Analysis of key value drivers for major mining companies for the period 2006–2015

J. MacDiarmid[a], T. Tholana[b,*], C. Musingwini[b]

[a] Anglo American, 45 Main St, Johannesburg 2107, South Africa
[b] School of Mining Engineering, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg, South Africa

ARTICLE INFO

ABSTRACT

The end of the 2000s commodity super cycle resulted in all-time high market values for most commodity based companies, followed by a rapid decline in the values post the Global Financial Crisis (GFC) of 2008. The period 2006–2015 was therefore an appropriate review period as it enabled reviewing changes in company value pre and post the GFC.

In order to determine the key drivers of company value, financial and production data of four diversified and international mining companies was analyzed. Each of the four companies had a different commodity mix. Due to its suitability for comparison of company value, the market based valuation approach was selected as the appropriate company valuation technique, using enterprise value (EV) as the value metric.

Eight potential value drivers were identified. These are production output; commodity price; revenue; earnings before interest, tax, depreciation and amortization (EBITDA) multiple; EBITDA margin; gearing ratio; net debt to EBITDA ratio; and return on capital employed (ROCE). The eight potential value drivers were analyzed firstly using graphical checks, followed by numerical determination of the degree of correlation between each potential value driver and EV using the Pearson correlation coefficient method to confirm the visual analysis. Hypothesis testing was finally done to investigate the strength of the relationships between the potential value drivers and EV.

This paper notes some key findings. Revenue, commodity price and EBITDA multiple are primary drivers of value across all four companies, despite their different commodity mix. Of these three drivers revenue is the strongest value driver. It was also noted that the two debt metrics, gearing ratio and net debt to EBITDA, only correlated with EV in times of declining commodity prices and revenue, indicating that value drivers can change with changing economic conditions. It is therefore important for mining companies to periodically identify key value drivers of company value during different economic periods and ensure that they measure their performance based on these.

1. Introduction

The 2000s commodities super cycle saw widespread growth for most mining companies as rising demand for commodities from emerging markets pushed commodity prices to all-time highs. This boom ended with the onset of the Global Financial Crisis (GFC) in 2008 and commodity prices started to decline to pre-2000 levels. Post the GFC, commodity prices have been recovering, *albeit,* slowly. Commodity price cycles inherent to the mining industry imply that commodity prices will change over time. Changing commodity prices have the potential to affect the value of mining companies as lower commodity prices may lead to lower revenues and profit margins.

As commodity prices changed pre and post the GFC, so did the market values of major mining companies. It is therefore intuitive to link changes in company value to commodity price changes only. However, there are other critical drivers of mining company value. For example for the period 2006–2015 the two diversified international major mining companies BHP Billiton and Rio Tinto increased in value by about 30%, while the other two diversified international major mining companies Anglo American and CVRD-Vale, declined in value by about 60% over the same period. This opposite movement in value was despite all the four companies being subjected to the same commodity price change regime. As recommended by Krinks et al. (2011, p22) every mining company *"needs to have a clear plan for differential value creation, beyond relying on commodity prices"*. An understanding of significant value drivers is important for companies, as all companies
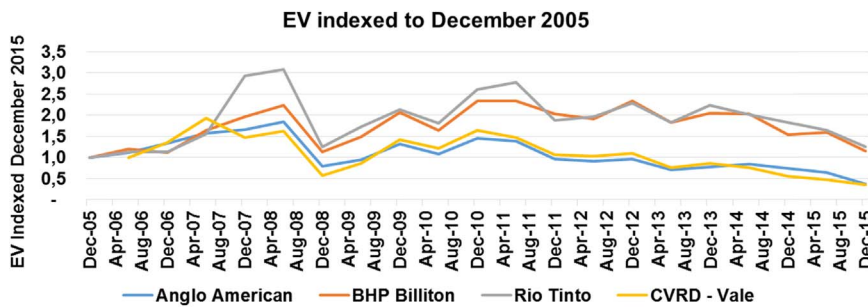

Fig. 1. Enterprise value for the four companies, 2006 – 2015.
Source: (Anglo American, 2006–2016; BHP Billiton, 2005–2015; South 32, 2015; Rio Tinto, 2006–2016; & Vale, 2006–2016)
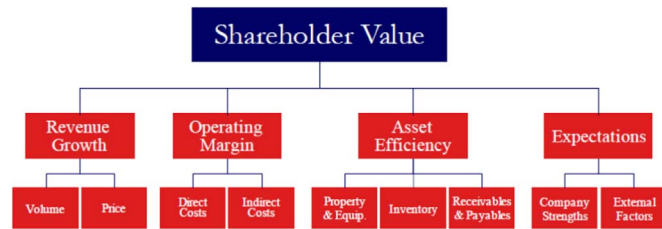

Fig. 2. High level shareholder value map.
Source: Deloitte (2012)

have a common goal of increasing company value. It is therefore important to identify these significant value drivers, in addition to commodity prices, as this will aid in developing financial strategies that can optimize value creation for shareholders. L.E.K Consulting (n.d.) defined a value driver as a variable that significantly impacts value and can be controlled by company management. For example Cambitsis (2013) developed a value driver tree model that can assist management to manage throughput in order to drive revenue through increased production output and demonstrated that managing an activity in isolation does not help to increase overall production system throughput. Lane and Wylie (2014) also developed a value driver tree model that identifies key value drivers along the mining value chain and demonstrated that in order to create value, key performance indicators (KPIs) need to be aligned across different functional disciplines in a mining production system. Garcia and Camus (2011) reviewed the oil and gas management practices and compared them to 14 mining companies in order to establish how value is created. Their study concluded that oil and gas companies create more value by focusing on upstream segments of the business compared to mining that generate less value by focusing more on downstream management of the business.

L.E.K Consulting (n.d., p2) suggested that *"by focusing on value drivers, management can prioritize the specific activities that will affect performance in each area"*. It is therefore important that management

include these value drivers in their Key Performance Indicators (KPIs). This paper explores drivers of mining company value for major mining companies over the period 2006–2015 using statistical analysis. Statistical techniques are key in any analysis as they provide a means to validate data and results through hypothesis testing. Hypothesis testing ascertains whether obtained results are meaningful and acceptable (Business Jargons, 2017). Various methods are available depending on the purpose of analysis which include tests such as, z-test, *t*-test and p-value.

The period 2006–2015 was selected for analysis as an appropriate window period as it includes different economic conditions represented by pre and post GFC periods. By analyzing value drivers under different economic conditions, it is possible to identify if the value drivers change with changing economic conditions. For example, the period 2006–2008 was characterized by a commodity price boom which saw mining companies making extraordinary profits as commodity prices were increasing. This was followed by a commodity price downturn with the onset of the GFC in 2008 and subsequent recovery during the period 2010–2011. Then from 2011 to 2015 there was a steady downward trend in commodity prices that increased pressure on mining companies to reduce costs in order to adjust to the declining commodity prices.

In order to determine the key drivers of company value, production and financial data of four international and diversified mining companies was analyzed. These companies are Anglo American plc, BHP Billiton Group, Rio Tinto Group and Companhia Vale do Rio Doce (CVRD-Vale). These four companies were selected as they represented over 40% of the total revenue of the top 40 mining companies for the 2006 calendar year (Price Waterhouse Coopers, 2007). Over the 10-year period 2006–2015, BHP Billiton, CVRD-Vale and Rio Tinto all remained within the top four revenue earners of global mining companies. However, Anglo American experienced a year-on-year decline in revenue and was ranked 27th by revenue in 2015 (Price Waterhouse Coppers, 2016), hence its inclusion in this study in order to understand how a decline in revenue affects company value. The work reported in

Table 1
A summary of potential value drivers and analysis approaches.

Potential value drive	Definition	Graph type	Statistical analysis possible
Production output	Quarterly change in production output for each commodity since Q4 2005. Measured quarterly.	Stacked area	Yes
Commodity price	Basket of commodities, all indexed back to the average price in 2005.	Linear	Yes
Revenue	Combination of production output change and commodity price to estimate revenue change since Q4 2005. Measured quarterly.	Stacked area (of %)	Yes
EBITDA multiple	A measure of EV to EBITDA. Measures the value of the company compared to earnings. Measured annually.	Linear	Yes
EBITDA margin	A measure of the EBITDA to revenue. Measures the portion of earnings which is profits compared to operating costs. Measured semi-annually.	Linear	Yes
Gearing ratio	Ratio of net debt to sum of debt plus equity. Measures the company financial leverage. Measured semi-annually.	Linear	Yes
Net debt to EBITDA ratio	Net debt divided by EBITDA. Measures the company's ability to pay back debt. Measured annually.	Linear	Yes
Return on capital employed (ROCE)	EBIT divided by capital employed. It is a measure of efficiency of a company's use of available capital. Measured annually.	Linear	Yes