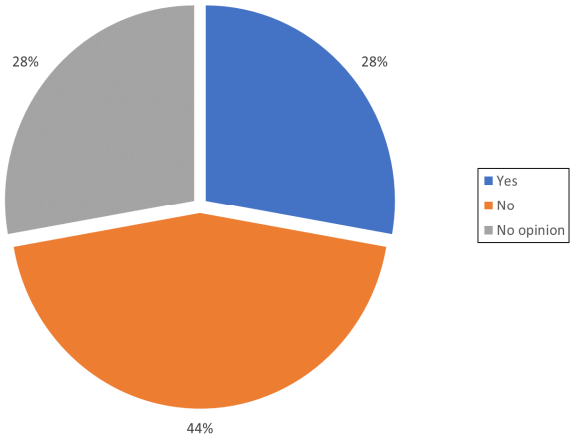
3. Do rating agencies do an adequate job rating leveraged loans, CLOs, etc.?

- Half of the survey participants (50%) believe the rating agencies are doing a better job today. Rating agencies were describe as being 'ahead of the curve', providing a 'very useful service,' and were viewed as being ' pretty conservative.
- Market participants believing the rating agencies were not doing an adequate job (11%) represented two sides. First, agencies were emboldened by the ultimate good performance of CLOs during the 2008 financial crisis, and therefore have allowed additional risk to creep in. Second, the fact that so few CLO BB or BBB notes have ever defaulted would actually argue that rating agencies are too strict on CLO.
- Many of those with no opinion (39%) offered explanations stretched from rating agency adequacy will not be determined until "through-cycle" results can be analyzed to truly no opinion.



4. If the credit cycle turns and defaults increase, what do you find most concerning from a systemic perspective? What are your concerns?

- The simple majority of participants believe the sector does not pose systemic risk (44%). In other words, loan defaults will increase and some investors will lose money – but with no transmission into the broader economy.
- Respondents fearing system risk are 28% of the total. This group believes competing but related stories:
  - High yield is most vulnerable but for unusual reasons. If CLO demand wanes, loan maturities will likely need to be addressed in the HY market which could set up a negative technical picture.
  - High yield and leveraged loans pose similar systemic concerns. Each asset class is held in large amounts by mutual funds – which may be forced to sell their holdings to satisfy redemption requests. Given limited liquidity in the loan market, heavy selling volume can push prices lower and force other investors to record mark-to-market losses.
  - CLOs mark to market will be affect by loan price drop but senior tranches less so than mezzanine tranches.
  - Leveraged loans and BBB corporates may pose a systemic risk, particularly if the next recession is a corporate driven event.
- The remaining 28% maintain no opinion.



5. What changes, if any, would you recommend that regulators implement to reduce the systemic risk of leveraged loan and/or CLO markets?

- The usage by sponsors and arrangers of EBITDA addbacks could be reviewed and scrutinized.
- More transparency about the underlying loans would benefit both the leverage loans and CLO markets.
- We do not believe any changes are needed.
- Interagency guidance on leveraged lending laws (6x and cumulative FFC/debt) were a good start, although they aided the increase in EBITDA adjustments.
- CLOs, BDCs and similar vehicles have effectively become banks and should be looked at as such.
- There have already been so many regulations and changes since the crisis we struggle to see what could be useful without being overly prescribing on telling grown-up institutional investors what to do in their jobs.
- "Stop trying to find the specific match which starts the fire and start recognizing that through creating a reach-for-yield and asset price inflation in a misplaced attempt to get inflation back on target, the Fed and other central banks have rendered the entire forest bone-dry, and vulnerable to lighted matches wherever they fall from! But I recognize that's not the answer you were looking for…"

6. What sources of data or metrics would enhance OFR's market monitoring efforts?

Data

- S&P LCD, Rating Agencies, Intex CLO cash flow models, Moody's Analytics, TIC data, which should include transaction-level holdings of virtually all US CLO tranches (because CLOs are registered in the Cayman Islands and therefore "foreign securities"). Insurance company filings and Y-14 data for bank holdings. JPM, Bank of America information on CLO Manager performance, particularly Wells Fargo, Citi, and Nomura provide detailed summaries by Manager. LSTA data is helpful but may be biased.

Metrics of CLOs

- Overcollateralization Ratios; CCC+/Caa1 and below %; Cov-Lite loan %; Defaulted Obligations %; Increase in B3 population versus historical will show how much risk market is taking; Monitoring B3/CCC exposure; Debt/EBITDA; interest coverage would all be useful to assess relative health of leveraged loan market.

Questions / Recommendations / Issues

- Tightening up the EBITDA metric would make the ongoing market leverage multiples stats much more representative of actual financial risk.
- Who holds CLO tranches to evaluate the risk to the capital base of pension funds, insurance companies, etc.
- Stress test of the CLO market.
- Philadelphia Fed uses Intex to analyze the structure of CLOs (partner with the Philly Fed).
- Precisely because the loan market is private, this remains really difficult.

Recommendations to OFR

How should OFR evaluate and monitor risks related to leveraged lending and CLOs?

- Systemic risk from leveraged lending or CLOs could potentially occur through two channels:
  1. Companies that are otherwise solvent are unable to fund themselves or roll over debt because of distress in the leveraged loan/CLO market.
  2. Broader financial markets become impaired because of concentrated losses emanating from investors in leveraged loans or CLOs.
- Of these two risks, the first is more likely. An increase in defaults in a credit cycle downturn could lead to significant losses for holders of CLO equity or lower rated CLO tranches. If these investors pull back, the CLO market can shut down, which in turn would substantially reduce demand for leveraged loans.

Systemic risk transmission channels table

Specific Risk Factor to Monitor	Risk: High, Medium, Low
Scale: As leveraged loan market grows, potential impact increases	Medium
Credit quality (average credit ratings decline)	Medium
Industry concentration	Low
Corporate leverage ratios	Medium
Recovery values deteriorate	High
Default rates increase in next credit downturn	High
Roll-over risk	Medium
Credit rating quality deterioration (rating agencies do worse job)	Low
Rating agencies ease CLO structural requirements	Low
CLO investor concentration, especially in specific parts of capital structure	Medium
Investor leverage	Low
Investor liquidity mismatches (potential for forced selling)	Medium
Synthetic CLO market growth	Low

How should OFR evaluate and monitor risks related to leveraged lending and CLOs?

- Scale: OFR should monitor the size and growth of these markets relative to the size of other markets and growth of the overall economy. The leveraged loan market is growing rapidly, more than 20% in 2018 alone.
- Credit quality: The trend toward lower rated issuance increases the probability of systemic risk. Higher default rates than experienced historically are likely in the next credit downturn. Monitor credit ratings of new issuance, and ratings changes for existing issuance.
- Concentration: Industry diversification is an important feature of the market. When large concentrations occur, the potential for a systemic disruption increases. Sector data is readily available and should be monitored.
- Leverage: The amount of leverage being utilized by corporates has trended higher for some years, while the amount of subordination in the capital structure has diminished. LBO “add-backs” can distort these ratios. These trends should be monitored.

How should OFR evaluate and monitor risks related to leveraged lending and CLOs?

- Recovery values: Most investors expect recovery values to fall. When defaults happen, monitor recovery values. If values fall precipitously this is an ominous indicator.
- Investor Leverage: Investors like hedge funds or distressed funds with appropriate liquidity terms using moderate or no leverage are appropriate investors for CLO equity or lower rated tranches. Monitor leverage provided by banks or others to these funds.
- Liquidity Mismatches: Measure the size of leveraged loan or CLO positions held by investors that must provide short dated liquidity to investors (open-end mutual funds, ETFs, some hedge funds). These create the risk of firesales that could undercut investor confidence.

How should OFR evaluate and monitor risks related to leveraged lending and CLOs?

- Roll-Over Risk: Track the density of leveraged loans that must be rolled at each maturity. Refinancing risk rises when outsized maturity walls must be rolled in tight windows.
- Credit Rating Quality: Monitor the performance of the rating agencies in rating underlying corporate credit. Most problematic would be a recurrence of fraud similar to the early 2000s (WorldCom, Enron), but this is challenging to monitor *ex ante*. Similarly, take note if rating agencies reverse course and become more lax in setting subordination levels for rating CLO liabilities.
- Synthetic CLOs: Gather data on the size of issuance and notional outstanding of synthetic CLOs. While we believe this market is currently modest in size, data is difficult to locate and substantial growth in this market could pose increasing systemic risk. Note the importance of synthetic CDO markets in the subprime mortgage crisis.

What other sources of data would enhance the OFR's market monitoring efforts?

- Incremental data on bank holdings of bank loans
- Data on mutual fund, ETF, and BDC holdings of loans
- Data on size of outstanding synthetic CLOs
- Data on total Total Return Swap (TRS) leverage used to invest in leveraged loans
- Data on total repo/PB financing of CLO liabilities and equity
- S&P/LCD is a rich source of data on the Broadly Syndicated Loan market, as is LSTA and Moody's Analytics

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