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Barclays Bond-Level Measures of Liquidity:

Liquidity Cost Scores (LCS[®])

Price Impact Measure (PIM)

January 2019

Liquidity Cost Scores (LCS[®])

LCS: Liquidity Defined as Cost of Trading

- LCS measures the cost of an *immediate, institutional-size, round-trip* transaction, expressed as a percent of the bond's price
- LCS is computed in two different but conceptually identical ways:

$\text{OASD} \times (\text{Bid spread} - \text{Ask spread})$ *if quoted on spread*

or

$(\text{Ask price} - \text{Bid price})/\text{Bid price}$ *if quoted on price*

- Example
 - For a bond with an OASD of 5, a trader quotes a bid spread of 140bp and an ask spread of 125bp
 - Given the bid-ask spread of 15bp, the bond's $\text{LCS} = 5 \times 0.15 = 0.750\%$
 - In other words, an immediate, round-trip trade would cost 75bp of the bond's value
- LCS relies on simultaneous, bond-level, bid-ask quotes issued by Barclays traders
 - The quotes are mapped to bond-level indicative and analytical information
 - Econometric models are used to estimate LCS for bonds without trader quotes

Uniform Bond-Level Metric vs. Multiple Indirect Indicators

Investors and academics use various indicators/proxies of liquidity, such as:

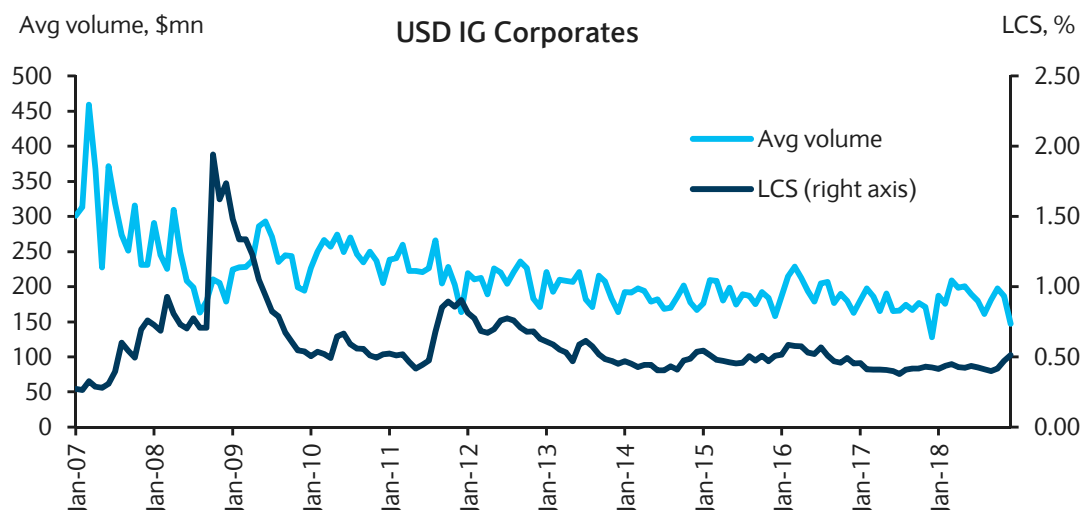
- Trading volume
- Issue size
- Age, maturity, etc.

Which do you expect to be the most liquid:

- a five-year old, \$300mn issue with OAS of 200?
- a two-year old, \$800mn issue with OAS of 400?
- a seasoned \$1bn issue with one year to maturity and OAS of 100?

For example –

Trading volume, a frequently used proxy for liquidity, and transaction costs are often decoupled



Source: Barclays Research, TRACE

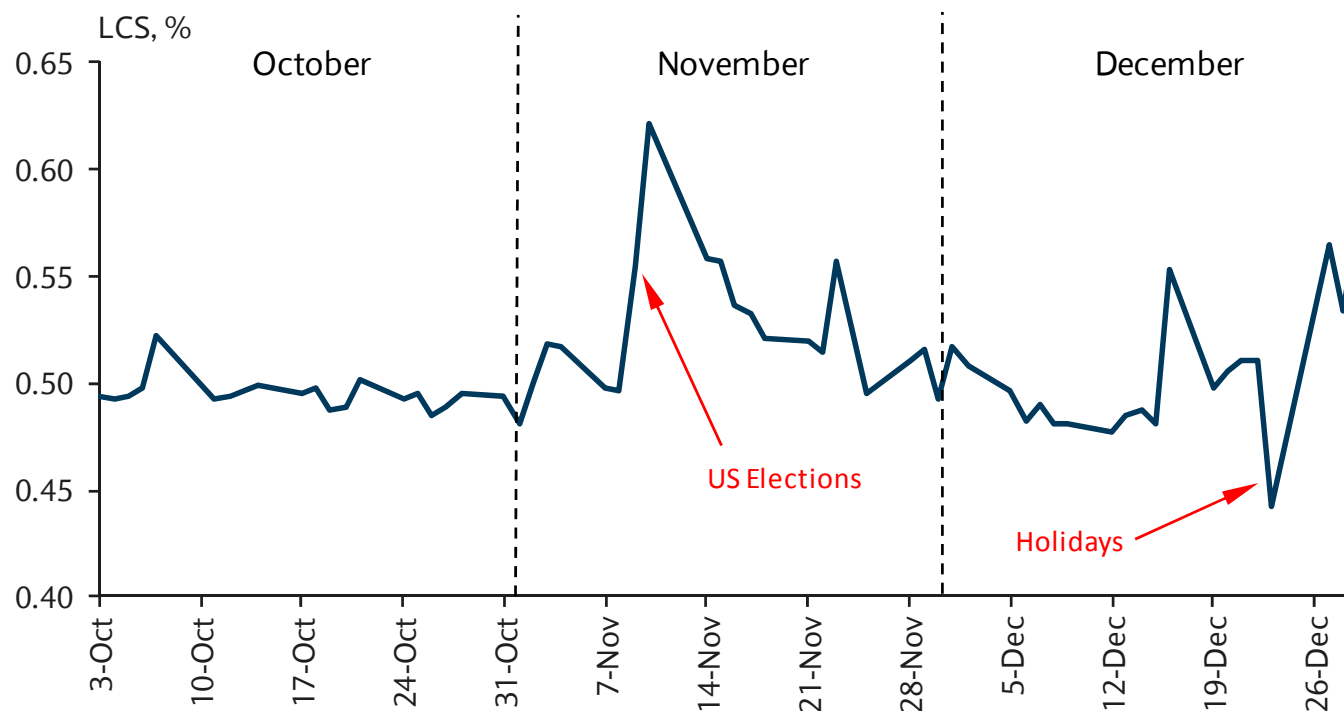
LCS Asset Class Coverage

- Launched in October 2009 for USD IG and HY corporate bonds (about 5,000 cusips at the time), with history available back to January 2007
- Currently, LCS is computed for more than 20,000 bonds

Index	Data since
USD Credit IG	Jan-07
USD Credit HY	Jan-07
USD IG Credit 144A (no registration rights)	Jan-07
USD Treasuries	Nov-09
USD TIPS	Jul-10
USD Fixed Rate Agency MBS	Mar-10
USD Emerging Markets	Feb-12
Pan Euro Credit IG	May-10
Pan Euro Credit HY	May-10
Pan Euro Credit FRN	May-10
GBP Corporate 100–200mm Amt Outstand	May-10
Pan Euro Agencies	May-10
Pan Euro Local Authorities	May-10
Pan Euro Treasuries	Feb-11
Pan Euro Inflation Linked	Mar-11
Global Covered Bonds	Sep-12
JPY Treasuries	Sep-13

- *LCS Extended Coverage Models* for non-index USD Credit and EM bonds, as well as for USD agency ABS and CMBS

Daily LCS: USD and EUR Corporates, USD Emerging Markets



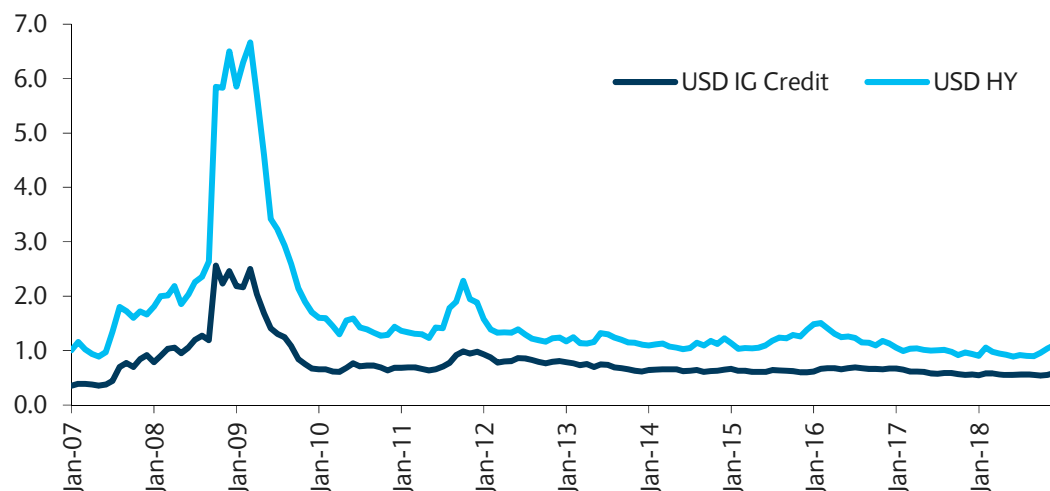
Source: Barclays Research

- Provide insights unavailable on the monthly basis (at best, delayed until month-end)
- Computed on liquid market segments consisting of actively-quoted bonds
- Approximate average daily bond universe
 - USD Corporate: 1,700 IG; 700 HY
 - EUR Corporate: 2,000 IG; 350 HY
 - USD EM: 1,200 IG; 500 HY

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LCS Applications: Analysis of Market Liquidity Trends

USD Credit, January 2007 – December 2018



HY LCS is consistently larger than IG LCS, confirming its higher risk and lower liquidity

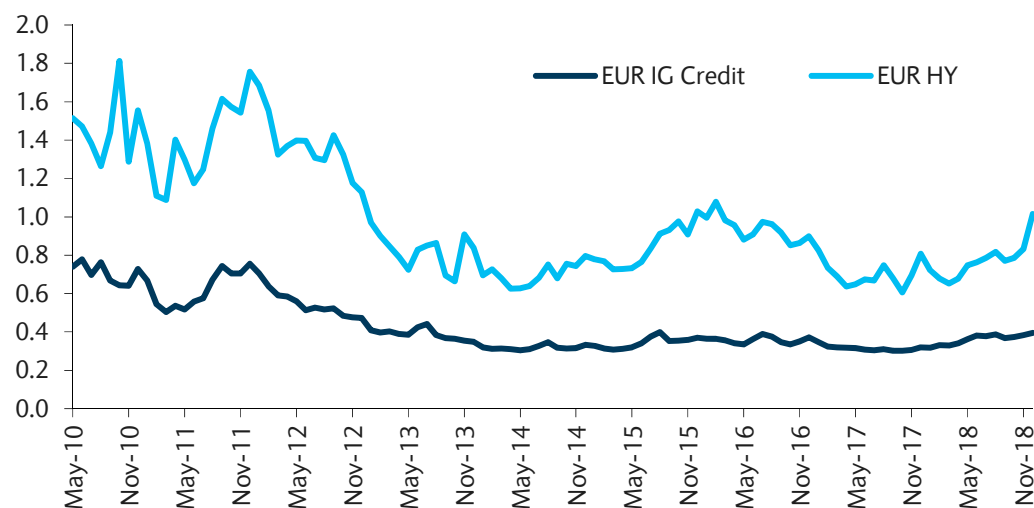
Both time series exhibit fluctuations consistent with investors' perceptions of liquidity conditions

Source: Barclays Research

Note:

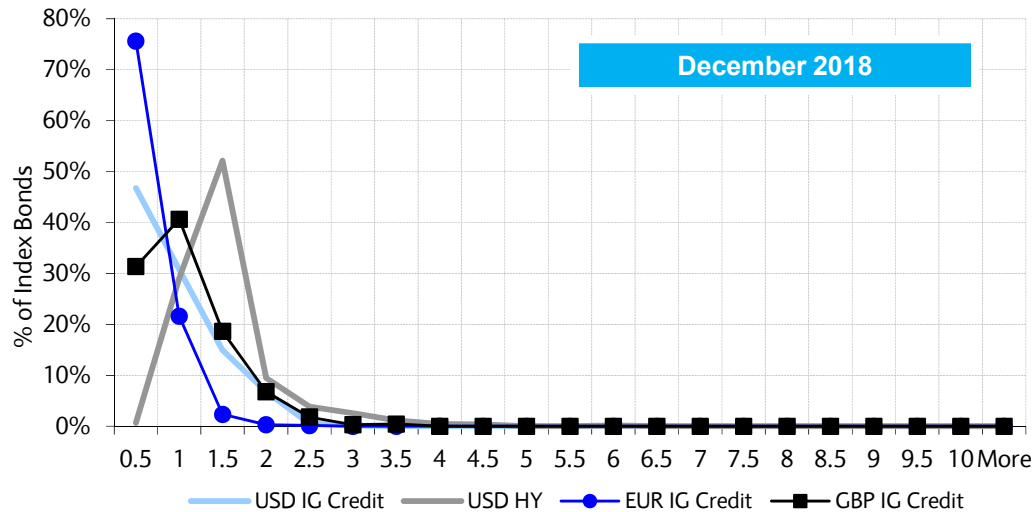
When comparing LCS across markets, it is important to take into consideration potentially different market attributes, eg, typical bond duration, age, issue size, etc.

EUR Credit, May 2010 – December 2018



Source: Barclays Research

LCS Applications: Cross-Sectional Market Liquidity Analysis



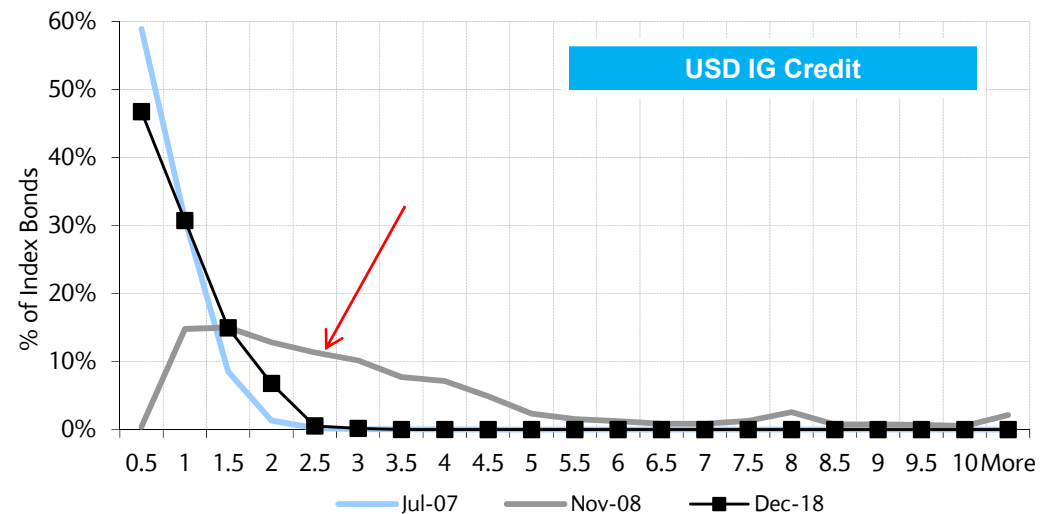
A more detailed picture of different markets – beyond aggregate LCS level comparisons

Source: Barclays Research

The frequency distribution highlights the high liquidity of 2007

A very different picture in Nov 2008

Since Nov 2008, the distributions have been drifting back to the 2007 pattern



Source: Barclays Research

LCS Applications: Insights into Drivers of Liquidity

Average LCS by Issue Size and Age. USD IG Credit

Maturity: 1-5 (41.7% MV)					Maturity: 5-10 (28.2% MV)				
Age, yr					Age, yr				
Size, \$mn	<1	1-5	5-7.5	7.5+	<1	1-5	5-7.5	7.5+	
<500	0.39	0.36	0.47	0.30	0.71	0.69		0.77	
500-750	0.34	0.31	0.39	0.25	0.65	0.64	0.73	0.90	
750-1,500	0.28	0.26	0.36	0.23	0.55	0.55	0.48	0.51	
1,500-2,000	0.26	0.21	0.42	0.19	0.51	0.47			
2,000-3,000	0.22	0.21	0.35	0.22	0.40	0.43			
>3,000	0.20	0.19	0.32		0.41	0.36			

Maturity: 10+ (30.1% MV)					Maturity: All				
Age, yr					Age, yr				
Size, \$mn	<1	1-5	5-7.5	7.5+	<1	1-5	5-7.5	7.5+	
<500	1.29	1.43	1.38	1.15	0.81	0.84	0.77	0.90	
500-750	1.15	1.36	1.33	1.16	0.66	0.72	0.74	0.81	
750-1,500	0.98	1.18	1.20	1.11	0.53	0.55	0.63	0.75	
1,500-2,000	0.82	0.99	1.16	0.99	0.52	0.48	0.60	0.70	
2,000-3,000	0.85	0.95		0.94	0.38	0.48	0.56	0.69	
>3,000	0.79	0.84			0.41	0.38	0.43	0.60	

Buckets with fewer than 10 bonds are not shown

Predictable gradients:

Bond age - Newer issues are more liquid

Outstanding – Larger issues are more liquid

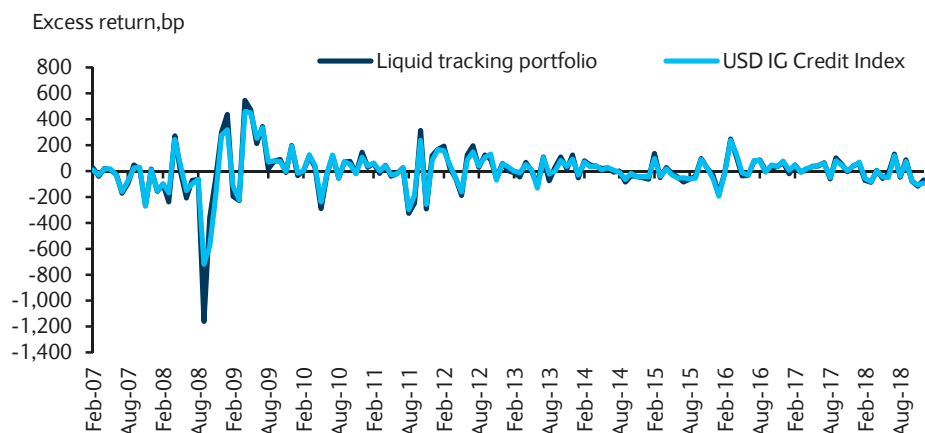
Source: Barclays Research

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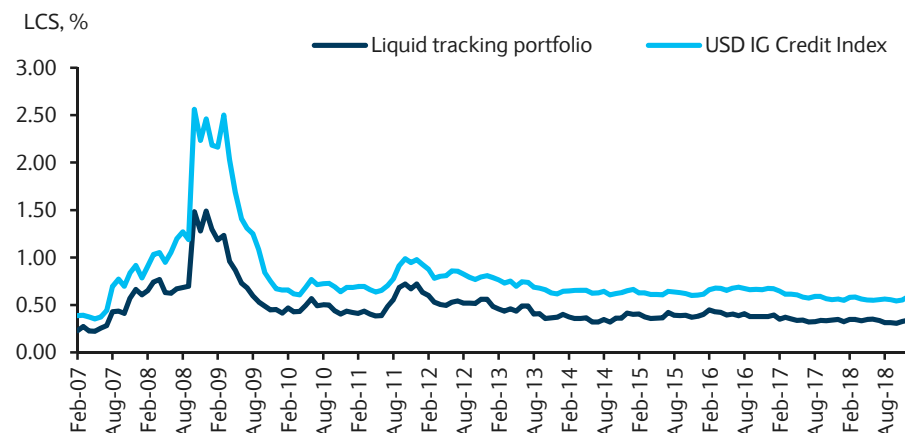
LCS Applications: Structuring Liquid Tracking Portfolios

	USD Credit	USD Long Credit	USD Corporate	EUR Credit	EUR Corporate	USD EM Corp
Inception	Feb-07	Feb-07	Feb-07	Jun-10	Aug-10	Feb-12
# of bonds	50	36	50	48	40	28
Rebalancing	Monthly	Monthly	Quarterly	Monthly	Quarterly	Monthly
	Dec 2018			Dec 2018		
LCS	0.342	0.727	0.516	0.220	0.249	0.647
Index LCS	0.588	1.074	0.634	0.394	0.369	0.864
	Since January 2009			Since inception		
Avg. monthly TE	-1.6	1.7	-1.4	1.5	-1.4	-8.3
TEV	50.1	37.7	49.9	12.3	24.4	47.0
Index ExcRet Vol	142.5	241.4	160.6	75.3	85.5	141.3

Source: Barclays Research



Source: Barclays Research



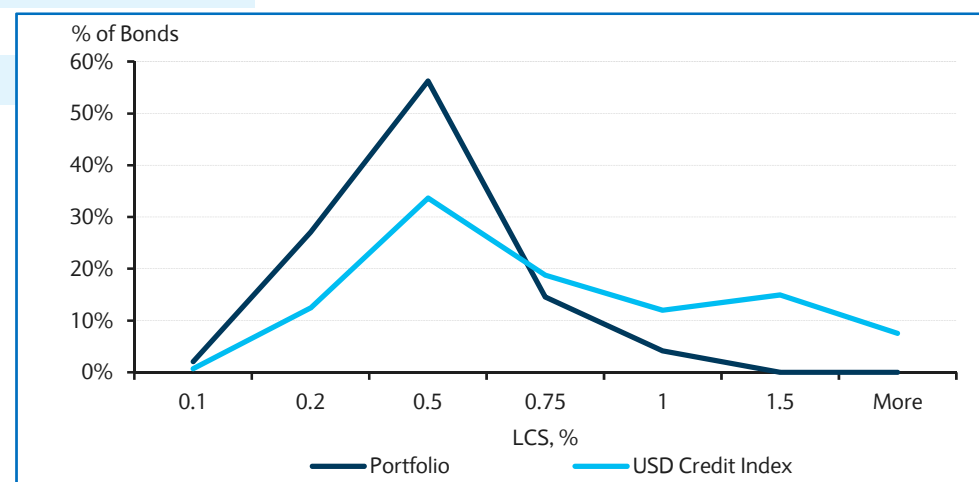
Source: Barclays Research

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LCS Applications: Portfolio vs. Benchmark Comparisons

	Market Value [%]		Liquidity Cost Score [%]		DTS	
	Portfolio	USD Credit	Portfolio	USD Credit	Portfolio	USD Credit
12/31/2018			0.342	0.587	11.51	11.87
SUPRANATIONAL	2.99	5.05	0.188	0.186	1.15	0.34
SOVEREIGN	9.43	3.19	0.369	0.514	20.71	15.76
AGENCIES	9.79	7.96	0.136	0.381	1.88	9.09
INDUSTRIAL	50.45	50.41	0.380	0.640	13.50	13.97
UTILITY		6.05		1.045		15.37
FINANCIAL	27.34	27.35	0.354	0.531	9.23	9.70
5/31/2018			0.348	0.554	9.25	9.35
SUPRANATIONAL		5.22		0.183		0.23
SOVEREIGN	5.50	3.17	0.393	0.546	21.43	14.48
AGENCIES	13.98	8.20	0.172	0.426	1.61	7.64
INDUSTRIAL	50.73	50.73	0.410	0.613	10.74	10.94
UTILITY	3.01	5.90	0.713	0.981		
FINANCIAL	26.78	26.78	0.273	0.461		

Source: Barclays Research



Source: Barclays Research

LCS Applications: Portfolio Optimization

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Portfolio Explorer

As of 1/9/2018

Benchmark (none)
Base Currency USD
Partition (none)
Scenario Result Set (none)
Access Read-only for Others
Pricing Set Private,BarCap,BarCap No...

Positions [100 positions]
Summary
Transaction History
Scenario Analysis
Cashflows
Risk Model
Optimizer
New Help
Optimizer Report 1
Performance Attribution
Performance
Reports
Notes & Attachments

Currency: USD - United States Dollar **As of:** ☒ Previous Close ☐ [] **Run** **Cancel**

Benchmark: US Credit Corp (System) **Faq** **Help**

Asset Allocation Benchmark: None ☒ Commit Trades after Run

Profile: DefaultProfile*

Tradable Universe Options

No.	Name	Type	Trade/Buy/Sell	Long/Short
1	Initial Portfolio	Initial Portfolio	Buy and Sell	Long Only

Risk Model Options Monthly, Weighted, Basis Points

Normalization
☒ Returns (bps) ☐ P&L (currency) ☐ Benchmark MV ☒ Do not scale ☐ Scale (Amount) ☐ Scale (Percent) **ScaleTo:**

Objectives (Robust Optimization available)
☒ Minimize ☐ Maximize

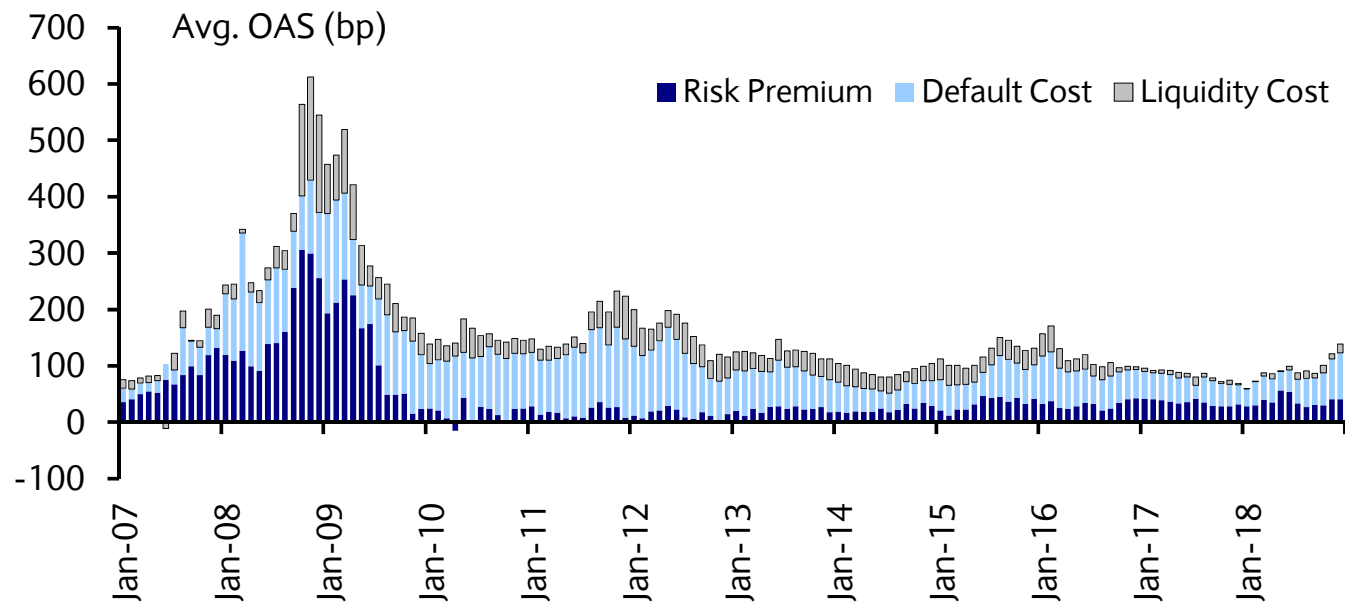
No.	Attribute	Measure	Weight	Unit	Initial Value
1	Liquidity Cost Score			1.000 decimal	

Common Constraints
Final Portfolio Cash (base currency): ☐ Long/Short ☒ Long Only ☐ Short Only ☐ No Cash

Ready

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LCS Applications: Spread Decomposition



Source: Barclays Research

- Spreads are largely explained by three variables: a market-wide risk premium; expected default cost; and (il)liquidity premium
- Application examples:
 - Buy-and-hold investors can ride out periods of low liquidity and high market risk. But if the wide spreads owe to an increase in expected default losses, they may take action
 - Active managers may take short-term exposure to bonds with a high default component but avoid those with a high liquidity component

Relative Liquidity Metric: Trade Efficiency Score (TES)

- LCS is an absolute measure of liquidity
 - Difficult to compare bonds' relative liquidity across diverse market environments
- TES is a bond-level, *intra-market*, relative liquidity rank, combining cost and flow:
 - Transaction cost per unit of duration; and
 - Trading volume
- Each month, bonds are sorted into LCS quintiles (1 lowest – 5 highest) and volume deciles (1 highest – 10 lowest); and mapped onto one TES score ranging from 1 (best) to 10 (worst)

LCS Quintile + Trading Volume Decile	TES
2 and 3	1
4 and 5	2
6	3
7	4
8	5
9	6
10	7
11	8
12	9
13-15	10

TES Buckets Statistics, USD Corporate Index, Dec 2018

Vol Decile + LCS Quintile	TES	# bonds	# bonds %	MV %	Age, yr	Issue size mn	OAS, bp	OASD	LCS, %	Vol, mn
2 and 3	1	803	13.77	29.25	2.5	1,880	154	8.06	0.505	177
4 and 5	2	743	12.74	16.19	3.3	1,113	146	6.84	0.546	54
6	3	493	8.45	9.32	4.4	960	156	6.69	0.650	50
7	4	493	8.45	8.12	4.2	831	155	6.17	0.616	32
8	5	468	8.03	7.00	4.7	756	157	7.02	0.698	22
9	6	528	9.06	6.83	4.7	649	148	6.81	0.696	15
10	7	538	9.23	6.52	5.2	604	150	6.80	0.703	10
11	8	502	8.61	5.28	5.7	522	156	7.35	0.785	6
12	9	450	7.72	4.47	6.5	485	157	7.39	0.873	4
13-15	10	813	13.94	7.00	7.5	415	161	7.42	0.913	2

LCS is Not a Research Offering from the Regulatory Standpoint

Quantitative Portfolio Strategies

- QPS Abstracts
- QPS FICC
- QPS Equity

← Research publications

QPS Analytics

White Papers

Periodic Reports

LCS (Liquidity Cost Scores) Weekly

LCS (Liquidity Cost Scores) Monthly

Data

LCS (Liquidity Cost Scores) Daily

LCS (Liquidity Cost Scores) Monthly

LCS (Liquidity Cost Scores) Annual

← Data and reports (paid subscription)

Monthly LCS Data

- On the first business day of each month, a new file is ready for download
- Two delivery platforms: Dedicated SFTP and Barclays Live download

31-Dec-18								
Contact: Vadim Konstantinovsky, vkonstan@barclays.com								
ISIN	CUSIP	LCS	TESUSDCORP	TESUSDHY	TESEURCORP	TESEURHY	TESUSDEM	TESCOV
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G2SF 4.5 2010 Mtge	GNB04410	0.076149577						

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Source: Barclays Research

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Daily LCS Data

Each Monday morning, the previous week's data are ready for download: USD and EUR Corp, USD EM

Barclays Liquidity Cost Scores (LCS®), %

Contact: Vadim Konstantinovskiy, vkonstan@barclays.com

14-Jan-19

Date	Investment Grade USD Corporates									High Yield USD Corporates								
	All	Industry sectors					Quality ratings			All	Industry sectors					Quality ratings		
	Financial	Basic	Industry	Consumer	Technology	Energy & Utility	Aaa-Aa	A	Baa	Financial	Basic	Industry	Consumer	Technology	Energy & Utility	Ba	B	Caa-C
11/15/2018	0.500	0.500	0.664	0.458	0.459	0.514	0.368	0.455	0.555	0.948	0.817	0.938	0.915	0.929	1.246	0.855	0.913	1.339
11/16/2018	0.476	0.434	0.671	0.418	0.477	0.506	0.336	0.419	0.534	0.949	0.811	0.963	0.923	0.927	1.110	0.863	0.950	1.256
11/19/2018	0.457	0.374	0.634	0.423	0.540	0.524	0.354	0.398	0.534	0.944	0.828	0.958	0.915	0.902	1.082	0.871	0.928	1.251
11/20/2018	0.463	0.389	0.655	0.421	0.565	0.490	0.344	0.409	0.540	0.920	0.884	0.939	0.894	0.838	1.142	0.851	0.883	1.278
11/21/2018	0.589	0.584	0.706	0.460	0.744	0.349	0.495	0.577	0.613	0.952	0.853	0.954	0.903	0.909	1.130	0.861	0.944	1.254
11/23/2018	0.398	0.436	0.575	0.264	0.281		0.247	0.362	0.478	1.050	0.885	0.996	0.999		1.171	0.926	1.041	1.681
11/26/2018	0.507	0.453	0.661	0.462	0.549	0.540	0.423	0.452	0.566	0.910	0.836	0.907	0.915	0.833	1.121	0.836	0.911	1.187
11/27/2018	0.528	0.479	0.682	0.424	0.654	0.540	0.451	0.481	0.575	0.903	0.852	0.932	0.886	0.814	1.162	0.830	0.884	1.222
11/28/2018	0.502	0.450	0.652	0.403	0.593	0.540	0.415	0.447	0.566	0.932	0.853	0.975	0.902	0.877	1.167	0.850	0.935	1.222
11/29/2018	0.527	0.469	0.650	0.407	0.709	0.538	0.485	0.468	0.579	0.905	0.875	0.973	0.874	0.805	1.182	0.852	0.893	1.178
11/30/2018	0.506	0.407	0.642	0.413	0.703	0.511	0.456	0.426	0.571	0.881	0.880	0.928	0.868	0.803	1.244	0.837	0.850	1.160
12/3/2018	0.562	0.601	0.707	0.493	0.545	0.558	0.477	0.558	0.581	0.903	0.903	0.929	0.864	0.831	1.117	0.858	0.886	1.156
12/4/2018	0.558	0.582	0.684	0.469	0.579	0.535	0.469	0.536	0.592	0.863	0.919	0.890	0.834	0.811	1.009	0.842	0.850	1.010
12/6/2018	0.602	0.484	0.758	0.571	0.740	0.718	0.496	0.523	0.693	0.953	0.931	1.024	0.891	0.906	1.160	0.896	0.947	1.207
12/7/2018	0.533	0.396	0.778	0.481	0.769	0.547	0.442	0.444	0.631	0.959	0.953	0.957	0.937	0.877	1.254	0.915	0.921	1.383
12/10/2018	0.528	0.452	0.739	0.466	0.609	0.601	0.410	0.476	0.604	0.913	0.938	0.953	0.863	0.874	1.050	0.880	0.896	1.110
12/11/2018	0.489	0.450	0.705	0.455	0.390	0.598	0.355	0.437	0.560	0.900	0.939	0.895	0.843	0.849	1.165	0.851	0.873	1.175
12/12/2018	0.455	0.358	0.749	0.429	0.392	0.575	0.318	0.378	0.541	0.887	0.929	0.887	0.848	0.836	1.119	0.854	0.853	1.155
12/13/2018	0.493	0.403	0.686	0.441	0.578	0.580	0.414	0.432	0.558	0.893	0.923	0.893	0.852	0.828	1.114	0.860	0.869	1.124
12/14/2018	0.540	0.463	0.712	0.459	0.600	0.611	0.427	0.519	0.581	0.895	0.869	0.910	0.870	0.853	1.037	0.843	0.877	1.174
12/17/2018	0.526	0.398	0.770	0.511	0.599	0.593	0.418	0.456	0.599	0.903	0.869	1.014	0.892	0.838	1.002	0.848	0.896	1.159
12/18/2018	0.494	0.402	0.554	0.509	0.600	0.494	0.423	0.428	0.561	0.952	0.902	1.064	0.894	0.879	1.296	0.878	0.921	1.312
12/19/2018	0.529	0.409	0.724	0.504	0.613	0.606	0.425	0.461	0.602	0.952	0.907	1.127	0.908	0.900	1.099	0.889	0.952	1.242
12/20/2018	0.548	0.447	0.742	0.557	0.624	0.498	0.482	0.455	0.627	1.037	1.002	1.106	1.011	1.021	1.271	0.955	1.024	1.406
12/21/2018	0.597	0.424	0.798	0.638	0.761	0.489	0.576	0.465	0.705	1.055	1.025	1.045	1.022	1.084	1.081	0.967	1.081	1.367
12/24/2018	0.930	0.784	0.794	1.033	0.641		0.637	0.718	1.027	1.053	1.026	0.916	0.966	1.214		0.967	1.051	1.293
12/26/2018	0.584	0.316	0.814	0.918	0.662	1.073	0.393	0.481	0.740	1.158	0.755	1.115	1.074	1.160	2.288	1.017	1.138	1.799
12/27/2018	0.704	0.673	0.954	0.346	0.870	1.091	0.777	0.634	0.751	1.153	0.882	1.079	1.080	1.187	2.283	1.063	1.137	1.763
12/28/2018	0.786	0.798	0.839	1.080	0.604	0.696	0.697	0.737	0.822	1.114	0.920	1.117	1.039	1.158	2.303	0.981	1.125	1.502
12/31/2018	0.487	0.448	0.858	0.300	0.549	0.700	0.355	0.440	0.564	1.114	1.029	1.168	1.051	1.083	1.252	0.986	1.145	1.507
1/2/2019	0.567	0.483	0.850	0.575	0.604	0.598	0.454	0.507	0.640	1.083	1.016	1.111	1.031	1.070	1.235	0.987	1.102	1.435
1/3/2019	0.555	0.502	0.746	0.519	0.598	0.581	0.462	0.509	0.614	1.031	0.985	1.066	0.985	1.026	1.158	0.962	1.033	1.312
1/4/2019	0.563	0.510	0.731	0.538	0.599	0.592	0.457	0.514	0.626	1.049	0.961	1.085	1.011	1.035	1.273	0.961	1.058	1.364
1/7/2019	0.551	0.485	0.734	0.530	0.597	0.605	0.456	0.499	0.612	1.004	0.949	0.998	0.963	1.020	1.215	0.932	1.013	1.244
1/8/2019	0.551	0.484	0.757	0.537	0.592	0.593	0.445	0.495	0.618	0.970	0.911	1.024	0.929	0.936	1.111	0.907	0.969	1.270
1/9/2019	0.558	0.513	0.745	0.523	0.592	0.570	0.458	0.513	0.611	0.949	0.894	1.002	0.915	0.909	1.098	0.888	0.951	1.215
1/10/2019	0.557	0.500	0.717	0.536	0.595	0.605	0.458	0.500	0.623	0.942	0.879	0.999	0.917	0.898	1.123	0.897	0.927	1.195
1/11/2019	0.553	0.541	0.750	0.519	0.554	0.533	0.492	0.512	0.595	0.918	0.860	1.000	0.866	0.854	1.118	0.879	0.910	1.123

Source: Barclays Research

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Market Liquidity Monitors and Liquidity-Related Research



Quantitative Portfolio Strategy
24 July 2015

Measuring Bond-Level Liquidity: Liquidity Cost Scores (LCS)

- In 2009, Barclays introduced Liquidity Cost Scores (LCS) for USD credit bonds, a bond-level liquidity measure. LCS is defined as the cost of a standard, institutional-size, round-trip transaction and is expressed as a percentage of the bond's price. LCS can be aggregated across bonds in a portfolio, as well as compared over time and vs. a

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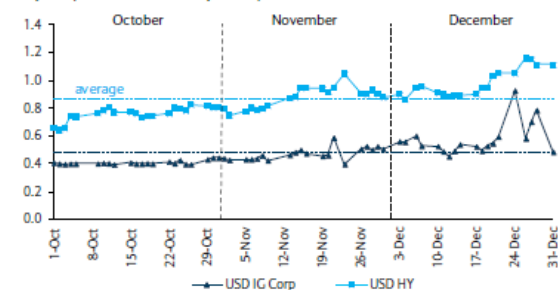
- Today, Barclays has a total amount of
- LCS has a relative ranking in the desk investment strategies
- For some of the relative ranking from 1 (best) to 10 (worst) liquidity cost
- This report introduces LCS methodology



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LCS® Report – December 2018

FIGURE 1
Daily LCS, USD IG and HY Corporates, %



Daily LCS are computed using a universe of the most-frequently quoted bonds that do not undergo any model adjustments, unlike many bonds in broad indices, which see much less activity. Hence, Daily LCS tend to be lower than the monthly values reported in Figure 2.

Source: Unless stated otherwise, the source for all figures is Barclays Research.

The usual holiday season slowdown in December was reflected in higher LCS across credit markets in the US and Europe (Figure 2). Trading volume was significantly lower with the declines ranging from 20 to 50% (Figure 5).

There was also a very significant deterioration of liquidity in the European government debt markets, especially inflation-linked (Figure 6). The two most liquid nominal government debt markets in Europe were Germany and France (Figure 7).

FIGURE 2
LCS for Various Markets, by Sector, %

	Current Month	-1m	-3m
USD IG Credit Index*	0.587	0.552	0.556
Industrials	0.640	0.607	0.606
Utilities	1.045	0.962	1.010
Financial Institutions	0.531	0.471	0.473
Non-corporate	0.346	0.365	0.370
USD HY Index	1.103	1.040	0.899
Industrials	1.110	1.051	0.904
Utilities	1.035	1.030	0.871
Financial Institutions	1.047	0.936	0.862
USD EM Index	0.722	0.696	0.730
Non-corporate	0.676	0.654	0.689
Industrials	0.881	0.822	0.810
Financial Institutions	0.829	0.819	1.010
EUR IG Credit Index	0.394	0.384	0.367
Industrials	0.394	0.386	0.373
Utilities	0.401	0.405	0.409
Financial Institutions	0.329	0.315	0.334
Non-corporate	0.455	0.443	0.381
EUR HY Index	1.015	0.832	0.770
Industrials	1.071	0.867	0.788
Utilities	0.742	0.571	0.662
Financial Institutions	0.801	0.708	0.710
Global Covered Bonds	0.227	0.217	0.238

* Throughout this report, "index" refers to Bloomberg Barclays bond indices

Current and historical bond-level LCS and TES data are available for download with an annual subscription. Please contact us for details.



Quantitative Portfolio Strategy
Analytics
7 January 2019

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Weekly LCS Monitor, December 31-January 4

NEW: We are introducing Daily LCS for USD Emerging Markets (page 3)

USD Corporates

FIGURE 1
Daily LCS, USD IG and HY Corporates, %

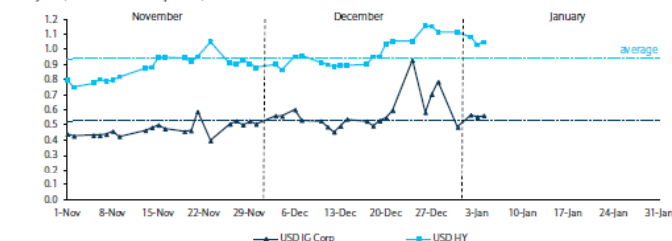


FIGURE 2
Daily LCS and Bond Universe Statistics, USD IG and HY Corporates

	1-Jan	2-Jan	3-Jan	4-Jan
# bonds	1,196	1,300	1,073	1,815
Financial	609	645	621	553
Basic Indust.	129	183	213	213
Consumer	234	490	438	461
Technology	6	317	319	317
Energy & Util.	218	265	282	271
Aaa-Aa	105	193	188	187
A	512	703	699	651
Baa	579	1,004	986	977
Avg LCS	0.487	0.567	0.555	0.563
Financial	0.448	0.483	0.502	0.510
Basic Indust.	0.858	0.850	0.746	0.721
Consumer	0.300	0.575	0.519	0.538
Technology	0.549	0.604	0.598	0.599
Energy & Util.	0.700	0.598	0.581	0.592
Aaa-Aa	0.355	0.454	0.462	0.457
A	0.440	0.507	0.509	0.514
Baa	0.564	0.640	0.614	0.626
MMV	60.1%	37.5%	37.3%	35.3%
Basic Indust.	7.8%	6.7%	8.3%	8.4%
Consumer	18.2%	25.4%	22.6%	24.3%
Technology	0.8%	20.3%	20.9%	21.3%
Energy & Util.	13.1%	10.1%	10.9%	10.6%
Aaa-Aa	8.8%	11.5%	11.7%	11.8%
A	47.3%	38.8%	39.4%	38.4%
Baa	44.0%	49.7%	48.9%	49.7%
Financial	4.2%	10.0%	10.1%	10.4%
Basic Indust.	15.3%	16.2%	14.8%	16.7%
Consumer	34.6%	32.1%	32.5%	32.7%
Technology	27.3%	27.3%	30.5%	31.5%
Energy & Util.	18.5%	14.4%	12.2%	8.8%
Ba	46.0%	48.3%	47.3%	46.1%
B	42.4%	40.9%	41.4%	42.3%
Baa	11.6%	10.8%	11.3%	11.6%

Note: Daily LCS are computed using a universe of the most-frequently quoted bonds that do not undergo any model adjustments, unlike many bonds in broad indices, which see much less activity. Hence, Daily LCS tend to be lower than monthly values. See *Introducing Daily LCS*, February 2015, Barclays Cross Asset Research.



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Market Liquidity Monitors and Liquidity-Related Research

References (Available on Barclays Live)

Dastidar, S., and B. Phelps, October 2009, Introducing LCS – Liquidity Cost Scores for US Credit Bonds, Barclays Cross Asset Research

Edelstein, A., S. Dastidar, and B. Phelps, April 2010, Tradable Credit Portfolio (TCX) to Track the USD IG Credit Index, Barclays Cross Asset Research

Edelstein, A., S. Dastidar, and B. Phelps, June 2010, Long Tradable Credit Portfolio (LTCX) to Track the USD IG Long Credit Index, Barclays Cross Asset Research

Dastidar, S., and B. Phelps, July 2010, Decomposing Bond-Level Credit OAS into Default and Liquidity Components, Barclays Cross Asset Research

Dastidar, S., A. Edelstein, and B. Phelps, September 2010, Liquidity Cost Scores (LCS)TM for Pan-European Credit Bonds, Barclays Cross Asset Research

Edelstein, A., S. Dastidar, B. Phelps, A. Desclee, and S. Polbennikov, February 2011, Obtaining Euro Credit Beta, Barclays Cross Asset Research

A Case Study: Constructing and Testing an Alpha Strategy Using LCS, June 2011, LCS Report, Barclays Cross Asset Research

LCS Application: LCS-Adjusted Tail Risk, August 2011, LCS Report, Barclays Cross Asset Research

Phelps, B., and A. Edelstein, February 2012, High Yield Investing – Manager Performance Drag from Uncompensated Transaction Costs, Barclays Cross Asset Research

A Case Study: Corporate-Treasury Liquidity Convergence in Europe, March 2012, LCS Report, Barclays Cross Asset Research

A Case Study: Dependence of Liquidity on Bond Age, April 2012, LCS Report, Barclays Cross Asset Research

Konstantinovskiy, V., and B. Phelps, May 2012, Implications of Constrained Broker/Dealer Inventories for Corporate Market Liquidity, Barclays Cross Asset Research

Liquidity Cost Scores for USD Emerging Markets, May 2012, LCS Report, Barclays Cross Asset Research

Konstantinovskiy, V., and B. Phelps, February 2013, Liquidity Cost Scores (LCS)TM for Global Covered Bonds, Barclays Cross Asset Research

A Case Study: The Relationship between LCS Level and LCS Volatility, June 2013, LCS Report, Barclays Cross Asset Research

The New Methodology for the USD EM Corporate TCX, March 2014, LCS Report, Barclays Cross Asset Research

Konstantinovskiy, V., and B. Phelps, September 2014, Corporate Liquidity across Markets, Barclays Cross Asset Research

Konstantinovskiy, V., and B. Phelps, March 2015, Liquidity and Market Efficiency: Cash Corporates, ETFs, and CDX, Barclays Cross Asset Research

Konstantinovskiy, V., K. Y. Ng, and B. Phelps, July 2015, Measuring Bond-Level Liquidity: Liquidity Cost Scores (LCS), Barclays Cross Asset Research

Konstantinovskiy, V., K. Y. Ng, and B. Phelps, October 2015, A Price Impact Measure of Corporate Bond Liquidity: PIM, Barclays Cross Asset Research

Konstantinovskiy, V., and B. Phelps, October 2015, A Note on Daily LCS and the Recent Market Volatility, Barclays Cross Asset Research

Estimating Return Impact of Portfolio Redemptions, Presentation at 2016 Insurance CIO Conference, January 2016

Konstantinovskiy, V., K. Y. Ng, and B. Phelps, February 2016, Estimating Return Impact of Corporate Bond Portfolio Redemptions, Barclays Cross Asset Research

Desclee, A., V. Konstantinovskiy, K. Y. Ng, and B. Phelps, September 2016, Corporate Managers' Performance in a Period of Diminished Liquidity, Barclays Cross Asset Research

Konstantinovskiy, V., and B. Phelps, October 2016, Liquidity Dynamics of Newly Issued Bonds, Barclays Cross Asset Research

Konstantinovskiy, V., November 2017, Liquidity: Barclays Bond-Level Liquidity Measure - LCS, US Credit Alpha, Credit Research

Hyman, J., and V. Konstantinovskiy, June 2018, Liquidity Dispersion in the USD IG and HY Corporate Market, Barclays Cross Asset Research

Konstantinovskiy, V., September 2018, In Brief: Barclays Bond-Level Liquidity Measure - LCS[®], Barclays Cross Asset Research

Journal Articles

Dastidar, S., and B. Phelps, "Credit Spread Decomposition: Decomposing Bond-Level Credit OAS into Default and Liquidity Components," Journal of Portfolio Management, Spring 2011

Konstantinovskiy, V., S. Laipply, and B. Phelps, "Liquidity and Market Efficiency: Cash Corporates, ETFs and CDX", Journal of Index Investing, Spring 2016

Konstantinovskiy, V., K. Y. Ng, and B. Phelps, "Measuring Bond-Level Liquidity," Journal of Portfolio Management, Summer 2016

Konstantinovskiy, V., and B. Phelps, "Quantitative Measures of Bond Liquidity", Society of Actuaries, Risk & Rewards Newsletter, Issue 68, August 2016

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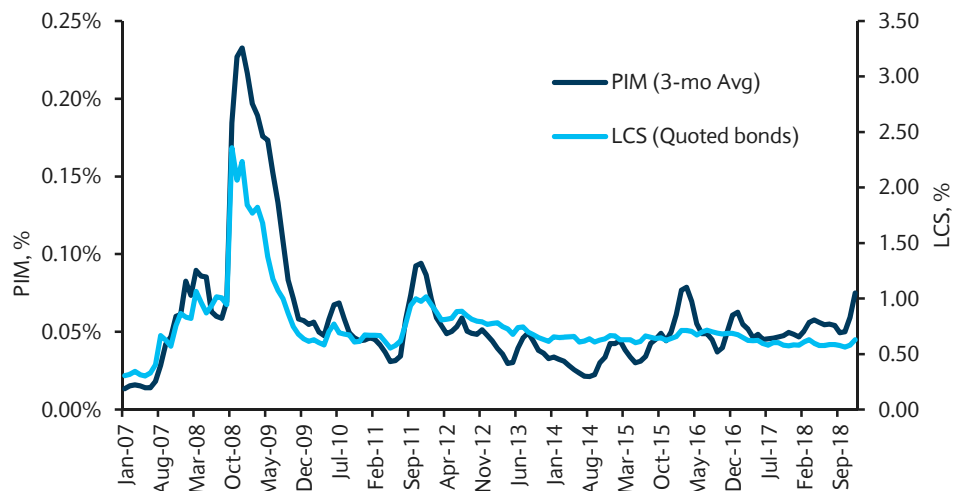
Price Impact Measure (PIM)

PIM: Liquidity Defined as Market Impact

- Liquidity is a broad term with many interpretations
 - One measure may not be sufficient
 - Unchanged bid-ask spreads = unchanged liquidity?
- LCS quantifies liquidity by measuring explicit transaction costs
- LCS may remain stable while a bond's price becomes more sensitive to trade size
- PIM quantifies liquidity by measuring a bond's price move (relative to the market) per dollar amount traded - a bond with a higher PIM is considered less liquid
- PIM and LCS measure liquidity from different perspectives, independently of each other
- Bond-level PIM is computed using bond prices and TRACE-reported volume

PIM and LCS Complement and Corroborate Each Other

USD IG Corp: PIM & LCS, January 2007 – December 2018



Source: Barclays Research

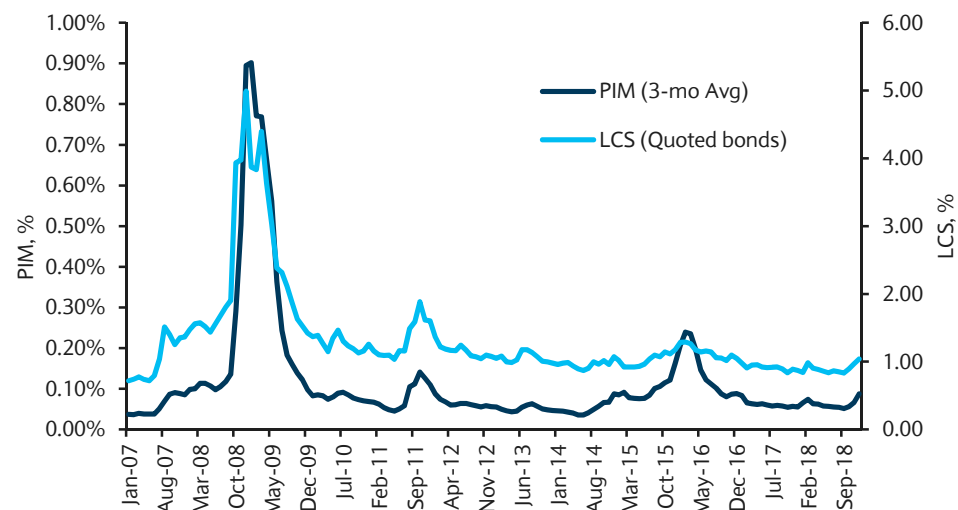
December 2018 Investment Grade universe:

~5,000 bonds

Investment Grade LCS and PIM correlation:

0.93; 0.75 in changes

USD HY: PIM & LCS, January 2007 – December 2018



Source: Barclays Research

December 2018 High Yield universe:

~2,000 bonds

High Yield LCS and PIM correlation:

0.92; 0.62 in changes

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Bond-Level PIM Calculation

- We compute a bond's daily excess return net of the duration-matched USD Corporate Index excess return
- Every day, we total the TRACE volume (Tvol) for each bond (as long as it is above \$1mn)
- Then, we divide the absolute value of the bond's net excess return by its volume in millions

$$R_t = |Daily\ Net\ ExRet_t| / Tvol_t$$

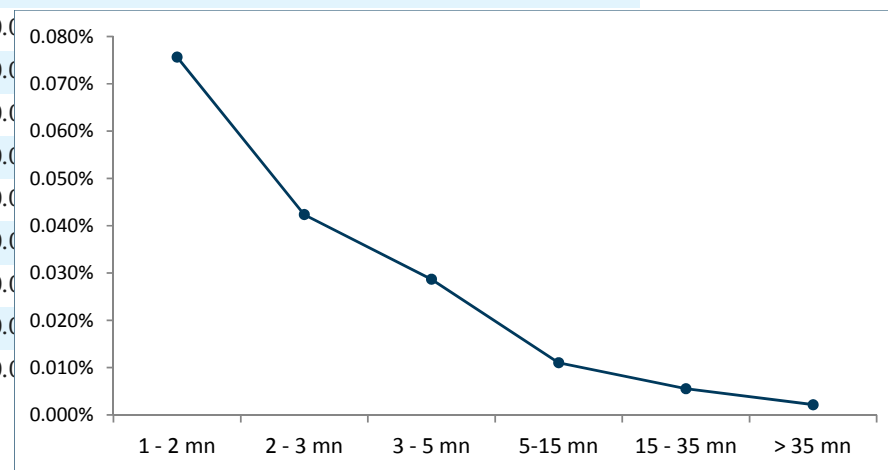
- For each bond, these daily rates are averaged for the month and become the bond's PIM

$$PIM = (1/n) \times \sum R_t$$

- Example: a PIM of 0.0005 means that, on average, the bond's excess return relative to the market (index) was 5bp per \$1mn traded
- For a bond with OASD of 5, this corresponds to a 1bp move in spread vs. the market

PIM “Vector”

USD IG Corporates, December 2018			Trading Volume Buckets					
Cusip	Ticker	Overall PIM	1 - 2 mn	2 - 3 mn	3 - 5 mn	5-15 mn	15 - 35 mn	> 35 mn
00206REP	M	0.0025%	0.0113%	0.0033%	0.0039%	0.0009%	0.0021%	0.0004%
00440EAT	DISCA	0.0301%	0.0463%	0.0588%	0.0036%	0.0037%	0.0024%	0.0020%
00287YAT	TEVA	0.0062%	0.0410%	0.0028%	0.0105%	0.0034%	0.0018%	0.0007%
00772BAR	ENBCN	0.0308%	0.1436%	0.0126%	0.0230%	0.0065%	0.0019%	0.0021%
00507UAT	EMBRBZ	0.0317%	0.0941%	0.0805%	0.0530%	0.0295%	0.0193%	0.0023%
02209SAR	AEE	0.0620%	0.1122%	0.1215%	0.0156%	0.0274%	0.0081%	0.0008%
00912XAY	VIA	0.0501%	0.0977%	0.0148%	0.0511%	0.0355%	0.0048%	0.0008%
0258M0EK	AMGN	0.0039%	0.0162%	0.0028%	0.0048%	0.0031%	0.0010%	0.0012%
023135BG	AMXLMM	0.0306%	0.0752%	0.0461%	0.0600%	0.0235%	0.0108%	0.0047%
026874DL	HSBC	0.0815%	0.3969%	0.0354%	0.0467%	0.0367%	0.0198%	0.0008%
02665WAH	VZ	0.0032%	0.0011%	0.0130%	0.0034%	0.0024%	0.0012%	0.0015%
03523TBT	MSFT	0.0657%	0.2421%	0.1307%	0.0181%	0.0128%	0.0111%	0.0054%
031162CQ	QCOM	0.0127%	0.0089%	0.0171%	0.0495%	0.0014%	0.0092%	0.0010%
037833DF	WBA	0.0171%	0.0336%	0.0432%	0.0209%	0.0041%	0.0016%	0.0027%
036752AG	WFC	0.0271%	0.0766%	0.0144%	0.0877%	0.0092%	0.0040%	0.0048%
05526DAU	V	0.0056%	0.0130%	0.0132%	0.0063%	0.0038%	0.0020%	0.0020%
054561AK	T	0.0184%	0.0945%	0.0032%	0.0000%	0.0000%	0.0000%	0.0000%
05567LT3	CNQC	0.0175%	0.0306%	0.0535%	0.0000%	0.0000%	0.0000%	0.0000%
05565QDC	ABIB	0.0088%	0.0067%	0.0251%	0.0000%	0.0000%	0.0000%	0.0000%
06053FAA	MS	0.0109%	0.0423%	0.0006%	0.0000%	0.0000%	0.0000%	0.0000%
05723KAF	BACR	0.0468%	0.1226%	0.1779%	0.0000%	0.0000%	0.0000%	0.0000%
06406RAG	CVS	0.0114%	0.0376%	0.0931%	0.0000%	0.0000%	0.0000%	0.0000%
06367T4W	SHW	0.0044%	0.0091%	0.0081%	0.0000%	0.0000%	0.0000%	0.0000%
06738EAS	BAC	0.0224%	0.0622%	0.0452%	0.0000%	0.0000%	0.0000%	0.0000%
Average		0.0251%	0.0756%	0.0424%	0.0000%	0.0000%	0.0000%	0.0000%



Source: Barclays Research

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