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Global Mining Industry

Summary

This rating methodology provides detailed guidance on the analytical approach behind Moody's assignment of credit ratings to mining companies globally. For the purposes of this methodology, we have defined mining issuers as companies engaged in the mining, smelting and refining of base and precious metals, other industrial metals, and coal. The major aluminum companies are actively engaged in packaging and manufacturing businesses as well, and are the only mining companies that are fully integrated with both upstream and downstream operations.

The primary goals of this rating methodology are to help issuers, investors and other participants in the industry understand how Moody's assesses risk in mining companies, and to enable our constituents to be able to gauge a company's ratings. This methodology is not an exhaustive treatment of all factors reflected in Moody's ratings of mining companies, but it should enable the reader to understand the key considerations and financial ratios used by Moody's as well as their relative weight in the final rating consideration.

The 40 mining issuers rated by Moody's cover a variety of industry segments (copper, aluminum, gold, coal, etc.) and exhibit similar business fundamentals with many common credit considerations. Overall, we utilize five broad rating factors to examine credit risk and assign ratings in the global mining industry. Each of these rating factors encompasses a number of specific elements and metrics (or "sub-factors"), which we discuss in detail in this report. The five rating factors are as follows:

1. Reserves
2. Cost Efficiency and Profitability
3. Financial Policies
4. Financial Strength
5. Business Diversity and Size

Additionally, we have included an "Other Considerations" section in which we discuss factors that are difficult to quantify or predict in a meaningful way (e.g., political risk) but which can nonetheless have a significant impact on ratings of mining issuers.

Other more generic factors (notably corporate governance, management strength and shareholder structure) remain important inputs into our ratings for global mining issuers. These factors are not deemed specific to this sector, however, but rather are applied across the corporate finance franchise. As a result, we have not covered these issues in significant detail within this rating methodology.

In an effort to promote transparency, we have also provided detailed rating grids that map each rating factor and financial metric to specific ratings.

Finally, because no company will match each dimension of this analytical approach exactly, we also include a discussion of “outliers” — companies whose rating for a specific factor differs significantly from what their actual rating would otherwise imply.

Highlights of this report include:

- An overview of the risk factors for the global mining industry
- A description of the rating methodology and the five primary factors (comprising fifteen metrics or sub-factors) that drive credit quality in this sector
- Application of the rating framework to 16 sample mining companies
- An explanation of other rating considerations
- A summary of our results and their weightings

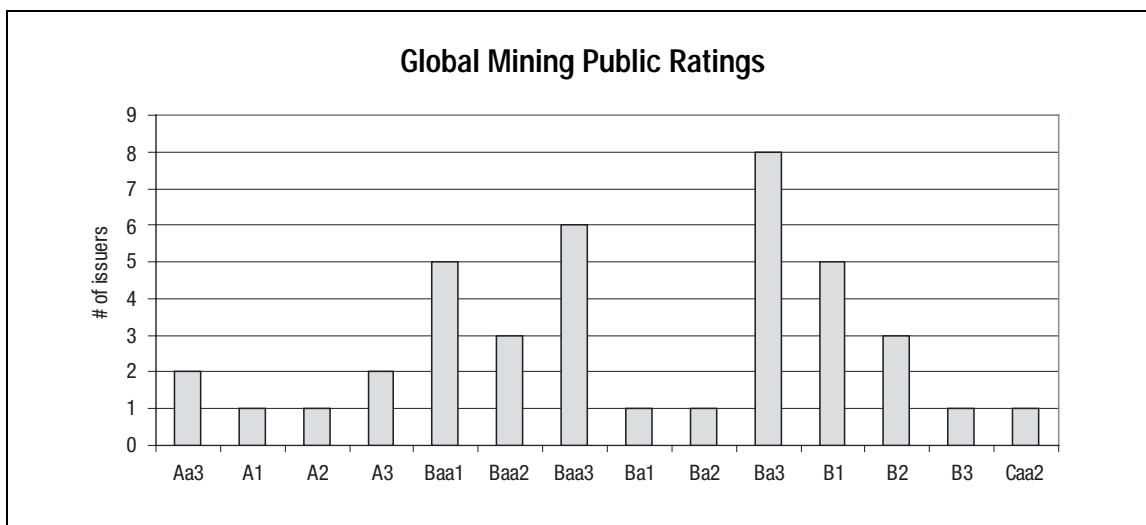
In analyzing the global mining industry, Moody’s looks to maintain some consistency of ratings during periods of both high and low metals and ore prices. We do this recognizing the volatility of cash flow and debt protection measurements that can result from swings in metals prices as driven by supply and demand imbalances in various economic environments. However, in the speculative grade categories, the ability to maintain ratings is diminished by the generally greater degree of financial and operating leverage and resultant vulnerability to market swings.

Moody’s practice for measuring ratios is to use the past two or three years’ actual results along with Moody’s expectation for the next two or three years’ results, and to consider the average as well as the high and low points. This gives us a view of a company’s ability to perform in both high and low price environments. For illustrative purposes in this methodology, we have used historical data only for each of the sample companies as a proxy for the various price environments that Moody’s would consider in ratings deliberations.

Certain of the metrics we use (such as EBIT Margin) are based on an average of five years’ results. Other measures (such as Reserves and Debt to Capitalization) are taken at a fixed point in time, which is usually the most recent year end (Reserves) or most recent reporting period (EBIT Margin) for which the data is available. We identify throughout the report the basis of measurement for each metric.

Overview of the Global Mining Industry Rated Universe

Moody’s rates 40 mining companies globally, with approximately US\$104 billion of rated debt. The ratings include issuers domiciled in North America (25), South America (4), Europe (6), Australia (2) and Asia (2). These issuers cover a wide range of ratings, from Caa2 (1) to Aa3 (2). Of all rated issuers, 49% percent are speculative-grade (dominated by Ba3 corporate family ratings), with the remaining universe primarily dominated by Baa3 corporate family ratings (6). The ratings reflect Moody’s opinion as to the relative competitive position, profitability and financial strength of each of these companies.



Approximately 87% of ratings have a stable outlook, 2.5% have a positive outlook, and less than 5% have a negative outlook. These rating outlooks do not currently correlate to any specific sub-segment or rating range.

Industry Overview

INDUSTRY RISK FACTORS

The global mining industry comprises companies engaged in activities ranging from the mining, smelting, refining and preparation of a single metal or ore in a single location to those engaged in the production of multiple metals and ores on a global basis. As noted, the major aluminum companies also engage in the global packaging and manufacturing (auto and aerospace) businesses, in addition to the mining and refining of bauxite and alumina. Taken as a whole, mining issuers share a number of similar characteristics, as follows:

- **Commodity nature of business and resultant cyclicity.** Cash flows are cyclical for all industry participants, including the major aluminum companies with their manufacturing and packaging businesses. Economic cycles play a key role in this cyclicity, as do basic supply/demand fundamentals for underlying metals, which impact each metal separately. The larger, more diversified companies get some relief from the concentrated cyclicity of single metal companies, and the coal companies have some smoothing of cyclicity because of the rolling nature of their contracts, but this remains a significant risk factor for all industry participants.
- **Capital intensity given need to replenish reserves and develop new properties.** Mining is a heavily capital intensive business given the need to maintain existing operations and to find and/or acquire and develop new reserves. A company's inability to manage this portion of its business on an ongoing basis to reduce the cyclicity of capital expenditures can, at times, have an adverse impact on the rating. The commitment to a solid capital structure is a key factor in enabling companies to manage this process.
- **Susceptibility to rising input costs.** The impact of cyclicity on cash flows is compounded by the industry's heavy reliance on specific commodities (energy, steel, explosives, etc.), as well as by exposure to currency fluctuations, which principally affect labor costs. Together these comprise a significant component of a mining company's input costs. While underlying costs tend to move in the same direction as metals prices, they can affect overall margins, particularly when there are timing differences as commodity prices decline.
- **Exposure to event risk.** Event risk can take many forms with mining companies, whether it is operational, political, or economic. This may include the risk of economic shock given the sector's end-market dependence on developing economies that occurs from time to time.

CREDIT ISSUES LOOKING INTO THE NEXT DECADE

- ongoing need for reserve acquisition via increased exploration and acquisition/consolidation
- development of new reserves with potentially significant associated capex
- metals prices likely to continue to rely significantly on emerging market economies, which heightens the risk of price volatility tied to political and economic shocks
- environmental/reclamation obligations likely to increase
- continued high input costs, particularly energy, which should serve to support higher metals prices, but at the expense of squeezed margins
- continuing labor shortages across all industry segments and most geographies

About This Rating Methodology

This rating methodology for mining companies takes readers through the following steps.

1. IDENTIFICATION OF THE KEY RATING FACTORS

Moody's rating committees for mining companies focus on five key rating factors, which we identify and explain in this report. These are:

1. Reserves
2. Cost Efficiency and Profitability
3. Financial Policies
4. Financial Strength
5. Business Diversity and Size

In addition to the five major factors discussed in this report, Moody's considers other qualitative factors, which either cannot be quantified or which cannot be quantified in a meaningful manner. These factors, however, may represent important and, in some cases, overriding considerations (e.g. political risk). These factors are explained in the "Other Considerations" section.

2. MEASUREMENT OF THE FIVE KEY RATING FACTORS

In identifying each key factor, we also present the metrics and sub-factors that we use to quantify that factor. These metrics comprise both financial statement metrics (e.g., debt to EBITDA) as well as other measurements (e.g., operational diversity) not derived directly from financial statement analysis. These factors may be defined using any or all of the following approaches, as warranted:

- Pure qualitative assessments (e.g., nature of products: commodity vs. value added)
- Qualitative assessments based on rankings estimated by Moody's, or broad quantitative measures defined by Moody's (e.g., number of regional operations)
- Pure quantitative or financial assessments that can be derived from publicly available data (e.g., EBIT margin, revenues)

For the five key factors in the mining industry, there are a total of 15 metrics, ten of which are pure financial measurements.

3. MAPPING TO THE RATING FACTORS

We next map each of the 15 metrics to broad rating categories, (Aaa, Aa, A, Baa, Ba, B and Caa).

4. ILLUSTRATION OF THE RATING METHODOLOGY/OUTLIER DISCUSSION

To illustrate the global rating methodology, we map 16 representative companies that span three broad geographic regions — North America, Australasia and Europe, and map each company's performance on each factor to its associated rating, with indicators of how the indicated rating for each element compares to the company's actual rating.

We also identify positive or negative "outliers" — companies whose indicated ratings for a given factor are at least two rating categories higher or lower than their existing rating (e.g., a Ba-rated company whose rating on a specific factor is in the A-rating category). We then explain the credit factors that may help explain the divergence.

Finally, for each of the sample companies, we map the aggregate of its ratings for each factor to an overall rating for that company. We do this using both equal weightings for each factor and "Moody's" weightings for each factor.

The Five Key Rating Factors

RATING FACTOR 1: RESERVES

Why It Matters

Reserves are the lifeblood of a mining company's enterprise and have perhaps the single most significant impact on a mining company's success. An accessible supply of high grade reserves provides an operating base that can be economically developed without the incurrence of finding and acquisition costs. Key factors affecting reserve quality include grade and recovery rates, size, indicated life, location and whether reported reserves are associated with existing mining operations or would require brownfield or greenfield development. Grade and recovery rates are the most important determinants of quality and are ultimately reflected in a given mine and company's operating performance. The underlying metallurgy of a deposit is also a significant factor impacting recovery rates and both development and operating costs. The physical location of reserves is another important consideration that can relate to a number of variables, including surface vs. underground mining, altitude, nearness to existing infrastructure, and political, regulatory and permitting issues, among others.

It is difficult to quantify and rank reserve quality on a direct basis or across different metals, especially when comparing companies that produce different metals. We also realize that certain ore bodies may be very predictable and that the cost of proving up reserves may be unnecessary and costly. Therefore, proven and probable reserves may understate the geologic reality. Moody's also considers a company's underlying price and cost assumptions to gauge potential for future reserve revisions.

Ultimately, reserve quality is reflected in a given company's earnings performance, a measure which is reflected in several other categories in this methodology, including Cost Efficiency and Profitability, Financial Policies and Financial Strength.

Moody's also pays attention — particularly with lower rated coal companies — to the amount of reserves associated with producing operations. It is not uncommon for companies to have a significant amount of reserves, but in locations that require costly greenfield development that may be beyond the current means of any particular company.

How We Measure It

- **Indicated Life:**

Most recent year's proven and probable reserves divided by most-recent year's annual production (weighted by average sales for multi-metal companies).

Notes on Measurement Criteria

We generally do not include in this calculation those reserves for any commodity that represent less than 15% of sales, in which case the sales of these commodities are excluded in determining the weighting. For example, if a company operates in four commodities (gold, copper, iron ore, and cobalt) and derives 40%, 35%, 20%, and 5% of sales from each, respectively, we would ignore the cobalt and make the respective sales weighting .42 for gold, .37 for copper, and .21 for iron ore. If the respective indicated reserve lives are 6, 25, and 40 years, the weighted average life would be 20.2 years.

A company with co-products in the same ore body is unlikely to have its proportion of metals in the total reserves match with current production. Therefore, the indicated life is calculated using a similar approach to that for a multi-metal company as above.

As is common in the aluminum industry, Alcan and Alcoa do not report their bauxite reserves, which are considerable but are also not as closely tied to their overall business (manufacturing and packaging) as is the case for the other mining companies. Reserves for the aluminum companies are excluded as a factor from the methodology.

Factor Mapping

Rating Category	A (# of yrs)	Baa (# of yrs)	Ba (# of yrs)	B (# of yrs)
I. Reserves	> 20	15-20	10-15	<10

Ratings Mapping

Company	Actual Rating	Reserve Life (most recent yr end)	Indicative Rating Category
Rio Tinto	Aa3	20	A
BHP Billiton	A1	20	A
Alcoa	A2	n/a	n/a
Anglo American	A3	30	A
Alcan	Baa1	n/a	n/a
Barrick Gold	Baa1	18	Baa
Newmont Mining	Baa1	13	Ba
Teck Cominco	Baa2 (Positive)	20	A
Phelps Dodge	Baa2	20	A
Inco Ltd	Baa3	30	A
Falconbridge	Baa3	21	A
Peabody Energy	Ba2 (Positive)	47	A
Arch Coal	Ba3	32	A
CONSOL	Ba3	65	A
Stillwater Mining	Ba3	42	A
Alpha Natural Resources	B2	20	A

 Positive Outlier
 Negative Outlier

Observations

All four of the US coal companies, plus Stillwater, are favorable outliers, in three cases having over 40 years' of reserves. While long reserve lives are obviously a positive rating factor, beyond a certain point they do not continue to have a positive impact on the rating, as indicated by our rating category for an 'A' rated company capping out at 20 years. All five of the outliers have speculative grade ratings, with this positive factor being offset by implied ratings for other factors that are more consistent with their overall ratings.

RATING FACTOR 2: COST EFFICIENCY AND PROFITABILITY

Why It Matters

Relative cost position is a critical success factor for any commodity company as prices often decline in a downturn to the point where only producers with first and second quartile cash costs are profitable. Further, with low levels of financial leverage, low cost producers will not only be better positioned to survive in a downturn but will also be in a better position to use their operating leverage to grow and strengthen their portfolios of mines and reserves when opportunities arise.

How We Measure It

- **EBIT Margin**
A five-year average of annual EBIT divided by annual revenue.
- **Return on Average Tangible Assets**
A five-year average of annual EBIT divided by average tangible assets.
- **“Other” Liabilities to Book Equity**
The most recent year’s other liabilities divided by book equity.

Operating cost efficiencies depend on factors such as quality of reserves, location of assets, labor rates, and capital invested. To assess operating costs, a company’s cash costs and its position on the industry cost curve (as well as the overall shape of the industry cost curve), are all valuable information. However, industry cost curve data is the property of various mining consultants and is not verifiable. In addition, unit costs do not allow comparisons between, for example, gold companies and coal companies, or pure commodity producers and those that produce value-added goods, making it difficult to rely on relative or absolute costs for ranking companies. “Other” liabilities, in addition to their balance sheet impact, have a real cash cost, which generally mirrors the income statement expense.

Therefore, to accommodate these comparability issues, we use the above three financial measures.

Notes on Measurement Criteria

EBIT is adjusted to remove equity income and income from non-wholly-owned subsidiaries and joint ventures for which the company does not have full access to its proportionate share of cash. Dividends received from such entities are added to EBIT. EBIT does include recurring “other” income and expense and excludes non-recurring “other” income and one time charges.

- **EBIT Margin:** This critical factor is an important measure of a company’s profitability over time. The use of EBIT margin and not EBITDA margin is an important indicator of a company’s ability to generate operating profit after the costs of mine maintenance and development, as represented by its annual depreciation charges. Experience indicates that while a mining company’s capex is often lumpy, it will generally need to “spend” its depreciation over time as it maintains and develops new mines.
- **Return on Average Tangible Assets:** This is a strong measure of a company’s ability to generate a consistent and meaningful return from its asset base in both high and low price environments, and specifically takes into account the capital intensive nature of the industry. Tangible assets are defined as total assets less goodwill and other intangibles.
- **“Other” Liabilities to Book Equity:** The presence and level of “other” or “legacy” liabilities and their associated costs can be a differentiating factor between companies and sectors. Legacy liabilities include OPEB, workers’ compensation, reclamation (environmental) and other industry-specific costs such as compensation for health liabilities or injuries. It should be noted that financial statements are not adjusted to treat “other” liabilities as debt, and that the consideration of “other” liabilities to equity is a relative measure used to gauge the magnitude of an issuer’s non-debt obligations to its book equity capital.¹

Reclamation and environmental liabilities are determined using the balance sheet amounts while OPEB, workers’ compensation and other items are taken from the footnotes. For OPEB in particular, we use the off balance sheet amount, which usually exceeds the balance sheet amount and reflects the full exposure without adjustment for accounting “smoothing”. When assessing these obligations, we may adjust reported figures in response to differences in accounting policies across companies, company-specific factors, and our assessment of how these liabilities may change over time. The cash flow impact of these liabilities is vitally important. The companies most affected by this measure are the old-line US coal companies, some of which have significant legacy liabilities.

We use book equity for the denominator rather than total capital as it results in clear and meaningful ratios and does not ‘aid’ the more highly leveraged companies whose ratios would be lowered by the use of total capital in the denominator.

¹ Moody’s may, however, adjust financial statements for OPEB liabilities. Ref: *Other Postretirement Benefits — Moody’s Analytical Approach (December 2004)*

Factor Mapping

Rating Category	Aaa	Aa	A	Baa	Ba	B	Caa
II. Costs & Efficiencies							
1. EBIT Margin	> 30%	22.5% - 30%	15% - 22.5%	7.5% - 15%	2.5% - 7.5%	0% - 2.5%	< 0%
2. ROA	> 20%	15% - 20%	10% - 15%	5% - 10%	2.5% - 5%	0% - 2.5%	< 0%
3. Other Liabilities to Equity	0%-5%	5%-10%	10%-25%	25%-50%	50%-75%	75%-100%	> 100%

* Other liabilities include OPEB, reclamation, black lung & worker's compensation.

Ratings Mapping

Company	Actual Rating	EBIT Margin (5-yr average)	Indicative Rating Category	ROA (5-yr average)	Indicative Rating Category	Other Liabilities to Equity (most recent yr end)	Indicative Rating Category
Rio Tinto	Aa3	32%	Aaa	15%	A	4%	Aaa
BHP Billiton	A1	22%	A	12%	A	20%	A
Alcoa	A2	10%	Baa	10%	A	32%	Baa
Anglo American	A3	19%	A	11%	A	6%	Aa
Alcan	Baa1	5%	Ba	6%	Baa	17%	A
Barrick Gold	Baa1	12%	Baa	6%	Baa	11%	A
Newmont Mining	Baa1	15%	Baa	7%	Baa	8%	Aa
Teck Cominco	Baa2 (Positive)	14%	Baa	6%	Baa	19%	A
Phelps Dodge	Baa2	6%	Ba	5%	Ba	15%	A
Inco Ltd	Baa3	20%	A	6%	Baa	30%	Baa
Falconbridge	Baa3	7%	Ba	5%	Ba	28%	Baa
Peabody Energy	Ba2 (Positive)	6%	Ba	3%	Ba	110%	Caa
Arch Coal	Ba3	3%	Ba	2%	B	88%	B
CONSOL	Ba3	3%	Ba	2%	B	722%	Caa
Stillwater Mining	Ba3	22%	A	8%	Baa	1%	Aaa
Alpha Natural Resources	B2	3%	Ba	9%	Baa	203%	Caa

Positive Outlier

Negative Outlier

Observations

EBIT Margin: Stillwater is a significant positive outlier in this category, reflecting very strong results from 2000 and 2001 when palladium prices were much higher. Its EBIT margin in recent years is well below the five-year average. Stillwater continues to benefit from floors in its long-term contracts, but is nowhere near the ceilings in its palladium contracts given current spot palladium prices. Its EBIT margin is also being squeezed by high cash costs of production.

Stillwater is a positive outlier in six of the eleven categories, but its rating is held back by very low scores in Business Diversity and Size, and FCF to Debt.

Return on Average Tangible Assets: Alpha Natural Resources indicated rating for this factor is significantly higher than its actual rating. Alpha's earnings performance is not directly comparable to that of its coal company peers because of its short corporate history of about two years (which corresponds to the current strong coal markets). In a rating committee, Moody's would emphasize future prospects and consider the prospects for performance in a down-cycle, which would make the distortion caused by inadequate historical data less relevant.

"Other" Liabilities to Book Equity: The ratios for this category are most meaningful from a ratings perspective when they are above 50%. As evidenced in the above table the real impact of this measurement is felt by the US coal companies, all four of which in this sample are above 50%. CONSOL is the most obvious negative outlier at 722%, with the largest legacy liability position of the representative companies in absolute terms (\$3.4 billion). The extremity of its ratio is, however, influenced by the company's smaller equity base relative to comparably sized companies. Peabody's unfavorable outlier status reflects its \$1.9 billion legacy liability.

Newmont and Stillwater are significant favorable outliers on this metric. Stillwater has a small level of reclamation liabilities reflecting the small footprint of its operations and a complete lack of employee legacy liabilities. Newmont's reclamation and employee liabilities are relatively low, nudging it into the Aa category. Companies with low ratios in this category often have a high percentage of non-US operations and a relatively low level of unionized employees.

RATING FACTOR 3: FINANCIAL POLICIES

Why It Matters

A company's financial policies receive a lot of attention in rating committees and are particularly important in the highly cyclical mining sector as they directly impact a company's ability to weather cyclical downturns. It is Moody's view that, over time, the amount of leverage with which a company operates is a choice, and therefore a direct result of its financial policy.

How We Measure It

We look at many qualitative factors that do not lend themselves to quantification via a ratio or metric as well as others that can be quantified. Among the qualitative dimensions we look at are target capitalization and leverage ratios and the company's history in operating within their targets. We also consider a company's history with mergers and acquisitions, stock buybacks, special dividends, etc., and its use of hedging programs (discussed in Other Considerations).

While recognizing the difficulty of quantifying these policies (and recognizing that companies may change their policies over time) we focus on the financial measures that are quantifiable and that we believe are, over a period of time, within the company's control. We note that these metrics also capture related, qualitative factors. The metrics we use are:

- **Debt to Capitalization**
Most recent year's debt to capitalization.
- **Debt to EBITDA**
A five-year average of debt to EBITDA.

Consistent with Moody's standard adjustments², we adjust debt and equity for operating leases (using Moody's modified present value approach), unfunded pension liabilities, hybrid securities and other standard adjustments. Consistent with our approach to adjust full sets of financial statements, we adjust the components of capitalization for these same items.

These two ratios are presented on a gross debt basis. Moody's does take into consideration the amount of cash on hand and considers the ratios on a net debt basis as well. However, cash balances are partly working cash, which needs to remain in the business. Additionally, cash balances are at times built up in anticipation of upcoming capital expenditure programs, scheduled debt amortization, or as is the case currently, in strong metals markets. In all of these circumstances it may make sense to consider gross debt only.

European companies may tend to maintain higher cash balances, which may be linked to tax considerations or to a higher caution on the availability of funding in the bank or bond markets. Thus, considering only gross debt may not reflect the true financial strength of such companies and Moody's may, in these cases, focus on net debt. In these cases we do consider liquidation and tax costs, if any, and deduct them from the cash balance.

While these measures generally incorporate a company's past history with mergers and acquisitions, stock buybacks, special dividends, etc., they do not reflect upcoming activity of this nature that may be unusual or of a size or nature that could significantly impact these measures. At times, Moody's may be aware of the potential for such activities before they are known publicly, and the rating may be affected by such knowledge.

Notes on Measurement Criteria

- **Debt to Capitalization** Although not an ideal measure, debt to capital is a simple way to compare the capital structures of companies operating within an industry. It also provides some insight into a company's financial policies, including its tolerance for debt levels. Further, it is an important indicator for the highly cyclical mining industry in that it provides a snapshot of overall debt in the capital structure and, therefore, a window into a company's ability to ride out a cyclical downturn.
- **Debt to EBITDA** is a measure that balances the above debt to capitalization ratio with the measurement of a company's ability to cover debt with cash flow in various price environments.

2. Ref: Moody's Approach to Global Standard Adjustments in the Analysis of Financial Statements for Non-Financial Corporations — Part I (July 2005)

Factor Mapping

Rating Category	Aaa	Aa	A	Baa	Ba	B	Caa
III. Management Strategies							
1. Debt to Cap	< 20%	20% - 30%	30% - 40%	40% - 50%	50% - 75%	75% - 85%	>85%
2. Debt to EBITDA	< 1.25x	1.25x - 1.75x	1.75x - 2.5x	2.5x - 3.5x	3.5x - 4.5x	4.5x - 6x	> 6 x

Ratings Mapping

Company	Actual Rating	Debt to Cap (most recent yr end)	Indicative Rating Category	DebttoEBITDA (5-yr average)	Indicative Rating Category
Rio Tinto	Aa3	25%	Aa	1.7x	Aa
BHP Billiton	A1	36%	A	1.8x	A
Alcoa	A2	37%	A	2.8x	Baa
Anglo American	A3	29%	Aa	2.1x	A
Alcan	Baa1	51%	Ba	5.0x	B
Barrick Gold	Baa1	33%	A	1.6x	Aa
Newmont Mining	Baa1	17%	Aaa	2.3x	A
Teck Cominco	Baa2 (Positive)	19%	Aaa	4.0x	Ba
Phelps Dodge	Baa2	24%	Aa	5.8x	B
Inco Ltd	Baa3	34%	A	3.9x	Ba
Falconbridge	Baa3	48%	Baa	5.9x	B
Peabody Energy	Ba2 (Positive)	52%	Ba	4.8x	B
Arch Coal	Ba3	58%	Ba	5.0x	B
CONSOL	Ba3	41%	Baa	2.8x	Baa
Stillwater Mining	Ba3	25%	Aa	2.4x	A
Alpha Natural Resources	B2	74%	Ba	1.8x	A

	Positive Outlier
	Negative Outlier

Observations

Debt to Capitalization: All of the current debt to capitalization outliers are favorable for the simple reason that companies like Newmont, Phelps Dodge and Teck Cominco have taken advantage of the strong metals cycle to reduce debt levels substantially and move this particular ratio to historically low levels. Their ratings continue to be held back however, by overall industry cyclical, and ongoing development programs, particularly for Newmont and Phelps Dodge. Stillwater is also a favorable outlier but its rating is constrained by its lack of diversity and high operating costs.

Debt to EBITDA: There are a number of significant outliers here, both favorable and unfavorable. Barrick is a favorable outlier, as the average for the measurement period includes an earlier period when cash flow was stronger and debt lower. Stillwater is a favorable outlier due to its relatively conservative debt position while Alpha is favorable due to its short history in a strong market.

Alcan is an unfavorable outlier due to its acquisition of Pechiney in late 2003, which resulted in year-end debt balances reflecting the impact of the largely debt financed acquisition without any attributable earnings benefit. Adjusting Alcan's 2003 debt to EBITDA ratio for pro-forma Pechiney EBITDA contribution would result in Alcan mapping to a Ba for this factor rather than the B indicated. This does not change with any further pro-forma adjustments as a result of the early 2005 Novelis spin-off due to the relationship between the EBITDA and debt reductions.

Phelps Dodge and Falconbridge are unfavorable outliers reflecting past levels of higher debt and weaker cash flow. Note that the above ratios for Falconbridge do not reflect higher debt levels following the takeover of Falconbridge (old) by Noranda (since re-named Falconbridge).

RATING FACTOR 4: FINANCIAL STRENGTH

Why It Matters

Companies in the capital intensive and cyclical mining industry need to generate sufficient earnings and cash flow to cover their significant maintenance and development capital expenditures, in addition to dividends, interest expense and debt amortization. The three key indicators we use to measure financial strength are the margin by which a company covers its interest expense and the amounts of both cash from operations less dividends and free cash flow that are available relative to debt. The differential in the cash from operations less dividends and free cash flow ratios directly

reflects a company's capital expenditures and therefore its ability to manage its ongoing maintenance and development capex programs. The free cash flow ratio reflects a company's ability to manage scheduled and voluntary debt reduction, additional growth capex and other extraordinary items that may arise.

How We Measure It

- **Interest Coverage**
A five-year average of annual EBIT to interest expense.
- **Cash from Operations Less Dividends to Debt**
A five-year average of cash from operations less dividends to debt.
- **Free Cash Flow to Debt**
A five-year average of annual free cash flow to debt.

Notes on Measurement Criteria

EBIT and debt are adjusted as described elsewhere in this report and interest expense includes capitalized interest.

- **Interest Coverage:** As discussed, the use of EBIT (as opposed to EBITDA) in the interest coverage ratio is important for companies in this industry as they typically need to "spend" their depreciation over time on maintenance and development capex and therefore need to cover interest expense with earnings (EBIT) and not cash flow (EBITDA).
- **Cash From Operations Less Dividends to Debt:** Measures a company's ability to cover all of its basic cash obligations, including working capital and dividends.
- **Free Cash Flow to Debt:** A key measure in determining a company's ability to cover ongoing cash requirements, including maintenance and development capex. The positive or negative cushion produced by this ratio speaks to a company's ability to cover scheduled debt amortization with internally generated funds and addresses its flexibility to maintain or advance its competitive position through growth capex or to alter its capital structure through voluntary debt repayments.

Factor Mapping

Rating Category	Aaa	Aa	A	Baa	Ba	B	Caa
IV. Financial Strength							
1. Interest Coverage	> 12x	9x - 12x	6.5x - 9x	4x - 6.5x	2.5x - 4x	1.5x - 2.5x	< 1.5x
2. FCF to Debt	>25%	17.5% - 25%	10% - 17.5%	6% - 10%	3% - 6%	0% - 3%	< 0 %
3. CFO less Dividends to Debt	>50%	40% - 50%	30% - 40%	20% - 30%	10% - 20%	5% - 10%	< 5 %

Ratings Mapping

Company	Actual Rating	Interest Coverage (5-yr average)	Indicative Rating Category	CFO minus Dividends to Debt (5-yr average)	Indicative Rating Category	FCF to Debt (5-yr average)	Indicative Rating Category
Rio Tinto	Aa3	12.1x	Aaa	28%	Baa	4%	Ba
BHP Billiton	A1	7.6x	A	36%	A	5%	Ba
Alcoa	A2	6.5x	A	18%	Ba	7%	Baa
Anglo American	A3	6.9x	A	23%	Baa	-1%	Caa
Alcan	Baa1	3.7x	Ba	19%	Ba	7%	Baa
Barrick Gold	Baa1	3.7x	Ba	53%	Aaa	6%	Ba
Newmont Mining	Baa1	4.6x	Baa	35%	A	5%	Ba
Teck Cominco	Baa2 (Positive)	5.1x	Baa	33%	A	19%	Aa
Phelps Dodge	Baa2	2.7x	BaS	29%	Baa	18%	Aa
Inco Ltd	Baa3	7.0x	A	25%	Baa	7%	Baa
Falconbridge	Baa3	2.6x	Ba	12%	Ba	-8%	Caa
Peabody Energy	Ba2 (Positive)	1.6x	B	10%	Ba	0%	B
Arch Coal	Ba3	0.7x	Caa	15%	Ba	0%	B
CONSOL	Ba3	1.7x	B	34%	A	2%	B
Stillwater Mining	Ba3	3.5x	Ba	47%	Aa	-11%	Caa
Alpha Natural Resources	B2	2.4x	B	54%	Aaa	22%	Aa

	Positive Outlier
	Negative Outlier

Observations

Interest Coverage: There is only one significant outlier in this category, Arch Coal, which is negative. Arch Coal is an unfavorable outlier, reflecting high debt levels and soft earnings performance throughout the prolonged slump in coal markets. This is the only negative outlier for Arch Coal.

Cash From Operations Less Dividends to Debt: While Rio Tinto is a negative outlier in this category, its CFO – Dividends ratio was very stable (in the 20% to 25% range) throughout the prolonged downturn in metals and coal prices, reflecting the company's broad diversity. The ratio doubled to 48% in the strong markets of 2004. The other significant negative outlier is Alcoa, whose CFO – Dividends ratio deteriorated over the 2001/2003 period due to generally poor aluminum market conditions in combination with debt financed acquisitions.

Barrick is a positive outlier as its five-year average reflects much higher cash flows in an earlier period. CONSOL is a positive outlier as its CFO – Dividends ratio has been steadily supported by the contribution from its methane gas production. Its rating is held back by its high level of other liabilities and relatively weak free cash flow. Stillwater is a positive outlier, as it is in many categories, but its rating is constrained by very limited diversity and negative average free cash flow over the past five years. Alpha is a positive outlier. As mentioned elsewhere, its ratios are generally positive reflecting its short corporate life in a very strong coal market.

Free Cash Flow to Debt: This category has a large number of both negative and positive outliers. Rio, BHP and Anglo are all negative outliers, reflecting their ongoing capital development throughout the downcycle, a period when some of the less diverse mining companies needed to curtail capital development programs due to financial constraints. The quality of the underlying asset base for these three companies however, as captured in the ROA factor, is an important consideration given the cyclicity inherent in the industry. BHP's ratios do not reflect the recent WMC acquisition and higher associated debt levels. Moody's views current debt levels as high for the rating but believes they can be brought back in-line with the rating as currently strong cash flow is used to reduce debt. Falconbridge is a negative outlier reflecting weak cash flow through the downcycle and high debt levels throughout. Its rating is supported by its ability to generate cash and reduce debt in the current metals price environment. Stillwater's unfavorable outlier status reflects the themes already discussed for this name.

Phelps Dodge is a positive outlier as its high leverage to copper, and to a lesser extent, molybdenum, resulted in a huge surge in both its CFO – Dividends and FCF ratios in 2004. The rating is constrained by a relatively high cost base. Teck Cominco's favorable outlier status reflects very strong cash flow in 2004, offsetting weaker FCF and higher debt levels in earlier years. Alpha's favorable outlier status reflects its strong performance during its two year corporate life.

RATING FACTOR 5: BUSINESS DIVERSITY AND SIZE

Why It Matters

Business Diversity and Size have a symbiotic relationship in that large size tends to enable diversification and diversification leads to large size. The larger more diversified companies tend to have reduced cyclicity and greater flexibility when it comes to the assignment of capital for new development properties. They also have greater flexibility to scale back or eliminate underperforming operations in difficult times. At the same time, in a positive metals or coal cycle, they can often quickly re-start shuttered capacity to take advantage of a favorable market on a relatively short-term basis.

Size usually provides insight into a company's operational and regional diversity and market share. It also often reflects diverse and somewhat granular operations that could be sold as necessary to provide alternate liquidity, to exit weaker performing segments or to provide funding for debt reduction or significant growth capex in other segments. Other advantages that generally accompany both size and diversity include greater access to capital and a global presence that opens up opportunities to acquire and develop low-cost reserves, thereby reinforcing a virtuous cycle.

A moderate revenue base could be a limiting factor to the overall rating. For example, we map US\$ 0.5 billion to \$1 billion in revenues to a B rating category on this dimension. More moderate revenues could restrict the business diversity factors (operational, commodity and regional diversity as well as market share) and prevent an issuer from reaching an overall Baa rating.

How We Measure It: Business Diversity

Business Diversity is measured through five principal elements:

- **Operational diversity**
- **Regional diversity**
- **Commodity diversity**

- **Nature of products**
- **Market share**

These types of diversity are some of the most important elements considered in establishing ratings and reflect some of the key risks faced by mining companies from both operational and market perspectives. They also provide a clear picture of the scope and scale of the company under consideration.

Business Diversity: Scoring Method

We have made the measurements for business diversity as objective as possible, but in actuality we do use some subjective judgment and market insight. We quantify the business diversity scale by measuring the most important aspects of the various elements (e.g., number of mines for operating diversity) and assign numerical scores to each element. The individual scores for the five Business Diversity sub factors are then aggregated and this total Business Diversity score is then mapped to a rating category (Aa, Ba, etc.).

Each element of the Business Diversity factor is scored as follows:

V. Business Diversity(Scoring)	
<i>Operational diversity: single vs. multiple mines/plants</i>	
a) Single mine or plant	-4
b) 2-5 mines in one region	0
c) Multiple mines & multiple regions	2
<i>Commodity diversity: single vs. multiple metals</i>	
a) Majority of CF from 1 metal	0
b) Significant contribution from 2-5 metals/products	1
c) Significant contribution from more than 5 metals/products	3
<i>Regional diversity</i>	
a) Assets solely in 1 region	0
b) Assets in multiple regions	1
<i>Nature of products: commodity vs. value-added</i>	
a) Sales are primarily commodities	0
b) Add significant value over LME	2
<i>Market share</i>	
a) Market share is inconsequential (<10%)	0
b) Sector has few players	1

The maximum possible Business Diversity score is therefore nine and the minimum score is negative four.

Notes on Business Diversity Scoring:

- ***Operational Diversity:*** This is a simple tally of the number of mines a company operates. For instance, a single mine or plant receives a score of -4, whereas a company with multiple mines in multiple regions receives a +2. However, in considering the number of mines a company operates, we only include a mine if it represents a material portion of the company's business (e.g., in the case of a company that operates three mines, with two representing less than 10% of cash flow, we are likely to consider this to be a one mine company).
- ***Commodity Diversity:*** This is a measurement of the number of metals produced by a given entity provided that the portion of cash flow derived from any given metal is greater than approximately 10% of the company's total cash flow. Scoring is as follows: zero if the majority of cash flow is from one metal; 1 if there is a significant contribution from two to five metals and 3 if there is a significant contribution from more than five metals.
- ***Regional Diversity:*** This is a measurement of the number of regions in which a company has a significant level of operations (greater than 10% cash flow contribution). This typically corresponds to presence on a single continent and represents an effective measurement of political risk, with so many mines being located in non-investment grade or unrated countries. For US coal companies, however, a distinct region is considered to be one of the five principal US coal producing regions. Scoring is simply zero if the majority of assets are in one region and 1 if significant assets are in two or more regions.

- **Nature of Products, Commodity vs. Value-Added:** We assign a score of zero if sales are primarily commodities and +2 if significant value-added exists. The only companies scoring a two in this sub-factor are the largest aluminum companies.
- **Market Share:** Companies score a zero if market share is inconsequential (less than 10%) and a one if the sector has few players.

Notes on Measurement Criteria: Business Diversity Elements

- **Operational Diversity: Single vs. Multiple Mines:** This is a very important consideration in the rating building block. The best examples of the impact of this variable are single mine companies that could have their business shut down entirely or severely curtailed with a single negative operational event such as a pit wall failure or underground calamity. Single mine operations are also subject to increased business risk tied to political, environmental or regulatory events. Single pit or single underground mines with several distinct access points and/or mining areas would fare better during such operating disruptions in that some production might be able to continue. However, any political, environmental or regulatory event risks faced by these companies would not be mitigated in this circumstance³.

The greater the number of mines that make positive contributions to a company's cash flow the greater the operational diversity and the less the impact of any single operational event on a company's ability to generate cash flow.

- **Commodity Diversity: Single vs. Multiple Metals:** While different base metals and different types of coal (thermal and metallurgical) tend to move broadly together and follow economic cycles in the same manner⁴ they are also affected significantly by supply and demand imbalances that can affect each metal or coal type independently. Any mining company relying solely on a single metal or coal type is therefore subject solely to the vagaries of the market for that specific commodity and is therefore subject to greater price risk and volatility of cash flow. The greater the number of individual metals that comprise a meaningful portion of a company's cash flow the less susceptible the company will be to exaggerated cyclicality.
- **Regional Diversity:** For base metal and gold companies, regional diversity tends to relate to the number of global regions in which a company operates. This usually equates to the number of continents on which it operates. Greater regional diversity is therefore a particularly important mitigant to political risk.

An additional positive factor for regionally diversified coal companies is the mitigation of market risk. Unlike base metal companies that produce pure commodities priced almost entirely in terminal markets, both thermal and metallurgical coal have many different properties and qualities, and are usually sold regionally and under contract, thus reducing the market concentration risk for regionally diversified coal companies. A coal company should derive at least one-third of its cash flow and/or have a significant component of "likely-to-be-developed" reserves within a given region to be considered regionally diversified.

We note that for US coal companies generally, regional diversity usually relates to the number of US mining regions in which a company operates. These regions are defined as Central Appalachia, Northern Appalachia, the Illinois Basin, the Powder River Basin and the western bituminous region.

- **Nature of Products, Commodity vs. Value-Added:** This factor simply differentiates between those companies that produce commodities sold in terminal markets (base metals) and in bulk (coal, iron ore) from those companies that produce products with genuine value-added attributes and which command independently derived pricing.

The only companies that meaningfully benefit from value-added products are the largest aluminum companies which command value-added pricing because of the integrated nature of their businesses, product range and markets served. With respect to coal, Moody's acknowledges that pricing is not of a pure commodity nature as different prices are paid for various coal qualities and coal is sold primarily under fixed price contracts. The underlying price of coal, however, is of a commodity nature and generally reflects pricing for the region in which it is produced. Additionally, Moody's acknowledges that some base metals (nickel in particular) receive a premium to terminal market pricing, but this usually amounts to no more than a cent or two per pound.

- **Market Share:** This factor addresses a company's market position within its various metals or, in the case of aluminum, products, and its ability to have a significant impact within each segment from a supply standpoint. A company's industry position also affects its ability to survive industry consolidation and the likelihood of it being a consolidator or a consolidatee.

3. In this category are Freeport McMoRan, PT International Nickel Indonesia and Stillwater, all of which operate essentially single pit or single ore body mines with multiple access points or distinct mining areas.

4. The price of gold, on the other hand, tends to be primarily related to US dollar movement.

Factor Mapping: Business Diversity

The total Business Diversity Score maps to rating categories, as follows:

Rating Category	Aaa	Aa	A	Baa	Ba	B	Caa
Business Diversity Score	>8	7	5-6	3-4	1-2	0-1	<0

Ratings Mapping: Business Diversity

Rating Factor Elements	Rio Tinto	BHPB	Alcoa	Anglo	Alcan	Barrick	Newmont	Teck Cominco	Phelps	Inco	Falcon-bridge	Peabody	Arch	CONSOL	Stillwater	Alpha
Actual Rating	Aa3	A1	A2	A3	Baa1	Baa1	Baa1	Baa2 (Pos.)	Baa2	Baa3	Baa3	Ba2 (Pos.)	Ba3	Ba3	Ba3	B2
Operational Diversity	2	2	2	2	2	2	2	2	2	2	2	2	2	0	-4	0
Commodity Diversity	3	3	0	3	1	0	0	1	0	0	1	0	0	1	0	0
Regional Diversity	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Nature of Products	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0
Market Share	1	1	1	1	1	1	1	1	1	1	1	1	0.5	0.5	0	0
Total Score	7	7	6	7	7	4	4	5	4	4	5	4	3.5	1.5	-4	0
Indicative Rating Category	Aa	Aa	A	Aa	Aa	Baa	Baa	A	Baa	Baa	A	Baa	Baa	Ba	Caa	B

	Positive Outlier
	Negative Outlier

Observations

Business Diversity: Alcan is a significantly favorable outlier reflecting its presence in a number of regions and markets and, in particular, its plastics business, which separates it from Alcoa on this score. Alcan's rating is constrained by high debt levels following the Pechiney acquisition, notwithstanding the recent debt reduction following the spin-off of Novelis.

Stillwater, the only unfavorable outlier, maps to a Caa on this score reflecting both its lack of diversity and its single mine operation.

Size

How We Measure It

- Most recent annual revenues

Notes on Measurement Criteria: Size

We map size directly using data derived from a company's financial statements. For this measure, we use the most recent annual revenues, with less than \$500 million mapping to a Caa and \$10 to \$25 billion mapping to an Aa.

While the most recent year's revenues will undoubtedly reflect the cyclicity of the metals and coal price cycles, we have used a point in time measure to best reflect the current status of each company i.e., it captures fundamental changes in a company's size that result from acquisition (and disposition) activity that a three or five year average would overlook. We would consider the point in the cycle at which the measure is taken for companies at or near the inflection point for each rating category.

Factor Mapping

Rating Category	Aaa	Aa	A	Baa	Ba	B	Caa
Size	>\$25b	\$10b-\$25b	\$5b-\$10b	\$2b-\$5b	\$1b-\$2b	\$0.5b-\$1b	<\$0.5b

Ratings Mapping

Company	Actual Rating	Size (\$ billions) (most recent yr end)	Indicative Rating Category
Rio Tinto	Aa3	11.3	Aa
BHP Billiton	A1	22.8	Aa
Alcoa	A2	23.5	Aa
Anglo American	A3	24.9	Aa
Alcan	Baa1	24.9	Aa
Barrick Gold	Baa1	1.9	Ba
Newmont Mining	Baa1	4.5	Baa
Teck Cominco	Baa2 (Positive)	2.7	Baa
Phelps Dodge	Baa2	7.1	A
Inco Ltd	Baa3	4.3	Baa
Falconbridge	Baa3	7.0	A
Peabody Energy	Ba2 (Positive)	3.6	Baa
Arch Coal	Ba3	1.9	Ba
Consol Energy	Ba3	2.7	Baa
Stillwater Mining	Ba3	0.4	Caa
Alpha Natural Resources	B2	1.2	Ba

	Positive Outlier
	Negative Outlier

Observations

Size: Alcan is a favorable outlier, with \$24.9 billion in revenues. Its rating, however, reflects its high leverage, contracted EBIT margins and weaker coverage ratios. Stillwater is also an unfavorable outlier, with its small size and diversity offsetting other favorable factors, as discussed throughout this report.

OTHER RATING CONSIDERATIONS

Although Moody's considers quantitative factors in addition to those discussed above, in most cases the metrics presented herein will enable a good approximation of our view on the quantitative aspects of the credit.

In each rating assessment Moody's also considers a number of qualitative factors that do not lend themselves readily to being quantified. These include liquidity; political; regulatory and permitting issues; letter of credit and bonding requirements; significant mine development capex programs; and hedging.

Liquidity: This is a very important consideration that can at times, when liquidity is very poor, have an overriding effect on a company's rating. Although cash flow to debt ratios can provide some insight into a company's longer term prospects for liquidity, they are not a substitute for a thorough review of each company's near-term liquidity. Moody's considers all near term sources of cash, including operating cash flows, balance sheet cash, external facilities, tax refunds, and proceeds from divestitures and other extraordinary payments that may be received. We also consider all potential near-term uses of cash, including operating losses that may require funding, capital expenditures, debt maturities, dividends, share buybacks, acquisitions, and litigation settlements. For these near-term uses of cash we would consider both their timing and the ability (and willingness) of the company to defer or eliminate them.

This analysis of liquidity complements Moody's Speculative Grade Liquidity Ratings and Liquidity Rating Assessments, if available for a particular company. Generally, we expect good liquidity for highly-rated mining companies, so the impact on ratings is generally limited, particularly at the top of the cycle when most, but not all, companies have good liquidity. Liquidity analysis, while always important, becomes much more of an issue for many companies as the cycle declines.

Political Risk: This is a key consideration that affects most mining companies given the simple fact that they must operate in the environment in which the reserves exist. Many of the emerging markets in which mining is prevalent, such as Indonesia (B2, Positive) and Peru (Ba3), present substantial political risks as evidenced by their ratings. Ratings of companies concentrated in a particular country will generally be constrained by the political and economic risks of that country.

In fact, companies that operate solely in a particular country are often small and are frequently single mine operations, either of which would usually contribute to a relatively low rating regardless of domicile. Most of the major companies operate in the riskier countries as well, but their global diversity mitigates the political risk.

We note that in countries such as the US, political risk often plays out as environmental or regulatory risk, which can have a significant negative impact on the development of new mines.

Over the forthcoming months, Moody's intends to develop its comments with respect to the risks associated with issuers that are domiciled or who operate predominately within emerging markets.

Regulatory and Permitting: This usually relates to permitting issues and perhaps most frequently affects companies operating in the US. While existing mining operations tend to operate in an understood regulatory environment, such companies may find it very difficult to develop new mines. This situation will vary state by state.

Significant Capital Spending Programs: This methodology's free cash flow to debt ratio, which is viewed over a four to five year period, is intended to capture and smooth out the inevitable variability in a mining company's capex. However, there are times when capital development programs become so extensive that they have an impact on the rating beyond what would be indicated by the FCF to debt metric. The impact on the rating can result from the sheer magnitude of the expenditures as well as the risks of executing the program on time, on budget and with anticipated operating costs upon completion.

Extraordinary capex programs can result when a company enters a significant growth phase. They may also occur if a company's production has fallen due to a period of lagging development and/or rapid depletion of the reserve and production base.

Gold companies in particular are the most susceptible to large swings in capex because of their generally smaller size and rapid depletion rates, as evidenced by their generally shorter indicated reserve lives than other metals and coal.

The cyclicity of all metals in the mining sector can also be a contributing factor as often neither the capital nor the inclination to develop new reserves exist during prolonged cyclical downturns. The upside of this scenario is a perhaps prolonged period of higher prices during the up-cycle as supply tightens with the lack of meaningful new mine capacity.

Hedging: Generally, there is little differentiation between most companies' hedging programs. Virtually all companies hedge (in one form or another) their interest rate exposure, raw material costs and sales of their commodities, all of which amount to a normal part of a company's financial strategy. This does not subject the company to undue risks if managed conservatively.

Moody's would be concerned if a company hedged a significant portion of one of the above elements, to the point that the hedge became an outright bet on a market direction. Similarly, Moody's would be concerned if a company undertook a hedge position as a pure financial transaction that had little or nothing to do with its underlying exposures.

Many commodity companies hedge none of their sales other than on a short-term basis to hedge some of their contractual pricing exposures. This lack of hedging is usually attributable to a company's desire to give its shareholders full exposure to the company's underlying commodities. Additionally, many commodity companies point to offsetting cycles for their commodity sales and underlying foreign currency exposures as a natural hedge, a view with which Moody's generally concurs.

Meaningful long-term hedge markets do not exist for many commodities. The exception, of course, is gold, which has a very long-term hedge market. Gold companies in the past have tended to be either "non-hedgers" or "hedgers". Moody's takes the view that well-managed gold hedge programs reduce a company's risk to cyclical downturns and can support a rating during those periods. What would cause concern is a situation in which a company hedged more ounces of production than it may be able to deliver, which, in a higher price environment, would force the company to buy at spot to settle contracts at a loss. Also of concern would be a situation in which hedge contracts had early termination provisions, which would force the same settlement situation as just described, or contracts that contain liquidity calls to support underwater positions, potentially causing a liquidity crisis.

Companies with significant hedge positions also have significant negative mark-to-market positions during periods of high prices. Moody's takes a rather benevolent view of these positions as long as there is no concern about the company's ability to deliver into the contracts and there are no early termination provisions or liquidity calls in the contracts.

Final Considerations

The following two tables illustrate the mapping and ratios for each of the eleven factors as well as each company's overall implied rating using both "Moody's" weighting and "equal" weighting (both discussed below). For each factor we have highlighted favorable and unfavorable outliers of two or more full rating categories (Aa, Baa, etc.). Among our conclusions:

- For many companies, the indicated rating categories vary considerably across the eleven factors. A given company may represent a favorable or high outlier for some of the eleven factors and an unfavorable or low outlier for others. There are no companies that rate consistently equal to or above their current rating, or equal to or below their current rating. Instead, all companies rate above their current rating for some factors and below for others.
- We believe the rating methodology is useful in identifying companies that fall outside of the indicated ranges for individual measurement criteria — either favorably or unfavorably — and determining whether there are offsetting factors to compensate for this.
- Because Moody's weights the factors unequally, depending on context, it is difficult to simply average the eleven factors into a composite rating for each company. Additionally, there is a natural inter-relationship among the measurement criteria. Generally speaking, companies of larger size have better diversity and lower dependence on any one element of diversity. Similarly, cash from operations less dividends to debt is likely to be stronger for companies that have lower debt to capital and are most efficient. It is important to note as well that most elements, such as earnings, cash flow and leverage are reflected in varying degrees in most of the metrics.
- Based on the presence and significance of certain qualitative factors, the exact weightings for each factor or measure can vary. In general, however, Moody's weighs all factors equally with the exception of the two factors for Business Diversity and Size, which are given twice as much weight as the other factors. In addition, the following points are of note:
 - Within Business Diversity, the measures of operational and commodity diversity are generally the most important, with operational diversity having a significant negative impact on the rating for single-mine companies.
 - The "Other" Liabilities to Equity component of the efficiency factor acts as a significant detriment to companies with high ratios, but is much less relevant to most mining companies.
 - Other factors that might arise but that are not captured by the model would be overlaid on the model score and the weight of that factor may vary by committee member.
- Using the "Moody's" weighting approach,
 - Twelve of the sixteen companies (75%) are rated exactly in line with the actual rating.
 - Three of the sixteen companies have an implied rating that is one category lower than the actual rating.
 - One has an implied rating that is one category higher than the actual rating.

Related Research

Rating Methodology:

[Moody's Approach to Global Standard Adjustments in the Analysis of Financial Statements for Non-Financial Corporations - Part I, July 2005 \(93570\)](#)

Industry Outlooks:

[Japanese Non-Ferrous Metals Industry Outlook, April 2005 \(91934\)](#)

[Base Metals Industry Outlook 2005, December 2004 \(90546\)](#)

[China's Base Metals Sector: Strong Domestic Fundamentals and Growing Global Impact; But Challenges Remain, December 2004 \(90524\)](#)

[Base Metals Industry, December 2003 \(80797\)](#)

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

Appendix I

KEY RATIO DEFINITIONS

Reserve Life (most recent year end)

Most recent year's proven and probable reserves divided by most-recent year's annual production, (weighted by average sales for multi-metal companies).

EBIT Margin (5-year average)

EBIT = Pretax Income + Interest expense +/- other recurring income/expense - other non-recurring income/expense - income from JVs and associates + cash dividends received from JVs and associates.

EBIT Margin (%) = 5 year average of annual EBIT divided by annual revenues.

Return on Average Assets (5-year average)

ROA (5 year average) = 5 year average of annual EBIT Divided by average tangible assets (last two years).

Other Liabilities to Equity (most recent year end)

Other Liabilities = OPEB + worker's compensation + occupational disease liabilities (including off balance sheet portion of the liabilities) + reclamation and environmental liabilities (balance sheet portions only).

Other Liabilities to Equity = most recent year's other liabilities divided by most recent year's book equity.

Debt to Capitalization (most recent year end)

Debt = ST debt + LT debt + operating leases (using Moody's modified present value approach) + unfunded pension liabilities + securitizations + preferred shares & hybrids.

Capitalization = Debt + deferred taxes + Minority interest + Book equity, adjusted to include other adjustment to debt noted above

Debt to Capitalization = Most recent year's debt divided by most recent year's capitalization.

Debt to EBITDA (5-year average)

EBITDA = EBIT + DD&A.

Debt to EBITDA = 5 year average of annual year end debt divided by annual EBITDA.

Interest Coverage (5-year average)

Interest expense = Gross interest + Capitalized portion of interest.

Interest Coverage = 5-year average of annual EBIT divided by annual interest expense.

Cash from Operation Less Dividends to Debt (5-year average)

Cash flow from operating activities – common dividends – preferred dividends – minority dividends.

CFO – Dividends to Debt = 5 year average of CFO less dividends divided by debt.

Free Cash Flow to Debt (5-year average)

Free Cash Flow = Cash from operations less dividends minus gross capital expenditures.

FCF to Debt = 5 year average of annual free cash flow divided by debt.

Company	Actual Rating *	Reserves	Cost Efficiency & Profitability			Financial Policies		Financial Strength			Business Diversity & Size		Indicated Rating	
		Reserve Life (# of yrs) (most recent yr end)	EBIT Margin (5-yr average)	ROA (5-yr average)	Other Liabilities to Equity (most recent yr end)	Debt to Cap (most recent yr end)	Debt to EBITDA (5-yr average)	Interest Coverage (5-yr average)	CFO minus Dividends to Debt (5-yr average)	FCF to Debt (5-yr average)	Diversity Score	Size (\$ billions) (most recent yr end)	Moody's Weight	Equal Weight
Rio Tinto	Aa3	A	Aaa	A	Aaa	Aa	Aa	Aaa	Baa	Ba	Aa	Aa	Aa	A
BHP Billiton	A1	A	A	A	A	A	A	A	A	Ba	Aa	Aa	A	A
Alcoa	A2	n/a	Baa	A	Baa	A	Baa	A	Ba	Baa	A	Aa	Baa	Baa
Anglo American	A3	A	A	A	Aa	Aa	A	A	Baa	Caa	Aa	Aa	A	A
Alcan	Baa1	n/a	Ba	Baa	A	Ba	B	Ba	Ba	Baa	Aa	Aa	Baa	Baa
Barrick Gold	Baa1	Baa	Baa	Baa	A	A	Aa	Ba	Aaa	Ba	Baa	Ba	Baa	Baa
Newmont Mining	Baa1	Ba	Baa	Baa	Aa	Aaa	A	Baa	A	Ba	Baa	Baa	Baa	Baa
Teck Cominco	Baa2 (Positive)	A	Baa	Baa	A	Aaa	Ba	Baa	A	Aa	A	Baa	Baa	Baa
Phelps Dodge	Baa2	A	Ba	Ba	A	Aa	B	Ba	Baa	Aa	Baa	A	Baa	Baa
Inco Ltd	Baa3	A	A	Baa	Baa	A	Ba	A	Baa	Baa	Baa	Baa	Baa	Baa
Falconbridge	Baa3	A	Ba	Ba	Baa	Baa	B	Ba	Ba	Caa	A	A	Ba	Ba
Peabody Energy	Ba2 (Positive)	A	Ba	Ba	Caa	Ba	B	B	Ba	B	Baa	Baa	Ba	B
Arch Coal	Ba3	A	Ba	B	B	Ba	B	Caa	Ba	B	Baa	Ba	B	B
Consol Energy	Ba3	A	Ba	B	Caa	Baa	Baa	B	A	B	Ba	Baa	Ba	Ba
Stillwater Mining	Ba3	A	A	Baa	Aaa	Aa	A	Ba	Aa	Caa	Caa	Caa	Ba	Baa
Alpha Natural Resources	B2	A	Ba	Baa	Caa	Ba	A	B	Aaa	Aa	B	Ba	Ba	Ba

Company	Actual Rating *	Reserves	Cost Efficiency & Profitability			Financial Policies		Financial Strength			Business Diversity & Size		Indicated Rating	
		Reserve Life (# of yrs) (most recent yr end)	EBIT Margin (5-yr average)	ROA (5-yr average)	Other Liabilities to Equity (most recent yr end)	Debt to Cap (most recent yr end)	Debt to EBITDA (5-yr average)	Interest Coverage (5-yr average)	CFO minus Dividends to Debt (5-yr average)	FCF to Debt (5-yr average)	Diversity Score	Size (\$ billions) (most recent yr end)	Moody's Weight	Equal Weight
Rio Tinto	Aa3	20	32%	15%	4%	25%	1.7x	12.1x	28%	4%	14	11.3	Aa	A
BHP Billiton	A1	20	22%	12%	20%	36%	1.8x	7.6x	36%	5%	14	22.8	A	A
Alcoa	A2	n/a	10%	10%	32%	37%	2.8x	6.5x	18%	7%	12	23.5	Baa	Baa
Anglo American	A3	30	19%	11%	6%	29%	2.1x	6.9x	23%	-1%	14	24.9	A	A
Alcan	Baa1	n/a	5%	6%	17%	51%	5.0x	3.7x	19%	7%	14	24.9	Baa	Baa
Barrick Gold	Baa1	18	12%	6%	11%	33%	1.6x	3.7x	53%	6%	8	1.9	Baa	Baa
Newmont Mining	Baa1	13	15%	7%	8%	17%	2.3x	4.6x	35%	5%	8	4.5	Baa	Baa
Teck Cominco	Baa2 (Positive)	20	14%	6%	19%	19%	4.0x	5.1x	33%	19%	10	2.7	Baa	Baa
Phelps Dodge	Baa2	20	6%	5%	15%	24%	5.8x	2.7x	29%	18%	8	7.1	Baa	Baa
Inco Ltd	Baa3	30	20%	6%	30%	34%	3.9x	7.0x	25%	7%	8	4.3	Baa	Baa
Falconbridge	Baa3	21	7%	5%	28%	48%	5.9x	2.6x	12%	-8%	10	7.0	Ba	Ba
Peabody Energy	Ba2 (Positive)	47	6%	3%	110%	52%	4.8x	1.6x	10%	0%	8	3.6	Ba	B
Arch Coal	Ba3	32	3%	2%	88%	58%	5.0x	0.7x	15%	0%	7	1.9	B	B
Consol Energy	Ba3	65	3%	2%	722%	41%	2.8x	1.7x	34%	2%	3	2.7	Ba	Ba
Stillwater Mining	Ba3	42	22%	8%	1%	25%	2.4x	3.5x	47%	-11%	-8	0.4	Ba	Baa
Alpha Natural Resources	B2	20	3%	9%	203%	74%	1.8x	2.4x	54%	22%	0	1.2	Ba	Ba

* Investment Grade ratings reflect senior unsecured ratings
Speculative Grade ratings reflect corporate family ratings

Positive Outlier
Negative Outlier

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