

## WHITEPAPER

# CLO Vintage Analysis (2005 to 2014)

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The Moody's Structured Finance Portal allows for extensive analysis of the performance of each CLO vintage. In this release, we will show the median, 25th percentile and 75th percentile results for a variety of CLO performance measures. We have not calculated the equity returns and annualized par build for the 2014 vintage given their recent issuance.

2009 is also not included due to the lack of issuance. Below is the number of CLOs per vintage in the analysis. You can see that 2008 & 2010 had very limited issuance. The data supporting these charts and exhibits are in the appendix.

Vintage	Count
2005	35
2006	121
2007	127
2008	6
2010	2
2011	22
2012	106
2013	161
2014	141
<b>Total</b>	<b>721</b>

## I) Charts showing the Median Results

Chart 1 compares the median Weighted Average Spread ("WAS") to the Weighted Average ("WA") Cost of Capital<sup>1</sup> for each vintage. Both the WAS and WA Cost of Capital have generally increased from CLO 1.0's (those issued prior to 2010) to CLO 2.0's. In particular, there is a more than tripling of financing costs. The older CLOs did benefit from the widening of collateral spreads during their reinvestment periods. This is more easily seen in Chart 2 where the difference between the two is greatest in CLO 1.0's and worst in those CLOs issued during the recession.

Chart 1

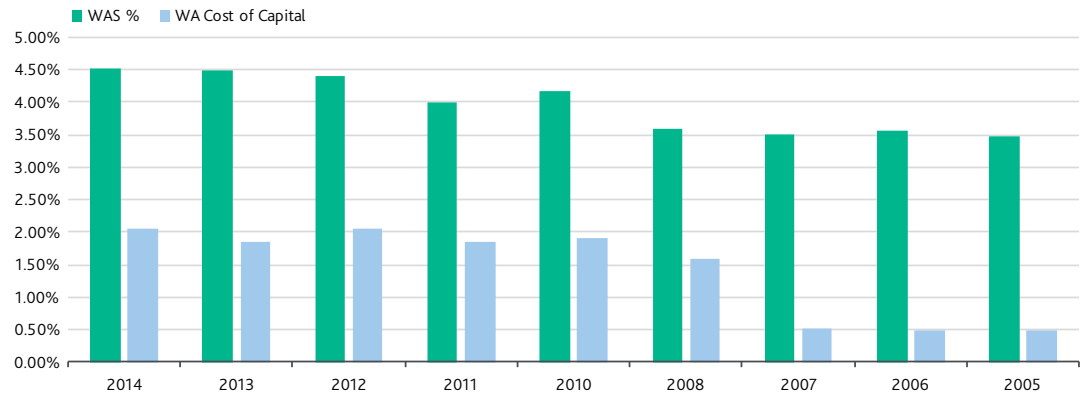
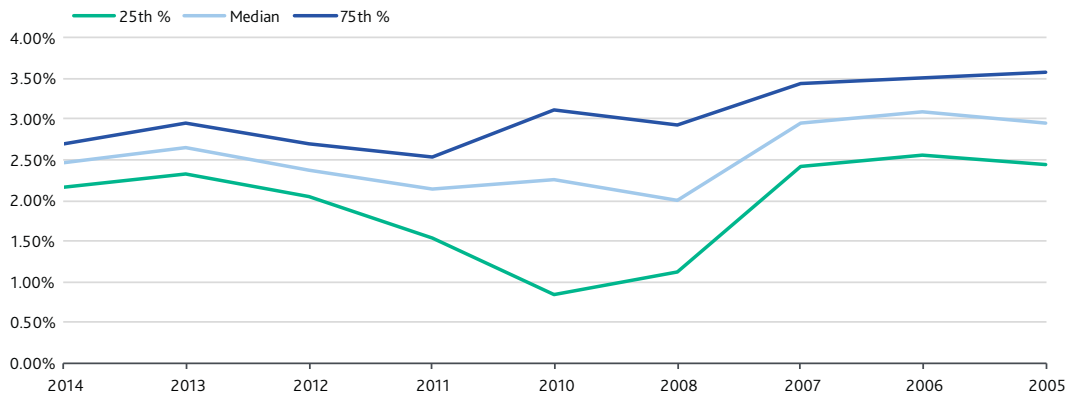


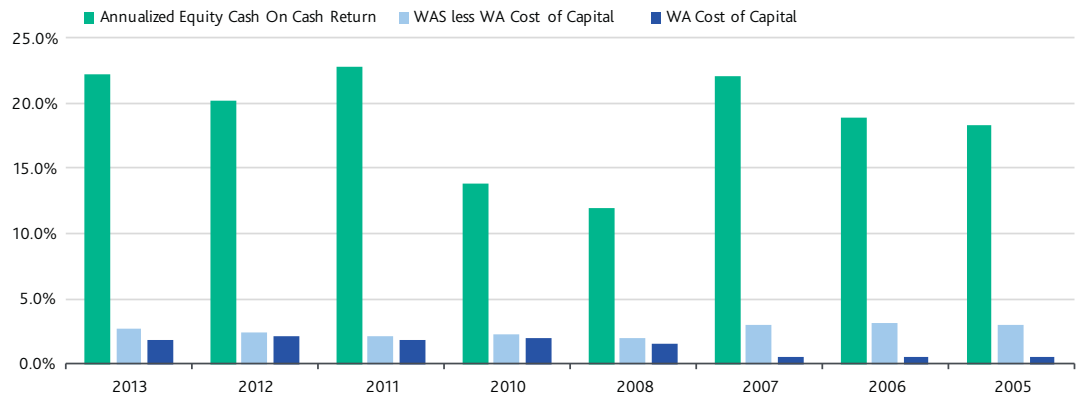
Chart 2: WAS less Weighted Ave Cost of Capital



Charts 3 compare the equity returns to the Cost of Capital and the WAS less the Cost of Capital. As you would expect based upon the prior graphs, the CLO 1.0's do well despite the recession given their low cost structure combined with the benefit of widening spreads over time. The CLO 2.0's are also performing well. The 2008 & 2010 are the weakest performing which may be due to their issuance during the recession. These vintages are also much smaller.

<sup>1</sup> Fixed rate tranches are not included

Chart 3



A key driver to the strong equity returns of the recent CLO's is the extremely low default rate of the collateral as shown in Chart 4. The table only shows collateral that the manager has indicated as defaulted. Chart 5 has the Suspected Defaults (collateral listed as default in any CLO). The vintages 2005 & 2006 have a large number of Defaults and Suspected Defaults which is partly explained by the typically higher repayment rate of performing collateral with the weaker collateral remaining in a significantly redeemed CLO. I have removed 2008 given the limited number of deals.

Chart 4: Annualized Default Rate %

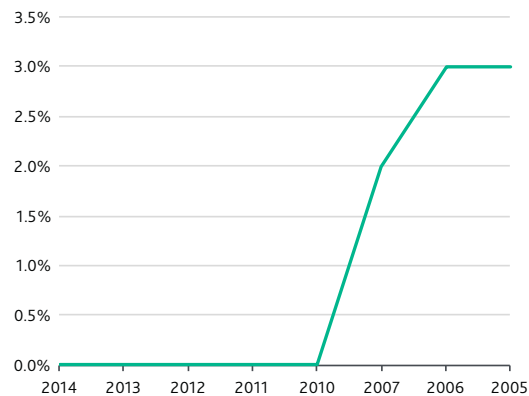
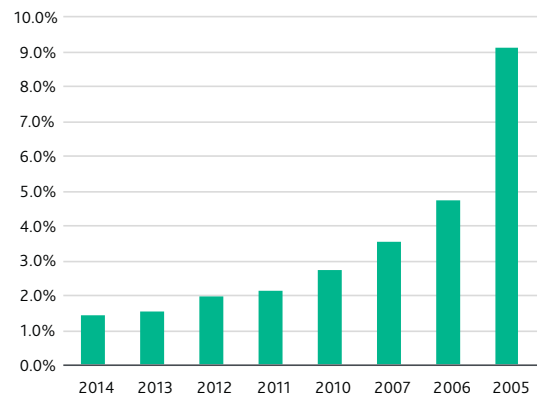
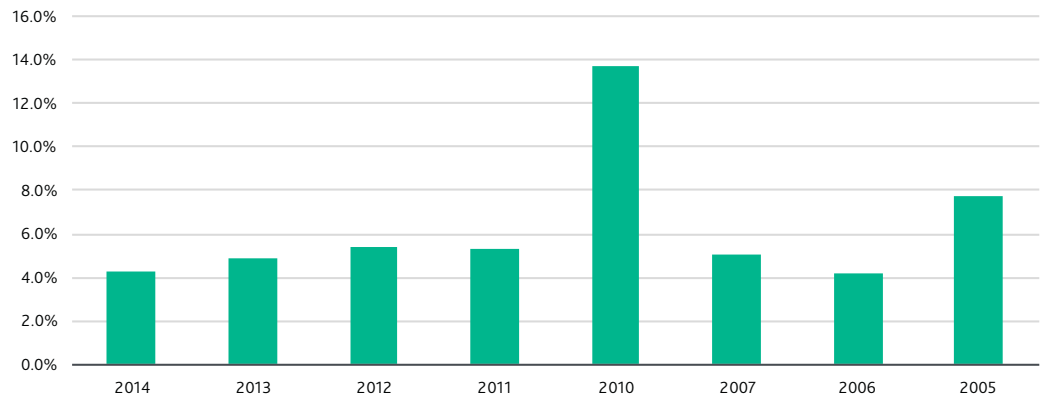


Chart 5: Suspected Default %



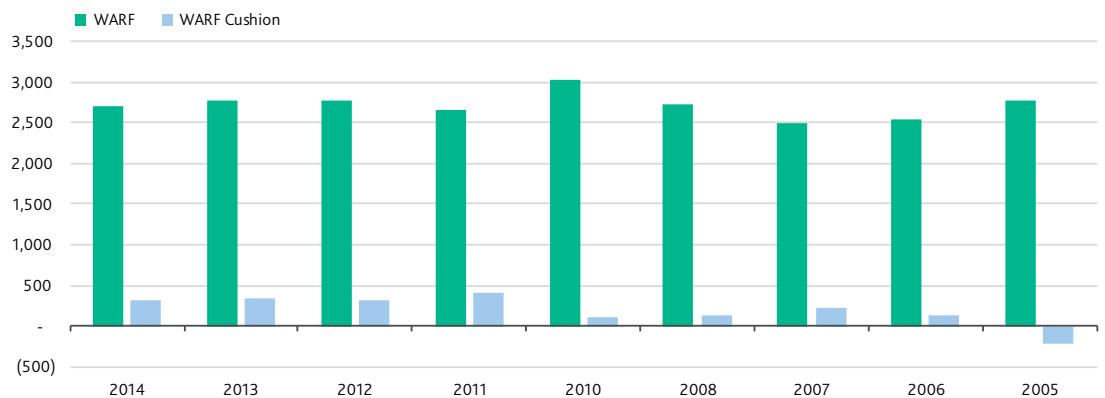
The inclusion of additional collateral in a CLO both protects investors from losses due to future defaults as well as provides additional income from the earnings on such collateral. Deals are structured with an assumption of some collateral reduction due to defaults. A measure of collateralization is the Junior OC Test Cushion. CLOs typically have 4-5% cushion in this test when the deal closes. During the reinvestment period, the cushion will decrease for net losses and increase due to trading gains. Certain stress on the collateral will also reduce the test results (excess Caa/CCC rated collateral for example). Chart 6 shows that other than the likely benefit of amortization, there is little change in the cushion. Several of the CLO 1.0s which are significantly amortized show large increases in their collateralization.

Chart 6: Junior OC Test Cushion



Another potential future indicator of losses is the Moody's WARF (weighted average rating factor) along with a measurement of the cushion to the WARF Test the CLO was modeled to support. Higher Moody's WARFs are an indicator of weaker credits which typically default at a higher rate. Different CLOs are structured to support different collateral ratings. The WARF cushion is a measure of relative collateral strength of a CLO as compared to the collateral ratings the CLO was designed to support. Chart 7 shows the greatest cushion on the more recent CLO's and the only vintage that on average failing the test is the 2005 vintage.

Chart 7



## II) Charts Comparing the 25th, 50th and 75th percentile for each vintage

This section shows many similar charts to section I only it compares the weak to the strong performing CLOs from each vintage. Specifically, we look at the 25th, 50th and 75th percentile for each vintage.

Charts 8 & 9 compare the WAS and the WA Cost of Capital. It is interesting to note the greater variance in performance of the 2010 and older CLOs than the more recent ones. The WAS of the 25th percentile of the CLO's from the earlier period is 100 to 180 bps less than that of the 75th percentile while in the recent deals the range is 30-40 bps. The range is expanded in the older CLOs as the deal performance varies over time. The cost of capital is in a much tighter band.

Chart 8: Weighted Average Spread

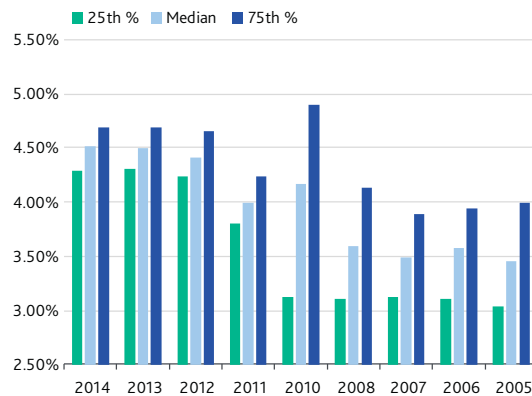


Chart 9: Weighted Average Cost of Capital

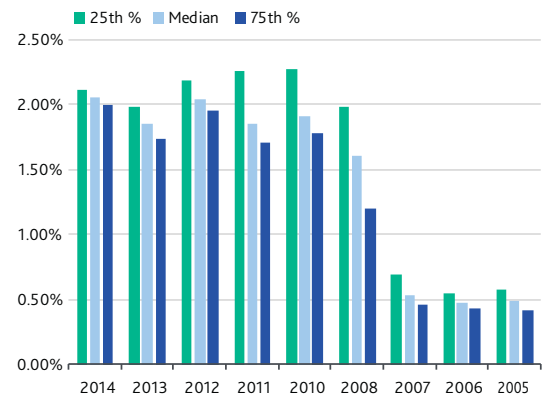
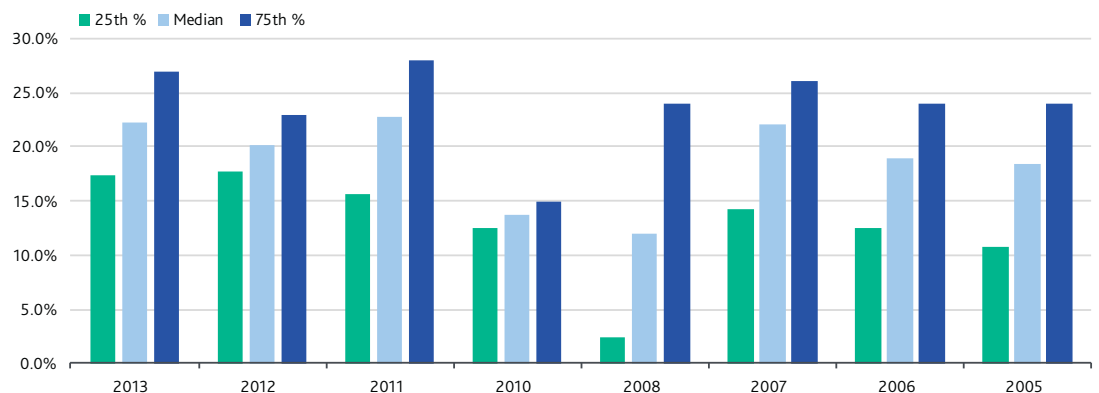


Chart 10 shows return analysis. As with the WAS, the older CLO's have a much wider range of outcomes with the exception of 2011. The CLOs have consistently produced double digit returns with the exception of the weakest quadrant of 2008. The greatest variance is also in 2008, however, few deals were issued that year.

Chart 10: Annualized Equity Cash on Cash Return



Charts 11 & 12 look at the defaults from two different perspectives. Chart 11 is a comparison of the annual default rate for collateral the manager indicates is defaulted while Chart 12 shows the current percentage of collateral that any CLO manager indicates is defaulted in any CLO. You will note that for 2012 to 2014, managers have not indicated any collateral has defaulted yet when you look at the Suspected Defaults chart some collateral is indicated at currently being defaulted. The variance of the 25th percentile to the 75th percentile is significantly greater in this category.

Chart 11: Annualized Default Rate

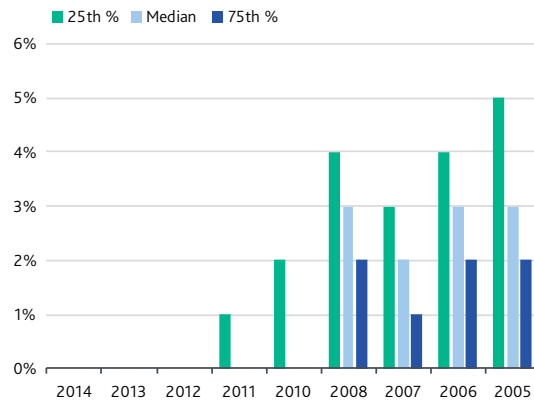
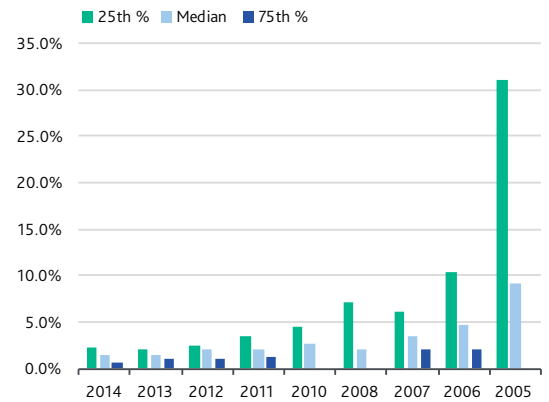
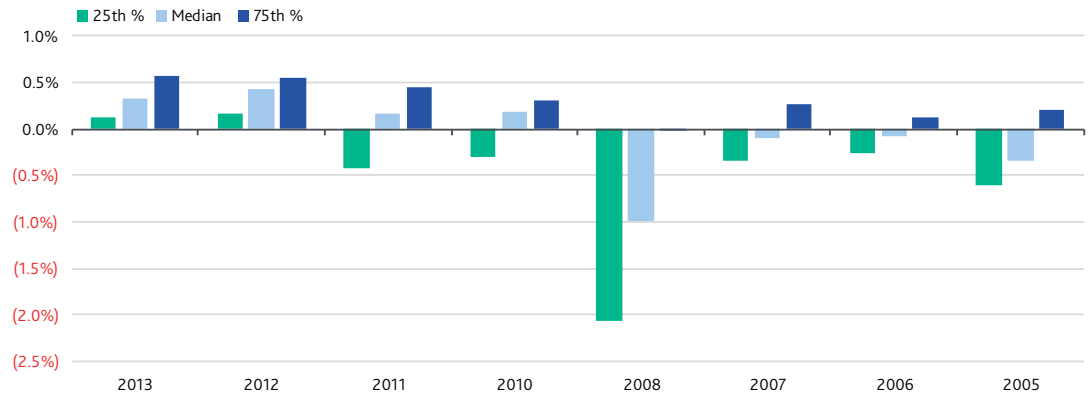


Chart 12: Suspected Defaulted Percentage



Related to the default rate is the amount of par building (additional collateral supporting the CLO) in a deal (Chart 13). Generally, the CLO 2.0's have increased par in their deals. As mentioned earlier, the 2008 vintage is under the greatest stress from its collateralization.

Chart 13: Annualized Par Building Percentage



A reduction in collateralization is a key early indicator of a potential failure of the O/C Test. Failing the O/C test causes a permanent reduction of the deal leverage through a repayment of senior liabilities. Chart 14 displays the cushion for this test. Only the 25th percentile of CLOs from 2005 and 2014 are failing the test. The outliers in the 75th percentile of 2010 and 2005 likely results from the few deals still outstanding from those vintages.

Chart 14: Junior O/C Test Cushion

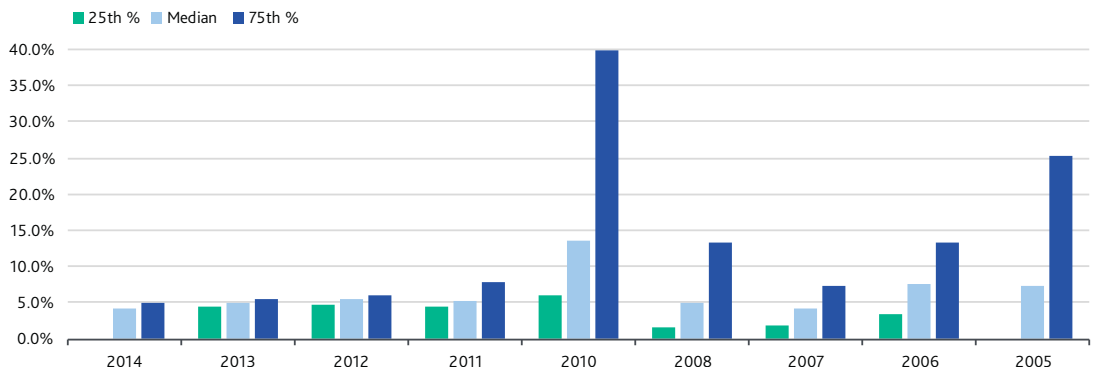


Chart 15 looks at the Moody's WARF. The Moody's WARF has increased in the recent vintages. Also of note is the particularly high Moody's WARF in the weakest percentile of the CLO 1.0's. Chart 16 compares the Moody's WARF to the WAS to determine if there is any linkage. However, the correlation somewhat breaks down in the recent vintages. While the Moody's WARF did increase, the WAS increased by a significantly larger amount.

Chart 15: Moody's WARF

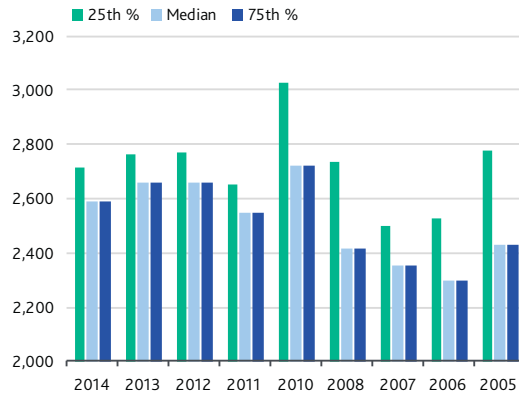
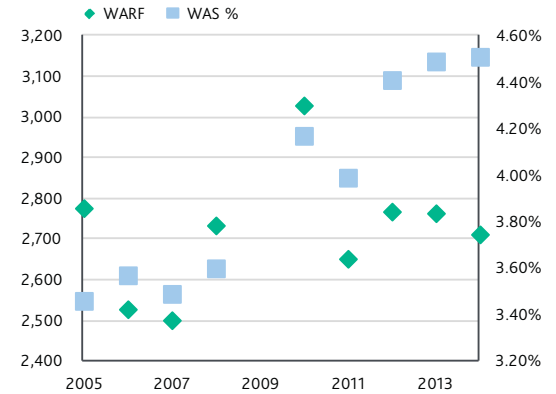
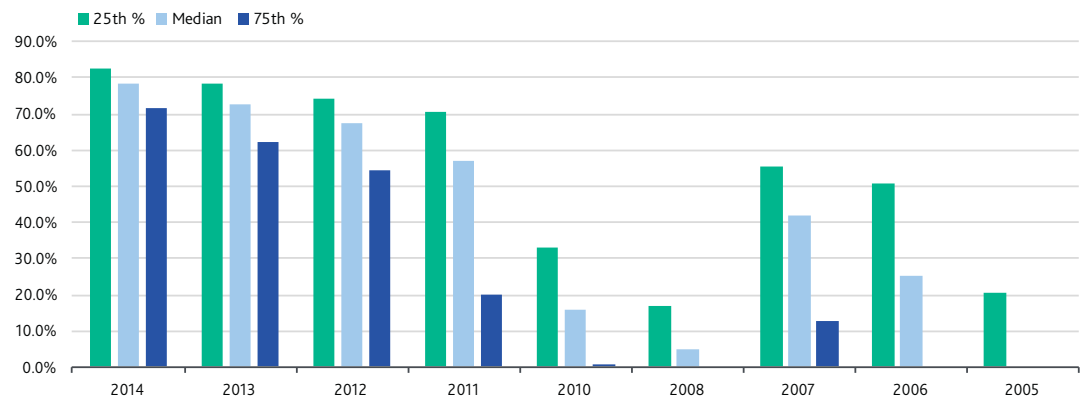


Chart 16



The final chart (Chart 17) shows the Suspected Covenant Lite Percentage by vintage and percentile. Suspected Covenant Lite is collateral that is indicated as covenant lite ("Cov Lite") in any CLO. The relevance is that some collateral is not considered Cov Lite in a particular CLO due to that deal's indenture yet has the performance characteristics of a Cov Lite security. As expected with the new issue market being dominated by Cov Lite, the recent vintages have high percentages. However, the amount of Cov Lite is significantly greater than the market as a whole. Managers may be purchasing such collateral to obtain a higher spread. The older CLOs are typically not reinvesting in new collateral so their percentages more closely reflect the market at the time reinvestment ended.

Chart 17: Suspected Cov Lite Percent



While there are many similarities across vintages, a careful analysis shows their relative strengths and weaknesses. Essentially, there is no such thing as a typical CLO. Overtime, CLOs that start out similar, vary based upon the performance of the underlying collateral, market conditions and collateral manager style.

## Appendix

## Vintage Performance Tables

Table 1: Median

	2014	2013	2012	2011	2010	2008	2007	2006	2005
<b>Collateral</b>									
Senior Secured %	97.1%	97.1%	97.0%	98.0%	97.8%	98.4%	95.4%	93.6%	93.0%
Bond %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.9%	0.0%
Second Lien %	2.3%	2.6%	2.5%	0.9%	1.1%	0.0%	0.8%	0.5%	0.0%
Structured %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Suspected Cov Lite %	78.5%	72.5%	67.3%	56.8%	15.8%	4.8%	41.8%	25.0%	0.0%
<b>Performance</b>									
Caa/CCC %	1.9%	3.0%	3.2%	2.1%	1.6%	0.3%	2.2%	2.7%	2.5%
Defaulted %	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	1.0%	1.6%	4.9%
Annualized Default Rate %	0%	0%	0%	0%	0%	3%	2%	3%	3%
Suspected Default %	1.5%	1.5%	2.0%	2.1%	2.7%	2.0%	3.6%	4.8%	9.1%
Annualized Equity Cash On Cash Return	N/A	22.3%	20.2%	22.8%	13.8%	12.0%	22.0%	19.0%	18.4%
WA Cost of Capital	2.05%	1.85%	2.05%	1.85%	1.91%	1.60%	0.53%	0.48%	0.50%
Annualized Par Build %	N/A	0.3%	0.4%	0.2%	0.2%	(1.0%)	(0.1%)	(0.1%)	(0.3%)
<b>Matrix Tests</b>									
Diversity	60	65	66	61	36	28	43	28	15
Diversity Test Cushion	7	13	13	12	(1)	(10)	(4)	(15)	(28)
WA Recovery %	48.9%	49.5%	50.0%	51.1%	50.3%	51.4%	51.3%	51.3%	50.9%
WA Recovery Test Cushion %	4.4%	5.7%	5.8%	7.1%	5.3%	4.7%	5.8%	5.8%	5.6%
WAL	5.5	5.2	4.9	4.1	3.5	3.8	3.8	3.4	2.8
WARF	2,712	2,764	2,768	2,652	3,029	2,734	2,501	2,528	2,777
WARF Test Cushion	317	345	312	417	107	137	233	142	(220)
WA LIBOR Floor %	0.98%	0.98%	0.99%	0.99%	1.19%	1.01%	0.98%	1.00%	1.11%
WAS %	4.51%	4.49%	4.41%	3.99%	4.17%	3.60%	3.49%	3.57%	3.46%
WAS Test Cushion	0.60%	0.52%	0.37%	0.36%	0.62%	0.83%	0.86%	0.87%	0.75%
<b>Other</b>									
Junior OC Test Cushion	4.3%	4.9%	5.4%	5.3%	13.7%	5.0%	4.2%	7.7%	7.4%
Senior OC Test Cushion	10.0%	10.6%	11.2%	11.5%	19.8%	17.2%	20.2%	50.0%	79.9%
Suspected Amended %	4.1%	4.8%	4.9%	7.7%	6.2%	8.9%	12.2%	14.5%	0.5%



Table 2: 25th Percentile

	2014	2013	2012	2011	2010	2008	2007	2006	2005
<b>Collateral</b>									
Senior Secured %	95.3%	95.6%	95.5%	96.0%	93.7%	91.8%	91.6%	84.2%	6.0%
Bond %	0.0%	1.6%	1.1%	0.5%	0.9%	0.3%	5.7%	6.4%	4.0%
Second Lien %	4.3%	3.9%	3.7%	2.2%	2.2 %	1.7%	1.9%	1.9%	2.3%
Structured %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	2.4%	0.0%
Suspected Cov Lite %	82.6%	78.2%	74.3%	70.6%	32.8%	16.7%	55.6%	51.0%	20.7%
<b>Performance</b>									
Caa/CCC %	4.0%	4.4%	4.3%	3.3%	8.9%	3.4%	4.2%	5.9%	21.7%
Defaulted %	0.0%	0.0%	0.0%	0.1%	1.6%	2.0%	2.9%	6.2%	26.7%
Annualized Default Rate %	0%	0%	0%	1%	2%	4%	3%	4%	5%
Suspected Default %	2.2%	2.1%	2.5%	3.4%	4.4%	7.1%	6.1%	10.4%	31.1%
Annualized Equity Cash On Cash Return	N/A	17.4%	17.7%	15.6%	12.6%	2.4%	14.2%	12.5%	10.8%
WA Cost of Capital	2.12%	1.99%	2.19%	2.25%	2.27%	1.99%	0.69%	0.54%	0.58%
Annualized Par Build %	N/A	0.1%	0.2%	(0.4%)	(0.3%)	(2.1%)	(0.3%)	(0.3%)	(0.6%)
<b>Matrix Tests</b>									
Diversity	47	57	54	47	19	10	32	18	7
Diversity Test Cushion	3	8	6	5	(13)	(22)	(11)	(24)	(46)
WA Recovery %	46.8%	48.7%	49.2%	50.2%	50.1%	49.7%	50.3%	49.9%	48.0%
WA Recovery Test Cushion %	1.4%	4.3%	3.9%	5.0%	2.3%	1.7%	3.7%	3.5%	2.2%
WAL	5.7%	5.3	5.1	4.5	3.8	4.4	4.3	4.0	3.3
WARF	2,808	2,843	2,890	2,738	3,382	3,069	2,753	2,984	3,362
WARF Test Cushion	168	180	179	276	7	(147)	13	(153)	(881)
WA LIBOR Floor %	0.97%	0.97%	0.97%	0.97%	1.05%	0.95%	0.95%	0.97%	0.99%
WAS %	4.28%	4.31%	4.24%	3.80%	3.12%	3.11%	3.12%	3.10%	3.03%
WAS Test Cushion	0.22%	0.27%	0.22%	0.19%	0.32%	0.41%	0.44%	0.46%	0.44%
<b>Other</b>									
Junior OC Test Cushion	(0.0%)	4.4%	4.8%	4.4%	6.1%	1.5%	1.8%	3.5%	(0.9%)
Senior OC Test Cushion	(0.2%)	10.1%	10.5%	10.9%	8.9%	11.9%	11.6%	23.1%	22.1%
Suspected Amended %	6.4%	6.6%	6.7%	11.0%	12.1%	20.5%	16.6%	21.4%	25.5%

Table 3: 75th Percentile

	2014	2013	2012	2011	2010	2008	2007	2006	2005
<b>Collateral</b>									
Senior Secured %	98.7%	98.7%	98.5%	99.2%	98.6%	100.0%	98.2%	97.9%	100.0%
Bond %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Second Lien %	0.1%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Structured %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Suspected Cov Lite %	71.4%	62.2%	54.3%	20.2%	0.9%	0.0%	12.5%	0.0%	0.0%
<b>Performance</b>									
Caa/CCC %	0.5%	1.3%	1.9%	0.5%	0.0%	0.0%	0.8%	0.8%	0.0%
Defaulted %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Annualized Default Rate %	0%	0%	0%	0%	0%	2%	1%	2%	2%
Suspected Default %	0.6%	0.9%	1.0%	1.2%	0.0%	0.0%	2.0%	2.1%	0.0%
Annualized Equity Cash On Cash Return	N/A	27.0%	23.0%	28.0%	15.0%	24.0%	26.0%	24.0%	24.0%
WA Cost of Capital	1.99%	1.73%	1.96%	1.70%	1.78%	1.20%	0.46%	0.44%	0.42%
Annualized Par Build %	N/A	0.6%	0.6%	0.5%	0.3%	(0.0%)	0.3%	0.1%	0.2%
<b>Matrix Tests</b>									
Diversity	68	74	75	67	44	42	56	42	23
Diversity Test Cushion	11	18	21	17	2	2	2	(6)	(17)
WA Recovery %	50.0%	50.3%	50.8%	51.9%	52.5%	57.9%	56.1%	55.2%	55.6%
WA Recovery Test Cushion %	5.9%	6.6%	7.0%	8.5%	5.5%	6.4%	7.1%	7.4%	7.5%
WAL	5.3	5.0	4.6	3.6%	3.2	2.5	3.3	2.8	2.2
WARF	2,592	2,662	2,661	2,550	2,724	2,417	2,350	2,297	2,433
WARF Test Cushion	479	502	465	619	207	432	450	423	187
WA LIBOR Floor %	1.00%	1.00%	1.02%	1.03%	1.27%	1.14%	1.02%	1.07%	1.36%
WAS %	4.69%	4.69%	4.66%	4.23%	4.90%	4.13%	3.89%	3.94%	4.00%
WAS Test Cushion	0.84%	0.76%	0.75%	0.72%	1.08%	1.28%	1.21%	1.28%	1.21%
<b>Other</b>									
Junior OC Test Cushion	5.0%	5.5%	6.1%	7.8%	40.8%	13.2%	7.3%	13.2%	25.2%
Senior OC Test Cushion	10.4%	11.3%	12.1%	14.2%	77.6%	35.8%	39.0%	130.7%	190.4%
Suspected Amended %	2.9%	3.3%	3.4%	4.9%	3.1%	0.0%	7.2%	3.5%	0.0%

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