

Analysis of US High Yield / Leveraged Loans

Cross sectional mapping and analysis of High Yield highlights
vulnerability to economic slowdown.

Leveraged loans face increased risk from diluted terms and conditions

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Club b, Monaco, 6th November 2019



Summary

- Central banks send warning on leveraged lending in Financial Stability Reports
- US bankruptcies running above trend in 2019
- Treasuries signal weaker economic growth but so far only CCC spreads are wider
- US High Yield total returns from 2008 – 2019 equal to cumulative annual cash distributions, and recent excess returns derived from changes in interest rate expectations
- High Yield bonds: cross sectional mapping and analysis highlights vulnerability to economic slowdown
Based on analysis of ETF HYG, 42% of listed constituents have unsustainable FCF-to-debt ratio
22.5% of borrowers face EBITDA declines of 30% triggering downgrades and default rates of 9.5% in recession scenario
- Leveraged Loans: increased risk from diluted terms and conditions
Covenant lite and EBITDA add-backs increase loss given default and reduce stated leverage from 7.4x to 5.6x
CLO first loss tranches have extreme risk profile
- Post crisis regulation shifted risk from banks to non-banks and institutional holders

Central banks send warning on leveraged lending in Financial Stability Reports



FEDERAL RESERVE

'...credit **standards have deteriorated**'

'rapid growth in debt concentrated among riskier firms, leverage ratios high, business sector **vulnerable to downturn.**'

'...50% of investment grade bonds rated BBB (\$1.9tr), a significant weakening of the economy will trigger **downgrades** of many of these bonds to sub-investment grade.'

FED Financial Stability report - May 2019



BANK OF ENGLAND

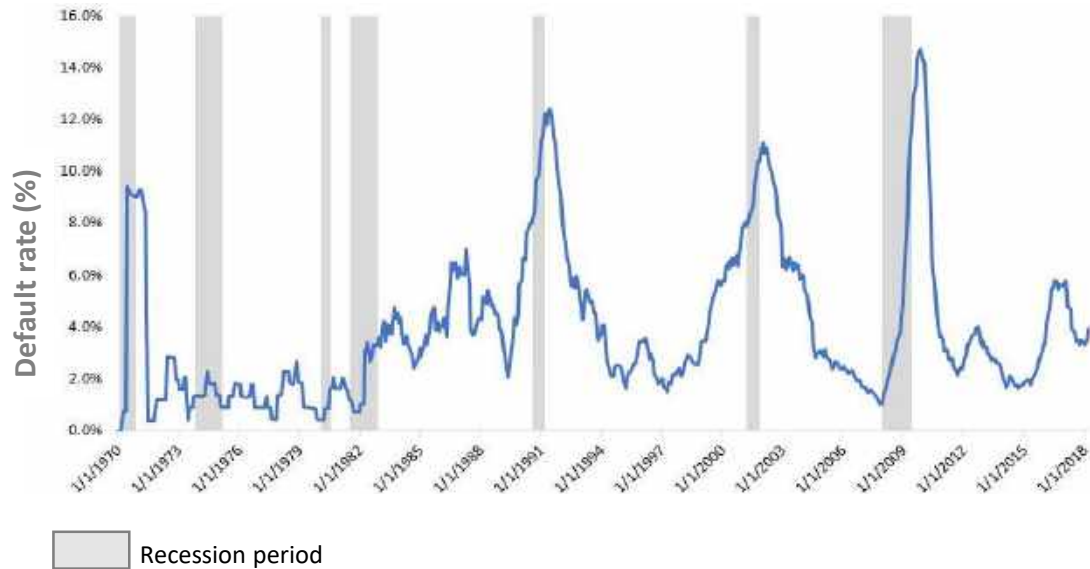
' 60% of new leveraged loan issuance has **no maintenance covenants**'

'Borrowers average reported debt to EBITDA ratio 5x. Supervisory data indicates 28% of **new lending with leverage ratio greater than 7x.**'

'Growing use of **add-backs** is understating leverage.'

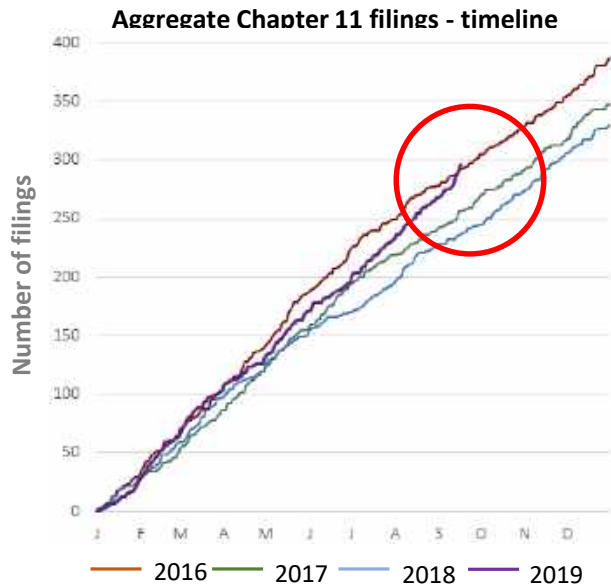
BoE Financial Stability report - July 2019

History of US recession and High Yield default rate since 1970



Source: Moody's

US bankruptcies running above trend in 2019

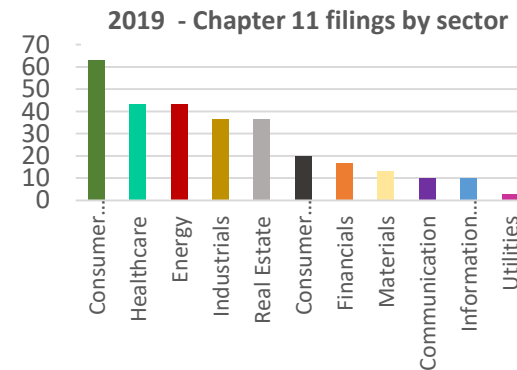


Source: Reorg First Day, Bloomberg Interview

“...there’s a secular shift in commerce, materials, manufacturing and energy, you’ve got to be really careful in high yield. Don’t go down in credit quality in the search for yield.” Rick Rieder, BlackRock Head of Fixed Income, October 4th 2019.

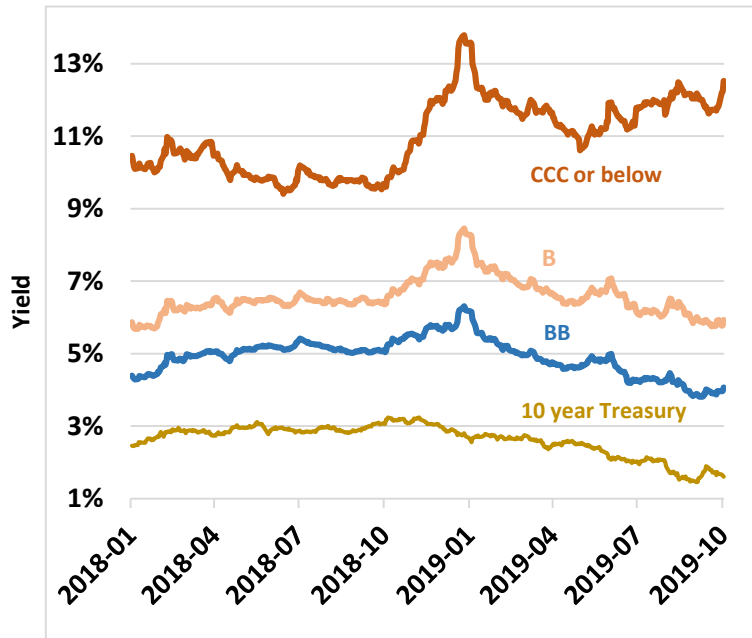
September 2019 was the busiest month for bankruptcies since 2015 with 43 filings, including Forever21 fashion retail, Gabriel Texas liquor and three companies related to tariff issues.

See chart below:



Treasuries signal weaker growth.. so far only CCC spreads wider

High Yield performance based on HYG ETF returns driven by 2018 rate hikes and 2019 rate cuts which reflects both expectations for future growth and the probability of defaults. Cash distribution stable at 4.5% each year.



Source: ICE BofAML

HYG Performance decomposition (%)

	Cumulative monthly cash distribution (%)**	Residual factor impact (%)	Fund absolute performance (%)
2017	4.5	1.6	6.1
2018	4.5	-6.5	-2.0
2019*	4.5	5.8	10.3

* 2019 YTD Sept.

** Cumulative monthly distributions during each calendar year, not compounded.

HYG Rating Distribution

BBB	1.5 %
BB	50.9 %
B	36.2 %
CCC or below	10.7 %
Cash / Derivatives	0.7 %

HYG: iShares iBoxx \$ High Yield Corporate Bond ETF

Analysis of HYG constituents to derive recession risk

Overview of US High Yield, Leverage Loan & Collateralized loan obligations (CLO) universe

High Yield	Ticker	Assets (\$bn)
Total outstanding (US)		1,200
Top ETFs	HYG, JNK, HYLB, SHYG, SJNK, USHY, HYS	40
Top 100 Mutual Funds		350

Recession episode	Default rate	LGD
1990/1991	9% / 8%	62%
2001/2002	13% / 6%	75%
2008/2009	7% / 14%	62%

LGD: loss given default

Sources: Invesco Oppenheimer Senior Floating Rate Fund, S&P Global Market Intelligence, Wells Fargo, Moody's, Guggenheim Investments, Wells Fargo, Palmer Square CLO Tranche yields, Bloomberg.

Leveraged Loans	Ticker	Assets (\$bn)
Total outstanding (US)		1,100
Top ETFs	BKLN, SRLN, FTSL	9
Top 100 Mutual Funds		108

Recession episode	Default rate	LGD
1990/1991	Mkt data minimal	32%
2001/2002	6% / 8%	38%
2008/2009	2% / 6%	40%

CLO	Ticker	Assets (\$bn)
Total outstanding (US)	CLODI, OXCL, ECC	600

Leveraged Loan Market		→	CLO Market		
Rating	Weight		Rating	Tranche weight	Current Yield
BBB	2%		AAA	65%	3.5%
BB	30%		AA	10%	4.0%
B	48%		A	7%	4.6%
CCC	4%		BBB	6%	5.7%
Unrated	5%		BB	3.5%	9.0%
			Equity	8.5%	12-15%

Using HYG ETF as proxy for US high yield universe

Analysis of the holdings of HYG covers almost 80% of issuers included in the entire HY universe of \$1,200 bn par value.

Fund	Ticker	Index	AUM (\$ bn)	Bond constituents	Corporates
iShares US High Yield Corp. Bond ETF	HYG	iBoxx USD Liquid HY Index	17.4	990	344
iShares 0-5 Year High Yield Corp. Bond ETF	SHYG	iBoxx USD Liquid HY 0-5 Index	3.3	636	259
SPDR Barclays US High Yield Bond ETF	JNK	Barclays US Corporate HY Index	9.3	891	452
Other top 10 ETFs			20.0		
Subtotal ETFs			40.0		
Top 100 mutual funds			350.0		
Grand total			390.0		

Source: Bloomberg, Carlyon AG estimates, Oct. 2019

* Funds above have a bond footprint of approx. \$922 bn

	Fund absolute performance (%)	Cumulative monthly cash distribution (%)*
2008	-17.6	7.7
2009	28.6	8.3
2010	11.9	7.5
2011	6.8	6.7
2012	11.7	6.2
2013	5.8	5.7
2014	1.9	5.1
2015	-5	4.8
2016	13.4	4.6
2017	6.1	4.5
2018	-2.0	4.5
2019 YTD	10.3	4.5

- Cumulative monthly distributions during each calendar year, not compounded.

HYG maturity distribution	%
0-1 Year	13.8
1-2 Years	10.1
2-3 Years	14.4
3-5 Years	31.7
5-7 Years	20.9
7-10 Years	7.7
Cash / Derivatives	0.6
Weighted average bond maturity	3.5 years

Liquidity metrics	units
Illiquid investment limit	15% > 7 days
Portfolio turnover by value in 2018	0.35
Median Secondary / Primary ratio	5x - 8x

Source: Bloomberg

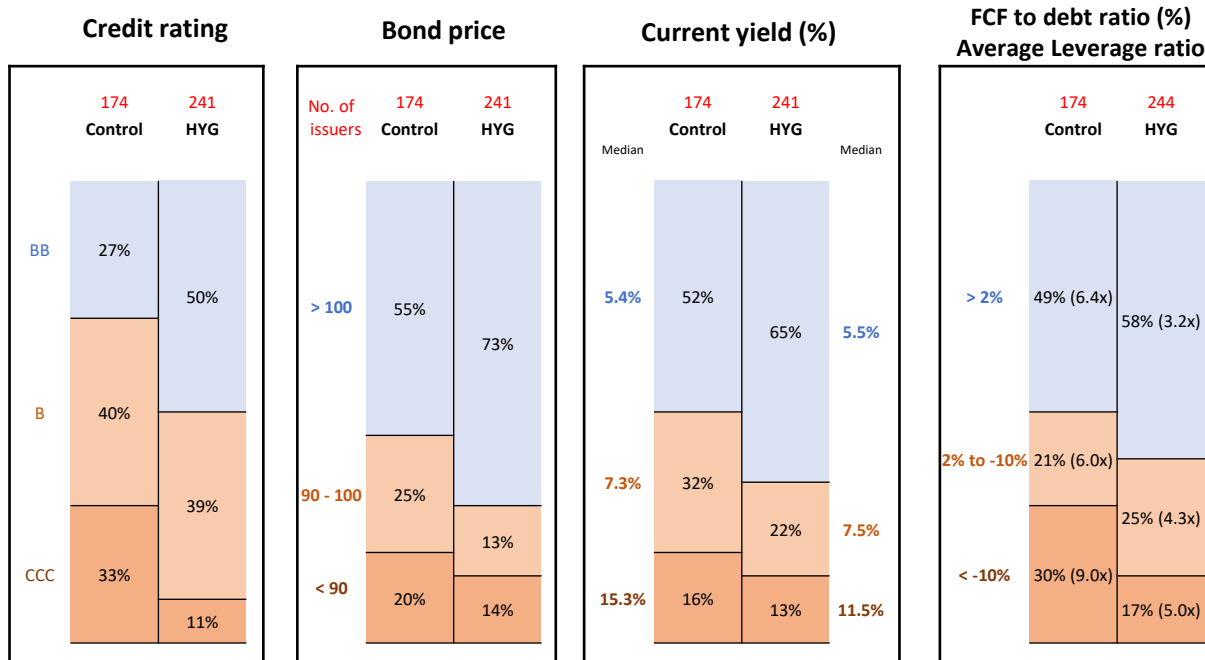
Data selection

Metrics for issuer universe	HYG	Control
Number of issuer groups	344	925
Listed & rated / unlisted & rated	241 / 103	174
Rating distribution (BB / B / CCC)	(50% / 39% / 11%)	(27% / 40% / 33%)
	Median	Median
Mkt cap (\$ bn)	3.5	2.0
Net debt / EBITDA	3.9x	5.0x
FCF / net debt	5.3%	1.6%

Source: Bloomberg, iShares

- Using HYG constituents to calculate EBITDA sensitivity and forward looking recession analysis.
Sample check performed for population of unlisted equity with rated bonds. Listed and unlisted names have similar credit profiles i.e. BB, B, CCC (50%, 39%, 11%).
- Control group selection criteria: US companies, > 3x net debt / EBITDA, market cap < \$10 bn, bonds traded, credit rating available, financial metrics available via listed parent entity.
- Data available from 2007 to 2019 to allow 2008/9 recession inclusion in dataset.

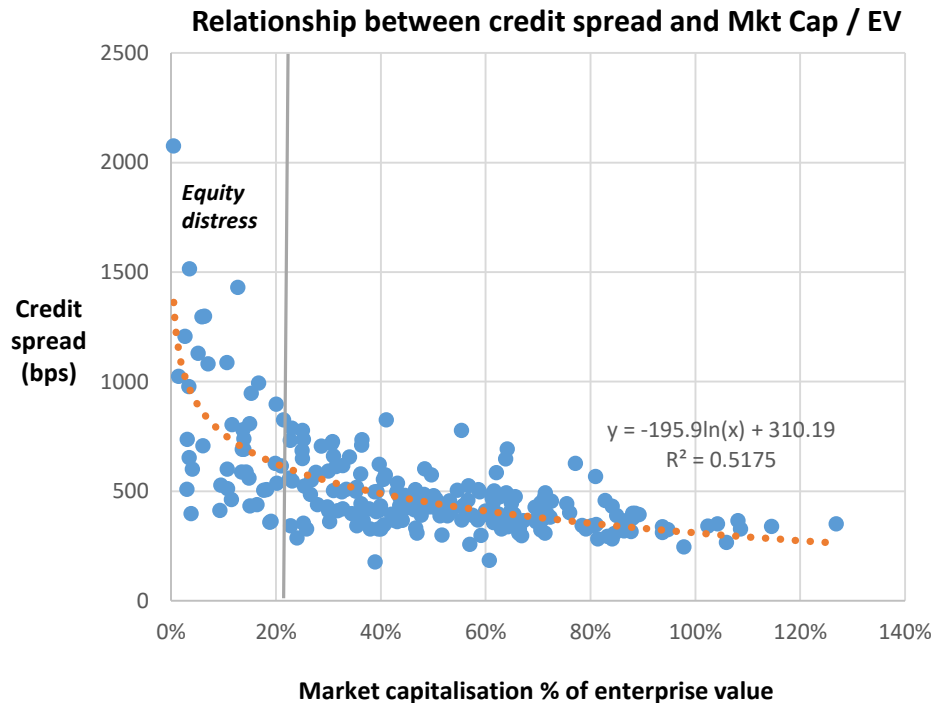
Cross sectional credit mapping highlights vulnerability to economic slowdown



42% of HYG constituents vulnerable to economic slowdown (25% + 17% shown on right hand column above). Moody's uses leverage, liquidity and FCF to debt as main triggers for changes to ratings and characterises FCF to debt of less than 2% as unsustainable. For all issuers in the 42% grouping, 30% are energy names.

HYG and other ETF managers proactively seek higher liquidity and higher rated issues within high yield. Clearly the control group of generally smaller names, with lower ratings and more bonds trading sub-par, will have significantly higher default rates than HYG in any given period of economic weakness.

Using equity distress as additional input to inform credit view

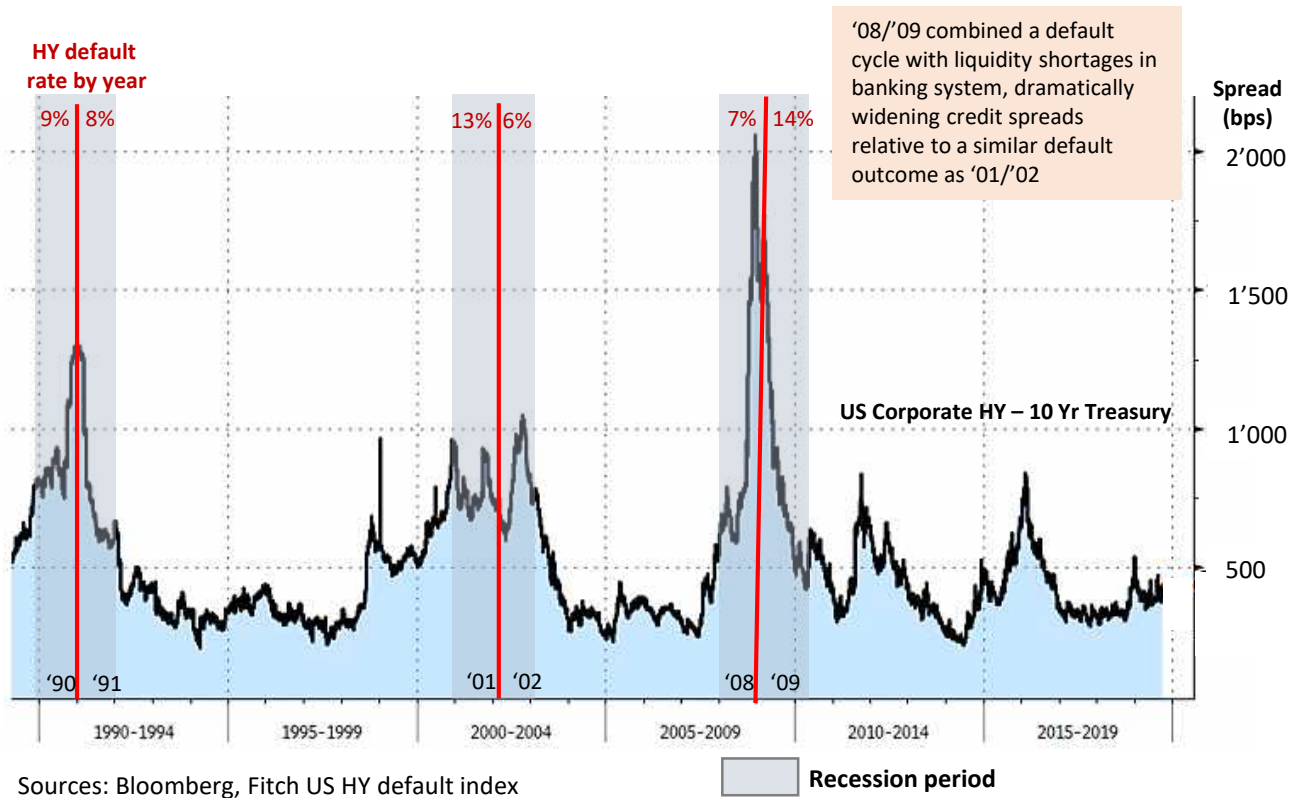


Source: Carlyon AG analysis based on HYG listed and rated constituents

- Mkt Cap / EV against credit spread to evaluate attitude of equity holders vs bond holders
- Equity Distress based on bottom two deciles for Mkt Cap to EV data, equates to 48 issuers between the boundaries of 0% and 23%.
- 38 of these issuers also fall into the worst deciles as measured by credit rating and 28 issuers as measured by current bond yield
- In contrast, only 22 of these names fitted with the two weakest FCF to debt groups
- 18 names (38%) of this group is represented by energy companies

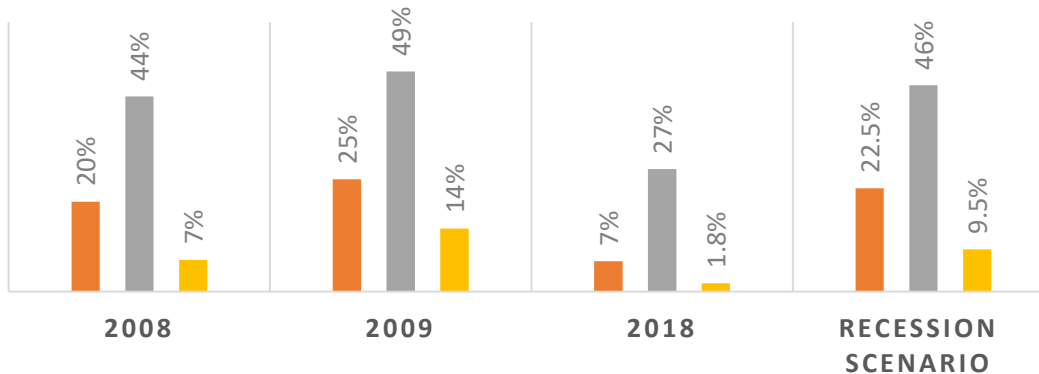
Recession Risk

Last three major debt cycles resulted in 2 consecutive years with high defaults



Weakest borrowers face EBITDA decline triggering rating downgrade / default

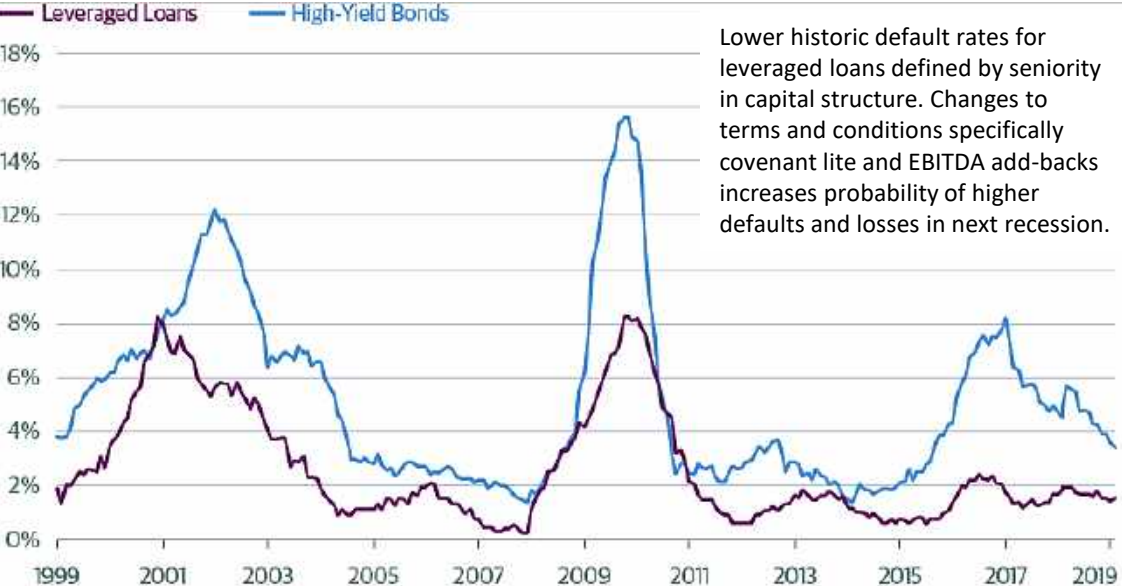
- Share of issuers with median -30% EBITDA year-on-year
- Share of issuers with declining EBITDA
- Default rate



- **Severity of EBITDA** declines during 2008-2009 were based on our Control group, which provides a benchmark for a severe recession over a 2 year period.
- **Future recession scenario** is modelled over one year based on EBITDA weakness of 30% impacting the constituents of HYG. We expect the population with FCF / debt of <2% to be hit the worst, these represent 42% of all constituents.
- **Expected default rate of 9.5%.** In a recession based on our model, 22.5% of these names will face a significant EBITDA impact and result in a 9.5% default rate. These two groups, <2% to -10% FCF to debt and less than -10% FCF to debt, have 5.3x and 5.9x leverage before the impact of economic slowdown and higher leverage ratios of 7.6x and 8.4x.

Issuers diluting terms and conditions

Expect higher defaults and losses for leveraged loans in next recession

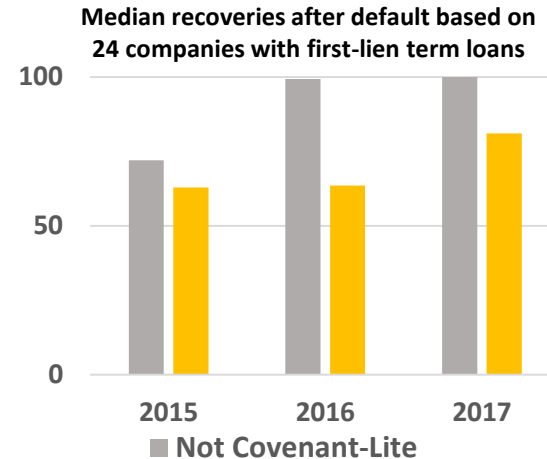


Source: Moody's, Guggenheim Investments, Wells Fargo, as of Jan. 2019

Recoveries for covenant-lite 22% pts lower than not covenant-lite



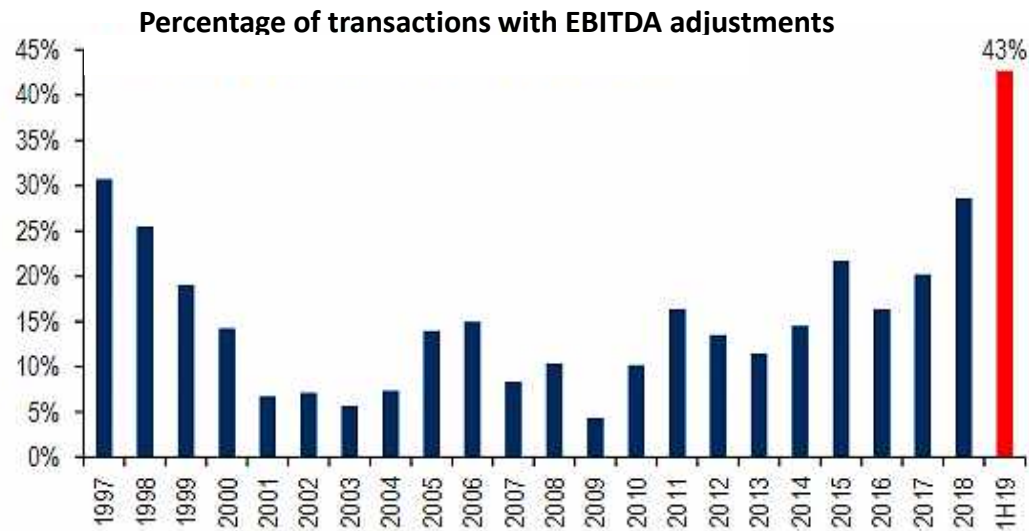
Source: LCD, an offering of S&P Global Market Intelligence



Recovery levels observed for pre-petition covenant-lite and not covenant-lite institutional loans issued by companies that recently emerged from bankruptcy. On average median recovery rates for covenant-lite were 22% pts lower than for not covenant-lite loans over the period 2015 - 2017.

Source: Allnews.ch, a closer look at how covenant-lite structures affect recoveries for institutional loans, 10 July, 2018

'EBITDA add-backs are so hot right now' Financial Times, 23rd July 2019



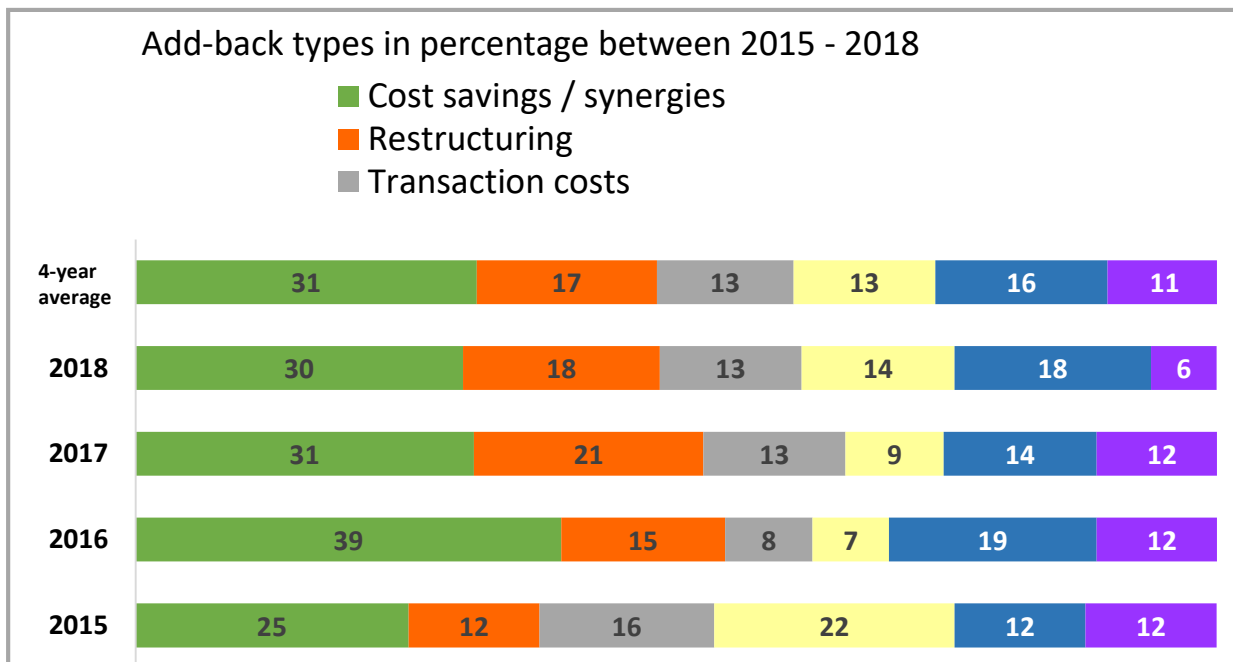
Source: S&P LCD

- EBITDA add-backs reduce stated leverage from 7.4x to 5.6x based on acquisitions in 2018.
- 43% of syndicated loan deals featured EBITDA add-backs in the first half of 2019.

Source: FT, EBITDA add-backs are so hot right now, 23rd July 2019, Jamie Powell

48% of EBITDA add-backs relate to cost savings, synergies and restructuring

On average, 48% of EBITDA Add-backs relate to cost savings, synergies and restructuring. Execution risk to deliver improved EBITDA is high, buyers of loans with significant add backs should factor this probability into expected returns. Rating agencies closely follow post acquisition cost and synergy metrics.



Source: Standard & Poor's Financial Services LLC

CLO first loss tranches have extreme risk profile

Leveraged Loan Market		→	CLO Market		
Rating	Weight		Rating	Tranche weight	Current Yield
BBB	2%		AAA	65%	3.5%
BB	30%		AA	10%	4.0%
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			BB	3.5%	9.0%
Unrated	5%		Equity	8.5%	12-15%

- Conversion of low rated loans into higher rated CLO tranches is executed by inserting an equity tranche and with rules, which re-direct bond cash flows from lower rated tranches to highest rated tranches in periods of weaker business conditions.
- Dilution of terms and conditions prevalent in many new loans acquired by CLO managers. Lower tranches have inherent leverage to default outcome and therefore equity tranches have extreme risk profile in recession.

Post crisis regulation shifted risk from banks to non-banks and institutional holders

Pro-cyclical legislation on leverage and limitations for regulated financials have reduced proprietary trading and it raises questions about liquidity and transparency under stress conditions.

Dodd-Frank Wall St Reform and Consumer Protection Act (July 21, 2010)

- Volcker rule, which limited proprietary trading
- Created the opportunity for non-bank financial institutions to increase capital offerings to PE funds

Basel III (December 2010)

- Basel III has had the largest impact on private debt funds
- By placing capital requirements on systemically important banks, Basel III restricted the lending of banks, and therefore expanded the market demand for non-bank sources of debt financing

Guidance on Leveraged Lending (March 2013)

- Introduced an upper limit of 6.0x EBITDA for leveraged loan issuance, further limiting banks' ability to participate in the leveraged loan market, while private debt funds were not bound by these restrictions
- 2017 decision by the Government Accountability Office rolled the guidelines back, allowing greater flexibility for banks in the leveraged loans space and creating greater competition for private debt funds deploying capital

Source: PitchBook, "Shifts in private debt since the Great Recession", Sept. 10th, 2019

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