

RESEARCH

11 MARCH 2016

Authors

Peter Sallerson,
Senior Director
peter.sallerson@moodys.com
+1.212.553.9447

Helen Yi,
Associate Director
helen.yi@moodys.com
+1.650.745.0462

Contact Us

Americas
+1.212.553.1653
clientservices@moodys.com

Europe
+44.20.7772.5454
clientservices.emea@moodys.com

Asia (Excluding Japan)
+852.3551.3077
clientservices.asia@moodys.com

Japan
+81.3.5408.4100
clientservices.japan@moodys.com

Metals & Mining across the US & Euro CLO Market

Highlights*

- » Metals & Mining exposure is over \$8 billion, mostly in the US CLO market
- » The largest holding is over twice the size of the next largest
- » Much of the exposure is marked below \$75 with a significant percent below 50.
- » While the larger managers tend to have the largest exposures, certain managers are over and under weighted in Metals & Mining
- » Euro CLO exposure is limited and dominated by two issuers and
 - It is marked significantly higher than the US CLO exposures.

*This article is authored and published by Moody's Analytics, Inc. and does not in any way reflect the opinion of Moody's Investors Service, Inc., its affiliated credit rating agency. The data for this report is from the latest available monthly surveillance report as of March 3, 2016.

Commodity prices have dropped significantly causing growing concern. The September report discussed Oil & Gas exposure in CLO's¹. This report's focus is on the Moody's Industry - Metals & Mining². Both the number of defaults is rising³ and the credit stress (as indicated by the marks) on the remaining names have increased.

The first step to analyzing the exposure is to determine which investments are in Metals & Mining. One method is to look at the monthly surveillance reports to see which investments are labeled Metals & Mining. This would result in about \$7.5 billion⁴ of exposure. On the extreme end, one could include all the positions of any issuer where at least one issue in one monthly surveillance report is labelled Metals & Mining. This is easy to disregard as issuers may either have subsidiaries in different industries, only some of which are Metals & Mining or a large number of the monthly reports could say another industry⁵. The criteria selected needs to be broad enough to show the industry risk, but not overly so as to be unreasonable. Thus, the total exposures of any issue (loan or bond) where at least 50% of the monthly surveillance reports⁶ indicate that issue as being Metals & Mining is used. Given were we are in the election cycle, majority rules should apply. This results in \$8.1 billion of collateral and will be the basis for the analysis for this paper.

US CLO Market

The US CLO market holds \$7.7 billion⁷ of Metals & Mining collateral across 84 different issuers and almost 3300 investments by 122 CLO managers. This represents 1.9% of the total US CLO market. Table 1 shows the largest (those over \$50mm) Metals & Mining holdings in the US CLO market. These total over 90% of the exposure.

TABLE 1: THE LARGEST METALS & MINING EXPOSURES BY ISSUER IN THE US CLO MARKET (\$MM).

Issuer	\$mm Exposure	Percent	Investments	Average Mark
FORTESCUE METALS GROUP LTD	1,748.1	22.81%	450	81.8
FMSA HOLDINGS INC.	688.2	8.98%	265	47.2
NOVELIS INC.	643.3	8.39%	266	93.6
MURRAY ENERGY CORPORATION	555.7	7.25%	315	43.4
PEABODY ENERGY CORPORATION	328.1	4.28%	131	34.4
ARCH COAL, INC.	292.1	3.81%	127	38.1
METAL SERVICES, LLC	278.9	3.64%	117	89.0
OXBOW CARBON LLC	265.6	3.47%	198	83.8
TMS INTERNATIONAL CORP.	245.2	3.20%	121	63.0
NORANDA ALUMINUM HOLDING CORPORATION	229.3	2.99%	101	26.4
JMC STEEL GROUP, INC.	210.3	2.74%	99	99.2
AMERICAN ROCK SALT COMPANY LLC	187.1	2.44%	77	90.9
ATKORE INTERNATIONAL, INC.	152.5	1.99%	66	92.9
ALPHA NATURAL RESOURCES, INC	143.9	1.88%	72	43.7
MINERALS TECHNOLOGIES INC.	136.1	1.78%	129	97.7
HI-CRUSH PARTNERS LP	135.1	1.76%	76	69.4
ESSAR STEEL ALGOMA INC.	131.1	1.71%	56	41.4
US SILICA HOLDINGS INC	120.3	1.57%	54	87.8
FORESIGHT ENERGY, LLC	100.4	1.31%	56	73.0
WALTER ENERGY, INC.	90.8	1.18%	40	14.2

1 see *Oil & Gas Exposure in Cash Flow Arbitrage CLO's* – September 29, 2015

2 This is one of the Moody's Industry designations available to CLO portfolio managers. I have removed collateral listed as equity from the analysis. Manager's using old Moody's Industries have been mapped to the current industries.

3 Recent examples include Noranda Aluminum, Paragon Offshore, Patriot Coal & Walter Energy

4 Euro exposure was converted to US dollar equivalent.

5 Please see *Inconsistent Industry Designation in CLO Monthly Surveillance Reports* – January 6, 2016 for a discussion of the variation of the industry selected for an issue in different monthly surveillance reports.

6 Measured by par balance

7 0.5% of the exposure is in the form of DIPs. Please see the appendix for details.

TABLE 1 CON'T

Issuer	\$mm Exposure	Percent	Investments	Average Mark
FREEMPORT-MCMORAN INC.	75.4	0.98%	25	87.1
WESTMORELAND COAL COMPANY	63.1	0.82%	60	59.9
PREFERRED PROPPANTS, LLC	62.2	0.81%	22	36.3
BOWIE RESOURCE PARTNERS LLC	61.7	0.80%	31	93.0
PTC ALLIANCE CORPORATION	53.7	0.70%	9	76.7
MRC GLOBAL INC.	51.8	0.68%	42	88.0
DYNACAST INTERNATIONAL LLC	51.4	0.67%	22	97.3
Subtotal/Average	7,101.4	92.67%	3027	68.8
Grand Total	7,663.0	100.00%	3276	69.0

Source: Moody's Analytics Structured Finance Portal

The largest by far is Fortescue Metals with over \$1.7bn of exposure representing 23% of the total. It is held by 82 CLO managers in 450 CLO's. The mark is 81.8 which is an increase from below 70 in February. The five largest issuer positions represent 52% of the total. Only one other of the top five Metals & Mining positions is marked over 70 (Novelis) and one has defaulted (Murray Energy). The weighted average mark of these five is 68⁸. For the entire group in Table 1, the average is 69. Novelis, the third largest and one of the highest marked positions (94), is held by 55 CLO managers in 266 CLO's. In comparing Fortescue and Novelis, it is worth noting that four of the six managers with the greatest exposure to each are the same (CSAM, Oak Hill, Carlyle & Voya). This leads into the next table which shows CLO manager exposure.

TABLE 2: CLO MANAGERS WITH AT LEAST \$75MM OF METALS & MINING EXPOSURE

CLO Manager	\$mm Exposure	Percent of Total M&M	Investments	Ave Mark	Metals & Mining/ Total Collateral
Credit Suisse Asset Management	593.9	7.75%	185	72.1	3.7%
3i Group plc	247.6	3.23%	83	63.1	3.2%
MJX Asset Management LLC	223.3	2.91%	171	65.0	2.5%
Halcyon Loan Investors LP	213.6	2.79%	43	72.9	4.1%
Oak Hill Advisors LP	206.6	2.70%	49	66.0	2.8%
Carlyle Investment Management LLC	206.2	2.69%	76	76.4	1.7%
Man Group plc	196.4	2.56%	47	66.5	5.0%
GoldenTree Asset Management LP	195.4	2.55%	52	60.2	3.4%
Babson Capital Management LLC	183.2	2.39%	86	65.2	3.0%
Columbia Management Investment Advisors, LLC	168.6	2.20%	67	49.2	2.4%
Highland Capital Management LP	164.7	2.15%	45	51.7	1.9%
Jefferies Finance LLC	154.5	2.02%	67	61.5	3.6%
Marathon Asset Management LP	148.1	1.93%	59	59.9	6.2%
Voya Investment Management (ING)	147.9	1.93%	68	79.8	1.7%
Prudential Investment Management Inc.	139.8	1.82%	124	66.8	1.5%
Sankaty Advisors Inc.	135.8	1.77%	36	57.0	2.0%
Onex Credit Partners LLC	132.2	1.73%	48	53.5	2.5%
Black Diamond Capital Management LLC	131.1	1.71%	36	64.8	4.4%
OakTree Capital Management LLC	127.6	1.67%	48	65.1	3.1%
Ares Management, LLC	126.8	1.65%	60	54.9	1.1%
Kramer Van Kirk Credit Strategies LP	124.1	1.62%	40	66.1	3.2%
BlueMountain Capital Management LLC	116.6	1.52%	79	69.8	1.6%
Seix Investment Advisors LLC	111.6	1.46%	32	70.8	3.7%
CIFC Asset Management LLC	99.2	1.29%	90	81.3	0.8%
Angelo, Gordon & Company LP	91.3	1.19%	15	80.1	3.6%
H.I.G. WhiteHorse Capital LLC	87.5	1.14%	33	69.7	3.6%

⁸ Marks provided to the Structured Finance Portal by Markit were generally used. Some collateral does not have a mark. Certain unavailable marks for defaulted collateral provided in the monthly surveillance reports was used.

TABLE 2 CON'T

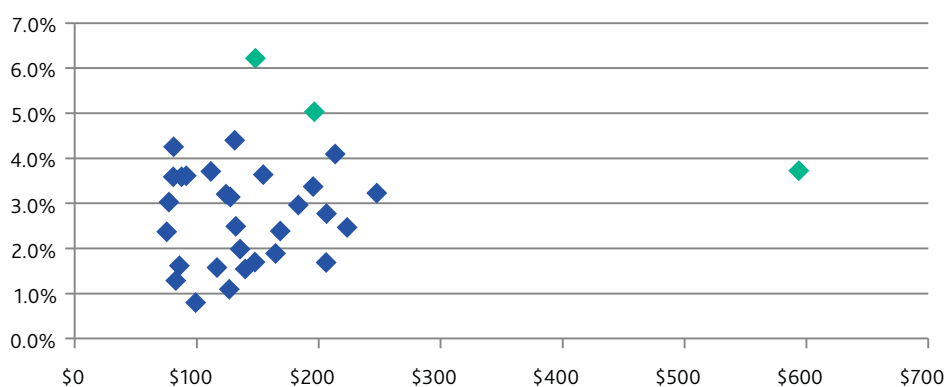
CLO Manager	\$mm Exposure	Percent of Total M&M	Investments	Ave Mark	Metals & Mining/ Total Collateral
Alcentra Inc.	85.8	1.12%	35	64.5	1.6%
LCM Asset Management LLC	82.8	1.08%	61	91.4	1.3%
Kingsland Capital Management LLC	81.0	1.06%	31	69.5	4.3%
Feingold O'Keeffe	80.7	1.05%	33	68.9	3.6%
New York Life Investment Management LLC	77.3	1.01%	35	78.6	3.0%
Shenkman Capital Management Inc.	75.5	0.99%	40	63.4	2.4%
Subtotal/Average	4,956.9	64.69%	1974	66.7	2.5%
Grand Total	7,663.0	100.00%	3276	69.0	

Source: Moody's Analytics Structured Finance Portal

Six managers own over \$200 million of Metals & Mining collateral in the US CLO market representing 22% of the exposure. CSAM dominates, but a better analysis is that of the percent of holdings which are in Metals & Mining. While CSAM is still higher than most, it is no longer the highest on Table 2. Halcyon owns the largest percent among the managers with over \$200mm of holdings. Carlyle has the lowest percentage in this group and near the bottom overall. Now let's look further at the 32 managers with over \$75mm of Metals & Mining collateral. Interestingly, GSO/Blackstone, Apollo, Octagon and CVC all have more than \$7.5 billion of US CLO AUM yet own less than \$75mm of Metals & Mining.

The managers with over \$75mm in Metals & Mining hold almost 2/3 of the total exposure. Within the table, the two managers with the highest Metals & Mining exposure are Marathon Asset Management and the Man Group with 6.2% and 5%, respectively. No other manager in Table 2 has over 4.4%. CIFIC is the only manager with over \$75mm of exposure, but less than 1% in Metals & Mining. Chart 1 is a scatter chart of Metals & Mining investment as compared to the percent of such AUM for the managers in Table 2 (over \$75mm of exposure). There are a few outliers, but they generally cluster in the mid to lower left.

CHART 1: METALS & MINING INVESTMENT (\$ VS % OF AUM)

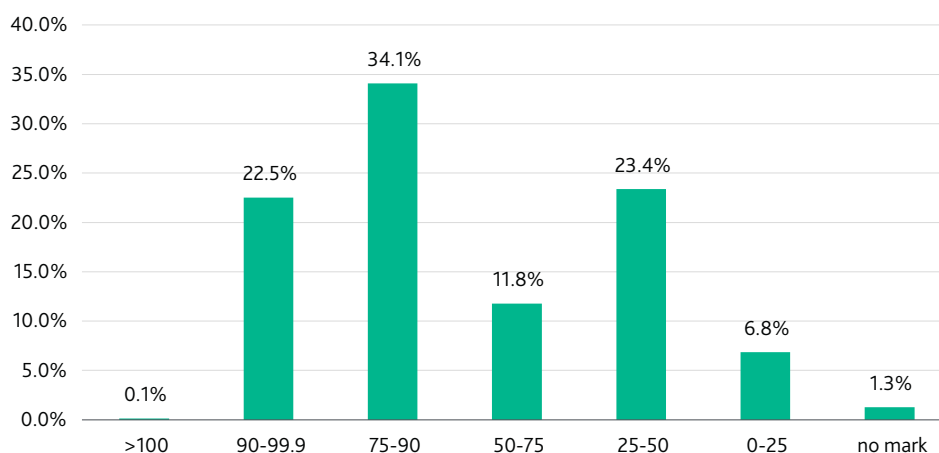


Source: Moody's Analytics Structured Finance Portal

Valuations of the Metals and Mining exposure is very important for any industry under stress. While a CLO is a cash flow vehicle, the valuations are a market indicator of potential trouble as well a factor in calculating overcollateralization tests if either the collateral defaults or an excess Caa/CCC test is breached. Additionally, trading flexibility may be impaired for low priced investments. Conversely, strong credits currently trading

at a relatively low price could present a buying opportunity. Please see Chart 2 for a breakdown of Metals & Mining marks⁹.

CHART 2: COLLATERAL PERCENT BY MARKS



Source: Moody's Analytics Structured Finance Portal

\$3.2bn or 42% of the Metals & Mining exposure is marked below \$75 in 1464 investments (see Table 3). The average mark is 43 vs the average for the total exposure of 69. The three largest issuers are close to 50% of the total. This is dominated by FMSA and Murray Energy.

TABLE 3: METAL & MINING EXPOSURE MARKED BELOW \$75 BY CLO MANAGER (\$MM)

Issuer	\$mm Exposure	Percent	Investments	Ave Price	Max Price	Min Price
FMSA HOLDINGS INC.	688.2	21.4%	265	47.2	62.1	43.0
MURRAY ENERGY CORPORATION	555.7	17.3%	315	43.4	51.3	40.0
PEABODY ENERGY CORPORATION	328.1	10.2%	131	34.4	34.9	4.0
ARCH COAL, INC.	279.9	8.7%	109	28.7	28.9	0.6
TMS INTERNATIONAL CORP.	245.2	7.6%	121	63.0	63.0	63.0
NORANDA ALUMINUM HOLDING CORPORATION	216.3	6.7%	92	23.4	23.9	2.0
HI-CRUSH PARTNERS LP	135.1	4.2%	76	69.4	69.4	69.4
ALPHA NATURAL RESOURCES, INC	132.4	4.1%	56	29.6	30.7	1.0
ESSAR STEEL ALGOMA INC.	110.6	3.4%	38	16.0	16.0	16.0
FORESIGHT ENERGY, LLC	100.4	3.1%	56	73.0	73.0	73.0
WALTER ENERGY, INC.	90.8	2.8%	40	14.2	15.3	14.1
WESTMORELAND COAL COMPANY	63.1	2.0%	60	59.9	62.0	59.8
PREFERRED PROPPANTS, LLC	62.2	1.9%	22	36.3	36.3	36.3
ATLAS IRON LIMITED	49.5	1.5%	12	8.0	8.0	8.0
PATRIOT COAL CORPORATION	38.4	1.2%	17	2.9	50.0	-
PTC ALLIANCE CORPORATION	34.4	1.1%	6	70.0	70.0	70.0
UNITED DISTRIBUTION GROUP, INC.	28.4	0.9%	5	63.5	63.5	63.5
TASEKO MINES LIMITED	15.4	0.5%	8	52.0	52.0	52.0
ARMSTRONG ENERGY, INC.	10.0	0.3%	2	36.6	36.6	36.6
FIRST QUANTUM MINERALS LTD	9.0	0.3%	4	62.5	62.5	62.5
XINERGY LTD.	5.1	0.2%	6	52.8	52.8	52.8
BOART LONGYEAR LIMITED	3.5	0.1%	2	37.3	37.3	37.3
AZURE LLC	2.6	0.1%	3	47.0	47.0	47.0
AMERICAN GILSONITE HOLDING COMPANY	2.5	0.1%	1	45.3	45.3	45.3

⁹ For the collateral that is marked. Collateral without a mark is not included for any analysis of collateral marks unless explicitly noted.

TABLE 3 CON'T

Issuer	\$mm Exposure	Percent	Investments	Ave Price	Max Price	Min Price
NATURAL RESOURCE PARTNERS L.P.	2.3	0.1%	3	48.0	48.0	48.0
SUNCOKE ENERGY, INC.	1.7	0.1%	3	63.4	63.4	63.4
GLOBAL GEOPHYSICAL SERVICES	1.0	0.0%	1	1.0	1.0	1.0
MOLYCORP, INC.	1.0	0.0%	1	2.6	2.6	2.6
THOMPSON CREEK METALS COMPANY INC.	1.0	0.0%	1	17.0	17.0	17.0
AMERIFORGE GROUP, INC.	1.0	0.0%	1	43.6	43.6	43.6
CROSBY WORLDWIDE LTD.	1.0	0.0%	1	73.3	73.3	73.3
BOOMERANG TUBE, LLC	0.9	0.0%	1	42.5	42.5	42.5
H.C. STARCK GMBH	0.8	0.0%	1	66.1	66.1	66.1
ALERIS INTERNATIONAL INC.	0.6	0.0%	1	-	-	-
UNITED STATES STEEL CORPORATION	0.5	0.0%	1	58.5	58.5	58.5
INTERNATIONAL ARCHITECTURAL PRODUCTS, INC.	0.1	0.0%	2	45.0	45.0	45.0
Grand Total/Average	3,218.5	100.0%	1464	43.1	73.3	-

Source: Moody's Analytics Structured Finance Portal

Table 4 has the analysis from a manager's perspective. CSAM has the largest below \$75 marked exposure, but has one of the smallest percent of its total Metal & Mining positions trading below that level. CIFIC has by far the lowest at only 11% of its Metals & Mining positions marked below \$75.

TABLE 4: RATIO OF BELOW \$75 MARKED COLLATERAL FOR CLO MANAGERS WITH AT LEAST \$40MM OF METALS & MINING EXPOSURE (\$MM)

CLO Manager	Low Marked Exposure	Total Exposure	Ratio	Ave Price	Min Price
Anchorage Capital Group LLC	49.8	49.8	100%	44.3	40.0
Western Asset Management Company	60.2	71.5	84%	38.0	8.0
Highland Capital Management LP	135.0	164.7	82%	32.7	14.1
Brigade Capital Management LLC	44.4	56.3	79%	46.8	40.0
Marathon Asset Management LP	112.5	148.1	76%	40.0	-
Allianz Global Investors Capital LLC	52.9	70.0	76%	35.2	1.0
TPG Capital	55.5	74.3	75%	52.3	34.9
Ares Management, LLC	87.5	126.8	69%	39.5	34.9
GoldenTree Asset Management LP	131.7	195.4	67%	38.4	16.0
Black Diamond Capital Management LLC	87.7	131.1	67%	40.8	-
Crescent Capital Group LP	48.7	73.6	66%	51.0	14.1
Columbia Management Investment Advisors, LLC	110.8	168.6	66%	37.9	23.9
OakTree Capital Management LLC	80.8	127.6	63%	48.8	28.9
Golub Capital Management LLC	32.1	51.5	62%	52.5	28.9
Onex Credit Partners LLC	78.3	132.2	59%	38.8	16.0
Palmer Square Capital Management LLC	33.2	57.5	58%	47.3	34.9
BlueMountain Capital Management LLC	66.5	116.6	57%	49.7	23.9
H.I.G. WhiteHorse Capital LLC	49.8	87.5	57%	51.6	23.9
ZAIS Group Inc.	35.0	61.5	57%	46.2	28.9
Babson Capital Management LLC	98.8	183.2	54%	41.2	28.9
Man Group plc	104.0	196.4	53%	47.4	34.9
Neuberger Berman Fixed Income LLC	35.5	70.1	51%	47.1	28.9
Jefferies Finance LLC	77.7	154.5	50%	37.9	14.1
Shenkman Capital Management Inc.	34.9	75.5	46%	49.5	40.0
Sankaty Advisors Inc.	58.2	135.8	43%	35.5	16.0
Kramer Van Kirk Credit Strategies LP	50.6	124.1	41%	32.0	-
Halcyon Loan Investors LP	84.5	213.6	40%	56.5	43.4
MJX Asset Management LLC	88.3	223.3	40%	41.9	14.1

TABLE 4 CON'T

CLO Manager	Low Marked Exposure	Total Exposure	Ratio	Ave Price	Min Price
3i Group plc	88.6	247.6	36%	42.1	23.9
Prudential Investment Management Inc.	46.1	139.8	33%	52.1	34.9
Oak Hill Advisors LP	63.2	206.6	31%	32.7	14.1
Credit Suisse Asset Management	164.8	593.9	28%	38.6	2.0
Seix Investment Advisors LLC	30.9	111.6	28%	38.3	8.0
Total/Average	2,378.3	4,640.7	51%	42.1	19.8
Minimum	30.9	49.8	28%	32.0	-
Maximum	164.8	593.9	100%	56.5	43.4

Source: Moody's Analytics Structured Finance Portal

Table 5 displays the CLO managers whose investment in Metals & Mining is entirely marked below \$75. Anchorage is the largest of such managers.

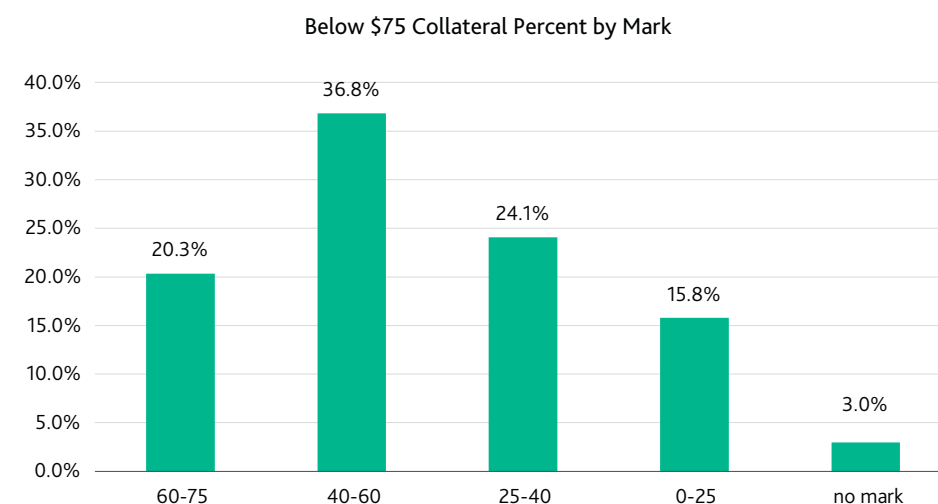
TABLE 5: CLO MANAGERS WHOSE ENTIRE EXPOSURE IS MARKED BELOW \$75 (\$MM)

CLO Manager	\$mm Exposure	Ratio	Investments	Ave Price	Min Price
Anchorage Capital Group LLC	49.8	100.0%	16	44.3	40.0
MFS Investment Management	6.4	100.0%	4	21.5	14.1
Arrowpoint Asset Management LLC	4.9	100.0%	4	64.6	63.0
DoubleLine Capital LP	4.0	100.0%	1	63.0	63.0
Fortis Investment Management France	2.9	100.0%	1	43.4	43.4
Princeton Advisory Group, Inc.	1.2	100.0%	1	43.4	43.4
Total/Average	69.1		27	44.7	40.8

Source: Moody's Analytics Structured Finance Portal

Charts 3 shows the percent breakdown of the collateral marked below \$75. Over 1/3 of the collateral is in the \$40 to \$60 range which is dominated by FMSA and Murray Energy. However there is a significant amount marked both \$25 to \$40 and \$60 to \$75.

CHART 3: BREAKDOWN BY MARK

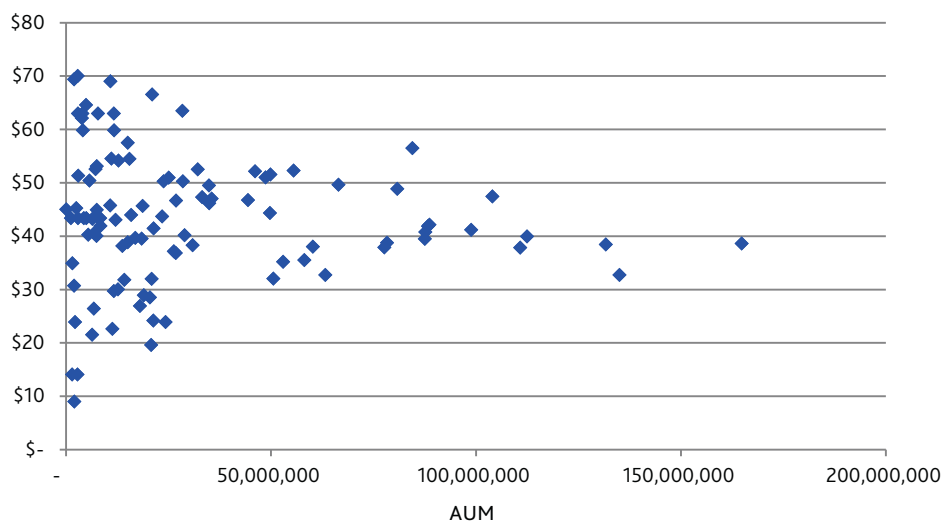


Source: Moody's Analytics Structured Finance Portal

Below are two scatter charts of marks as compared to CLO manager's Metals & Mining AUM marked below \$75. Chart 4 looks at average marks and Chart 5 is for the minimum marks. The data on Chart 4 is fairly

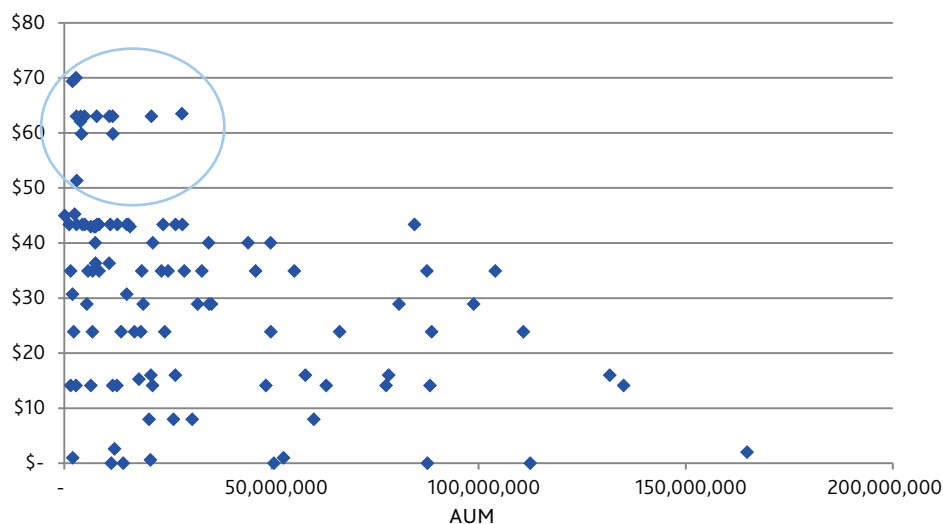
clustered in the \$37-\$65 range with a few outliers. A few of the managers with small exposure have the lowest and highest average marks, but that is not unexpected given the small number of positions. This is even more apparent in Chart 5. Note the group of managers with less than \$50mm of exposure and particularly high minimum marks on their investments. The average minimum mark for all CLO manager's Metals & Mining exposure is \$23 yet it is \$32 for those with less than \$50mm of below \$75 exposure.

CHART 4: AVERAGE MARK VS METALS & MINING AUM MARKED BELOW \$75



Source: Moody's Analytics Structured Finance Portal

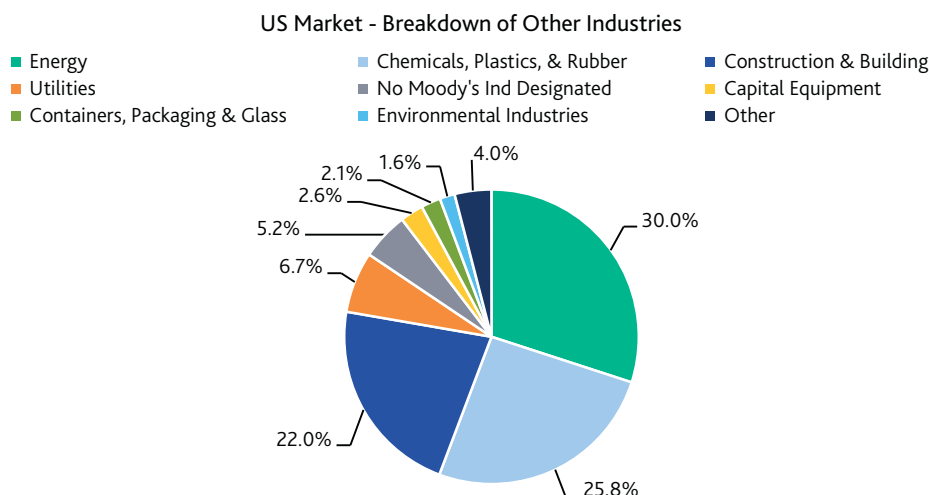
CHART 5: MINIMUM MARK VS METALS & MINING AUM MARKED BELOW \$75



Source: Moody's Analytics Structured Finance Portal

As mentioned early in this paper, collateral that most managers have indicated as Metals & Mining is included. Of this, about 7.6% of the total is not labeled Metals & Mining on the monthly reports of certain managers, but is on the majority of monthly reports by others. Chart 6 shows the larger industries indicated on the monthly reports other than Metals & Mining. The three industries, i) Energy, ii) Chemicals, Plastics, & Rubber and iii) Construction & Building, represent over 75% of the industries.

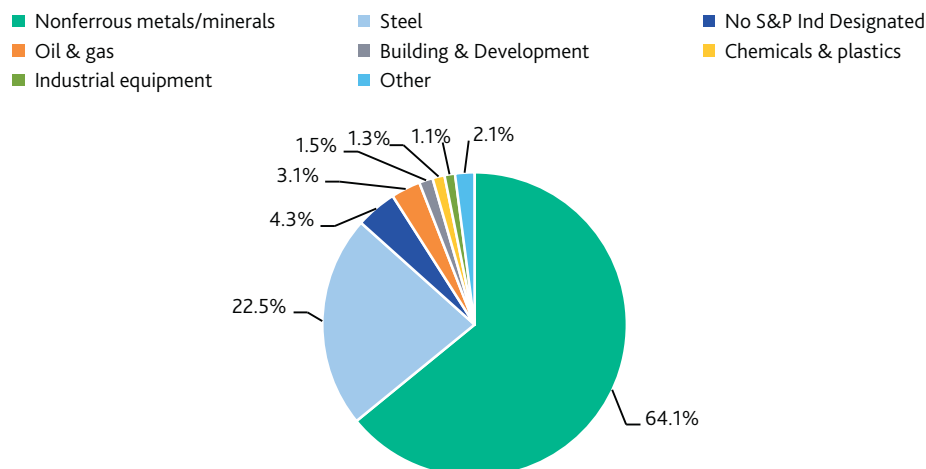
CHART 6: COLLATERAL NOT LABELED METALS & MINING ON SOME MONTHLY REPORTS



Source: Moody's Analytics Structured Finance Portal

Another way to look at how the collateral is designated in the monthly reports is to look at the indicated S&P Industry. Please see chart 7. About 89% of the collateral shown as the S&P Industry Nonferrous metals/mining or Steel. 17 other industries are indicated. This further supports our contention that all analysis should be based upon what most managers label the collateral rather than what any one manager indicates.

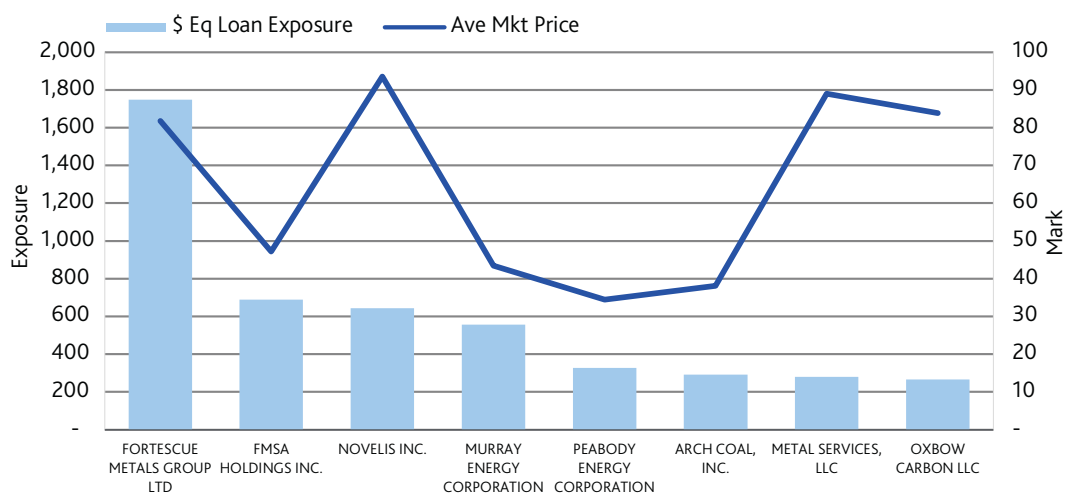
CHART 7: S&P INDUSTRY DESIGNATION



Source: Moody's Analytics Structured Finance Portal

Chart 8 looks at the eight largest aggregate Metals & Mining positions as compared to their marks. Together they total \$4.8bn which is 62.5% of the total exposure. 110 CLO managers own at least one of these four which is close to the 122 that own any Metals & Mining. While the average is 68, the marks range from about 33 for Arch Coal to over 90 for Novelis.

CHART 8: EXPOSURE (\$MM) VS MARK



Source: Moody's Analytics Structured Finance Portal

Table 6 shows the CLO managers with the largest holdings of these four issuers. Different managers are more or less focused on the four largest investments. CSAM is the lowest in this group.

TABLE 6: MANAGERS WITH INVESTMENTS OF AT LEAST \$75MM IN THE TOP FOUR METALS & MINING ISSUERS IN CLO'S

CLO Manager	\$mm Exposure	Percent of Total M&M
Credit Suisse Asset Management	202.3	34.1%
Oak Hill Advisors LP	177.2	85.8%
Halcyon Loan Investors LP	133.7	62.6%
Voya Investment Management (ING)	124.9	84.4%
Sankaty Advisors Inc.	111.8	82.3%
Carlyle Investment Management LLC	111.5	54.0%
MJX Asset Management LLC	105.3	47.2%
Highland Capital Management LP	99.4	60.4%
Man Group plc	98.9	50.4%
Babson Capital Management LLC	90.6	49.4%
Prudential Investment Management Inc.	89.0	63.7%
Kramer Van Kirk Credit Strategies LP	87.4	70.4%
Alcentra Inc.	82.8	96.5%
Columbia Management Investment Advisors, LLC	80.5	47.7%
GoldenTree Asset Management LP	78.6	40.2%
Grand Total/Average	1,673.9	61.8%

Source: Moody's Analytics Structured Finance Portal

EURO CLO Market

The Metals & Mining exposure in the Euro CLO market is a fraction of the size of that in the US. There is \$441mm (equivalent) invested in Euro CLO's (about 0.70% of the total Euro CLO market). This consists of 199 investments by 31 CLO managers in 83 CLO's. Table 7 shows the Metals & Mining issuers held in Euro CLO's. The holdings are much more concentrated with the three largest positions represent over 56% of the total.

TABLE 7: METALS & MINING COLLATERAL IN THE EURO CLO MARKET

Issuer	\$ Eq Exposure	Percent	Investments	Ave Mkt
H.C. STARCK GMBH	113.4	25.71%	35	72.4
LEVANTINA NATURAL STONE	95.7	21.70%	64	68.4
OPUS INVESTMENT MANAGEMENT, INC	40.0	9.07%	18	57.3
SODELHO S.A.	36.0	8.16%	14	96.9
MONDO MINERALS HOLDING B.V.	27.5	6.24%	5	95.5
S-PROCESS EQUIPMENT ACQUICO GMBH	27.1	6.15%	6	98.0
CONSTELLIUM N.V.	18.8	4.26%	11	81.9
H.E.S. BEHEER N.V.	15.5	3.51%	3	95.6
FORTESCUE METALS GROUP LTD	11.2	2.54%	4	81.8
1908 HOLDING BV	7.5	1.70%	1	95.6
GALAPAGOS HOLDING S.A.	7.0	1.59%	1	
ALU HOLDCO 1 LIMITED	5.0	1.14%	2	98.8
INA-HOLDING SCHAEFFLER GMBH & CO. KG	4.5	1.01%	2	99.9
SCHENCK PROCESS HOLDING GMBH	4.3	0.97%	4	99.0
ERM WORLDWIDE LIMITED	4.0	0.91%	1	90.3
RANPAK CORP.	4.0	0.90%	1	98.5
NOVELIS INC.	3.8	0.85%	2	93.6
RAIN CII CARBON (INDIA) LIMITED	3.2	0.73%	2	73.5
UNIFRAX I LLC	2.6	0.60%	1	95.3
JMC STEEL GROUP, INC.	2.4	0.54%	1	99.2
EP MINERALS, LLC	1.8	0.40%	1	97.8
WHA HOLDING SAS	1.7	0.39%	11	
FMSA HOLDINGS INC.	1.4	0.32%	2	52.7
NORANDA ALUMINUM HOLDING CORPORATION	1.2	0.27%	2	23.9
ALPHA NATURAL RESOURCES, INC	0.8	0.18%	2	30.7
PATRIOT COAL CORPORATION	0.5	0.12%	2	
OXBOW CARBON LLC	0.3	0.06%	1	88.7
Grand Total	441.0	100.00%	199	74.6

Source: Moody's Analytics Structured Finance Portal

Interestingly, the marks on the Euro CLO Metals & Mining holdings are higher than for the US. For example, in the Euro CLO market, 33% (vs 23% in the US) is priced over \$90 and 88% (vs 60% in the US) is over \$67. Table 8 shows the breakdown of the Euro CLO manager's exposure.

TABLE 8: EURO CLO EXPOSURE TO METALS & MINING BY MANAGER

CLO Manager	\$mm Eqv Exposure	Percent	Investments	Average Mark	M&M/ Total Collateral
Carlyle Investment Management LLC	70.6	16.02%	23	64.0	1.2%
CVC Credit Partners LLC	53.0	12.01%	17	96.7	2.4%
Babson Capital Management LLC	27.6	6.27%	11	90.4	1.2%
CapVest Ltd.	23.3	5.29%	3	66.1	6.5%
3i Group plc	19.0	4.31%	15	86.0	0.4%
Cohen Bros. Financial Management LLC	18.6	4.21%	4	53.9	4.1%
Credit Suisse Asset Management	17.8	4.03%	6	55.1	1.0%
Eaton Vance Management	17.0	3.86%	14	62.8	2.7%
Chenavari Investment Management	16.1	3.65%	3	95.5	1.9%
Halcyon Loan Investors LP	15.1	3.44%	8	74.7	1.4%
BNP Paribas	14.6	3.31%	8	69.3	2.0%
Pemba Credit Advisers	14.2	3.22%	13	59.7	3.4%
NIBC Credit Management, Inc.	12.9	2.93%	4	88.8	2.7%
Neuberger Berman Fixed Income LLC	12.6	2.86%	4	87.7	4.6%
KKR Financial Advisors LLC	12.0	2.72%	8	61.6	0.3%
Alcentra Inc.	11.0	2.49%	2	90.3	0.2%
CQS Investment Management Ltd.	10.6	2.39%	3	71.0	1.2%
Apollo Credit Management LLC	10.0	2.27%	2	96.9	0.8%
IKB Capital Corporation	9.6	2.18%	2	95.5	2.3%
M&G Investment Management Ltd.	9.1	2.07%	12	64.2	3.8%
Invesco Inc.	9.0	2.04%	5	78.0	3.3%
Ares Management, LLC	8.3	1.87%	5	84.0	0.4%
Cairn Capital Ltd.	5.2	1.19%	3	84.4	0.4%
Penta Management Limited	5.0	1.13%	1	66.1	2.1%
Black Diamond Capital Management LLC	3.6	0.81%	3	95.0	0.6%
Bank Of Ireland	3.1	0.70%	3	64.2	18.6%
Sankaty Advisors Inc.	3.0	0.68%	2	80.9	0.2%
Man Group plc	3.0	0.68%	1	73.5	0.9%
PineBridge Investments LLC	2.6	0.60%	1	95.3	0.3%
Prudential Investment Management Inc.	1.7	0.39%	2	80.9	0.1%
IMC asset management B.V.	1.7	0.39%	11		2.6%
Grand Total/Average	441.0	100.00%	199	76.3	2.2%

Source: Moody's Analytics Structured Finance Portal

Carlyle, CVC and Babson are the three largest with over 34% of the market (as compared to the 3 largest manager positions in the US represent only 13%). Bank of Ireland has by far the largest percent holdings in Metals & Mining at over 18% though their remaining deal collateral is low. Bank of Ireland also does not list the collateral as Metals & Mining, but most managers do¹⁰. CapVest is the next highest at 6.5%.

¹⁰ Bank of Ireland indicated the credit of Levantina as the Moody's Industry Environmental Industries. However, others say the credit is Metals and Mining and Bank of Ireland lists the S&P Industry as Nonferrous metals/mining.

Table 9 shows the exposure to collateral marked below \$75

TABLE 9: EURO CLO MANAGERS' EXPOSURE TO COLLATERAL MARKED BELOW \$75

CLO Manager	Below 75 \$mm Eq Exposure	Total Exposure	Ratio	Investments	Ave Mark	Min Mark
Carlyle Investment Management LLC	30.53	70.6	43.2%	12	35.82	5.50
Credit Suisse Asset Management	13.97	17.8	78.6%	4	35.82	5.50
Cohen Bros. Financial Management LLC	12.48	18.6	67.2%	2	23.00	23.00
CapVest Ltd.	6.52	23.3	27.9%	2	66.14	66.14
CQS Investment Management Ltd.	5.46	10.6	51.7%	2	66.14	66.14
Penta Management Limited	5.00	5.0	100.0%	1	66.14	66.14
BNP Paribas	4.83	14.6	33.1%	2	23.00	23.00
KKR Financial Advisors LLC	4.75	12.0	39.6%	3	23.00	23.00
Eaton Vance Management	3.89	17.0	22.9%	8	26.83	-
Pemba Credit Advisers	3.74	14.2	26.4%	5	16.00	5.50
M&G Investment Management Ltd.	3.62	9.1	39.6%	4	23.00	23.00
Man Group plc	3.00	3.0	100.0%	1	73.50	73.50
NIBC Credit Management, Inc.	2.90	12.9	22.5%	1	66.14	66.14
Halcyon Loan Investors LP	2.73	15.1	18.0%	2	44.57	23.00
Cairn Capital Ltd.	2.00	5.2	38.2%	1	66.14	66.14
Invesco Inc.	1.58	9.0	17.5%	1	23.00	23.00
Bank Of Ireland	1.22	3.1	39.6%	1	23.00	23.00
Ares Management, LLC	0.99	8.3	11.9%	2	66.14	66.14
Babson Capital Management LLC	0.20	27.6	0.7%	1	73.50	73.50
Grand Total/Average	109.4	297.1	36.8%	55	36.3	-

Source: Moody's Analytics Structured Finance Portal

25% of the collateral is marked below \$75. The managers with more than one investment and the largest percentage of their Metals & Mining collateral marked below 75 are CSAM and Cohen Bros. The average mark of the Cohen Bros. collateral is \$23. Table 10 lists the collateral marked below \$75.

TABLE 10: EURO CLO METALS & MINING COLLATERAL MARKED BELOW \$75

Issuer	\$mm Eq Exposure	Percent	Investments	Ave Price
H.C. STARCK GMBH	35.80	32.7%	13	38.2
OPUS INVESTMENT MANAGEMENT, INC	35.38	32.3%	15	50.0
LEVANTINA NATURAL STONE	31.12	28.4%	17	23.0
RAIN CII CARBON (INDIA) LIMITED	3.20	2.9%	2	73.5
FMSA HOLDINGS INC.	1.39	1.3%	2	52.7
NORANDA ALUMINUM HOLDING CORPORATION	1.17	1.1%	2	23.9
ALPHA NATURAL RESOURCES, INC	0.82	0.7%	2	30.7
PATRIOT COAL CORPORATION	0.51	0.5%	2	-
Grand Total/Average	109.39	100.0%	55	38.5

Source: Moody's Analytics Structured Finance Portal

88% of the analyzed collateral in these Euro CLO's is listed as Metals & Mining in the monthly reports with the remainder indicated as another industry in a particular report, but Metals & Mining in most of the reports. Charts 9 and 10 show the breakdown of the i) Moody's Industries other than Metals & Mining and ii) S&P Industries, respectively. 82% of the included collateral that is not labeled Metals & Mining either has i) no Moody's industry, ii) Chemicals, Plastics & Rubber or iii) FIRE: Banking, Finance, Insurance & Real Estate. The 27% FIRE: Banking, Finance, Insurance & Real Estate is the more unusual choice. The S&P industry designation is only 58% Nonferrous metals/mineral or Steel with much of the rest not having an industry label in the monthly reports. The remainder is spread across 5 industries.

CHART 9: BREAKDOWN OF MOODY'S INDUSTRY DESIGNATIONS OTHER THAN METALS & MINING

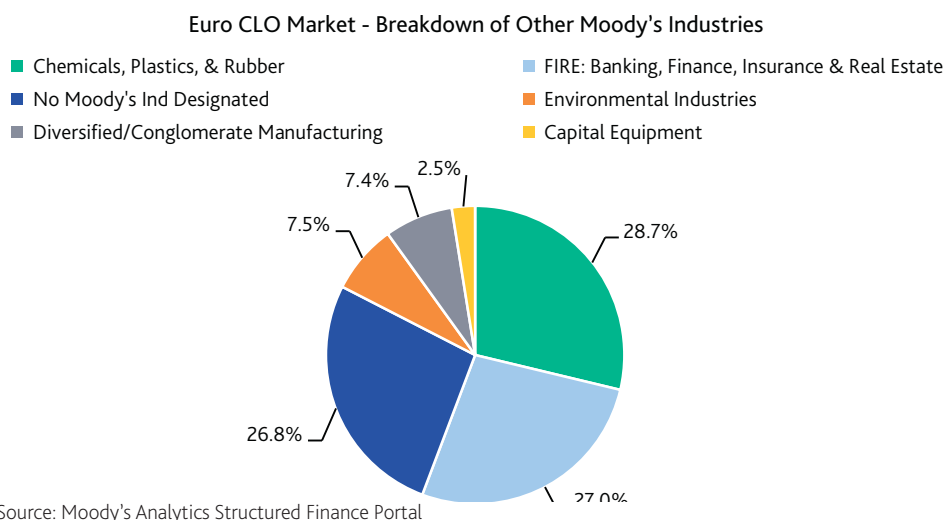
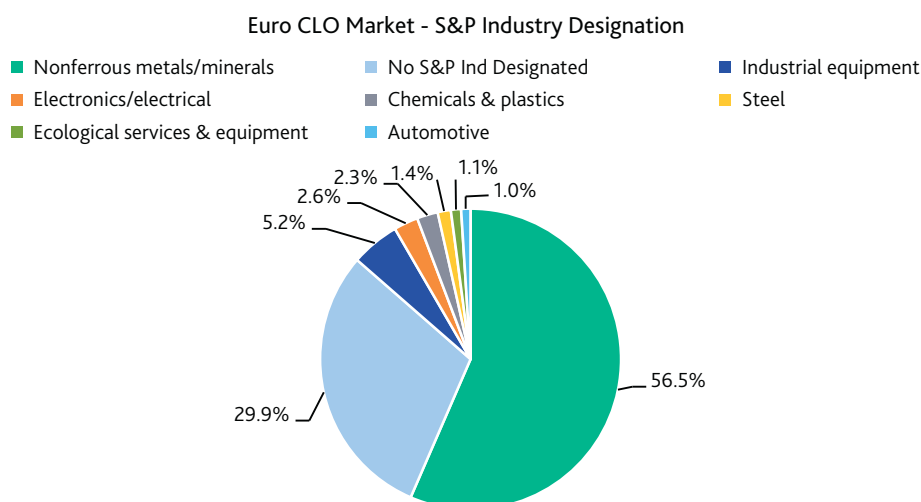
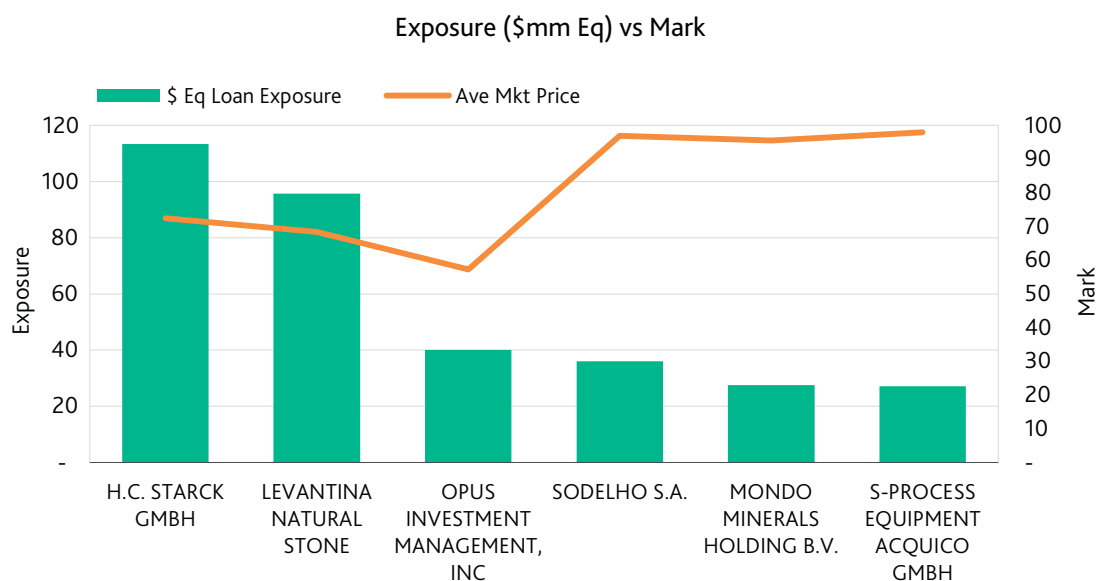


CHART 10: S&P INDUSTRIES



The six largest names represent 77% of the total Euro CLO Metals & Mining exposures. Chart 11 looks at the relationship between the holdings and the marks. 24 Euro CLO managers own at least one of these names and they are in 66 CLO's. The average mark is \$76 but the range is very wide stretching from \$57 for Opus to the mid to high 90's for Sodelho, Mondo Minerals and S-Process Equipment Acquico.

CHART 11: EXPOSURE VS MARK FOR THE LARGEST EURO CLO EXPOSURES



Source: Moody's Analytics Structured Finance Portal

Conclusion

Metals & Mining investment in CLO's is over \$8.1 billion with the vast majority in the US market. When looking at the exposure, one should include collateral that is either directly indicated at Metals & Mining on a monthly surveillance report or when not, that position is designated Metals & Mining in most of the monthly reports provided by others.

A high percentage of the US investment is under stress based upon the collateral marks. This is less so for the Euro CLO market. Some managers have been more able than others to avoid low marked Metals & Mining investments. Others, have tended to avoid the industry as a whole. Investors, Risk Managers and others looking at CLO exposures are encouraged to look beyond the monthly surveillance reports to allow for in-depth analysis of CLO's or CLO managers.

Appendix

Post-petition financing in the form of Debtor-in-Possession ("DIPs") represent 0.5% of the US CLO Metals & Mining Exposure. Given the relative seniority of those positions, their marks are typically much higher than the pre-bankruptcy obligations. Tables A-1 and A-2 show such holdings by Issuer and by CLO Manager. The marks on the DIPs are 3 to 6 times that of the non-DIPs (93-96 vs 16-38). Valcour has the highest percentage of its Metals & Mining in the form of DIPs.

TABLE A-1: US CLO MARKET METALS & MINING DIPs BY ISSUER

DIP Issuers	\$mm Exposure	Count	Ave Mark	\$mm Non-DIP Exposure	Count	Non DIP Mark
ESSAR STEEL ALGOMA INC.	20.4	18	95.0	110.6	38	16.0
ARCH COAL, INC.	8.6	13	95.5	283.5	114	31.6
ALPHA NATURAL RESOURCES, INC	8.0	8	93.0	135.9	64	37.6
NORANDA ALUMINUM HOLDING CORPORATION	4.7	4	96.0	224.6	97	25.7
Grand Total/Average	41.8	43	94.8	754.6	313	29.1

Source: Moody's Analytics Structured Finance Portal

TABLE A-2: US CLO MARKET METALS & MINING DIPs BY CLO MANAGER

CLO Manager	\$mm Dip Exposure	Count	Ave Mark	DIP/Total M&M Exposure
Valcour Capital Management LLC	2.0	1	93.0	11.1%
Kingsland Capital Management LLC	4.2	3	95.0	5.2%
GoldenTree Asset Management LP	10.0	8	95.0	5.1%
Guggenheim Investment Management LLC	1.3	2		4.8%
Invesco Inc.	3.0	6	95.5	4.7%
Black Diamond Capital Management LLC	5.0	4	93.0	3.8%
Oak Hill Advisors LP	6.2	7	95.0	3.0%
Marathon Asset Management LP	2.9	3	95.5	2.0%
OakTree Capital Management LLC	1.8	2	95.5	1.4%
Eaton Vance Management	0.8	2	95.5	1.4%
Credit Suisse Asset Management	3.4	2	96.0	0.6%
MJX Asset Management LLC	1.0	3	93.0	0.4%
Grand Total/Average	41.8	43	94.8	

Source: Moody's Analytics Structured Finance Portal

© 2016 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND CREDIT RATINGS AND RESEARCH PUBLICATIONS PUBLISHED BY MOODY'S ("MOODY'S PUBLICATIONS") MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's Publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."