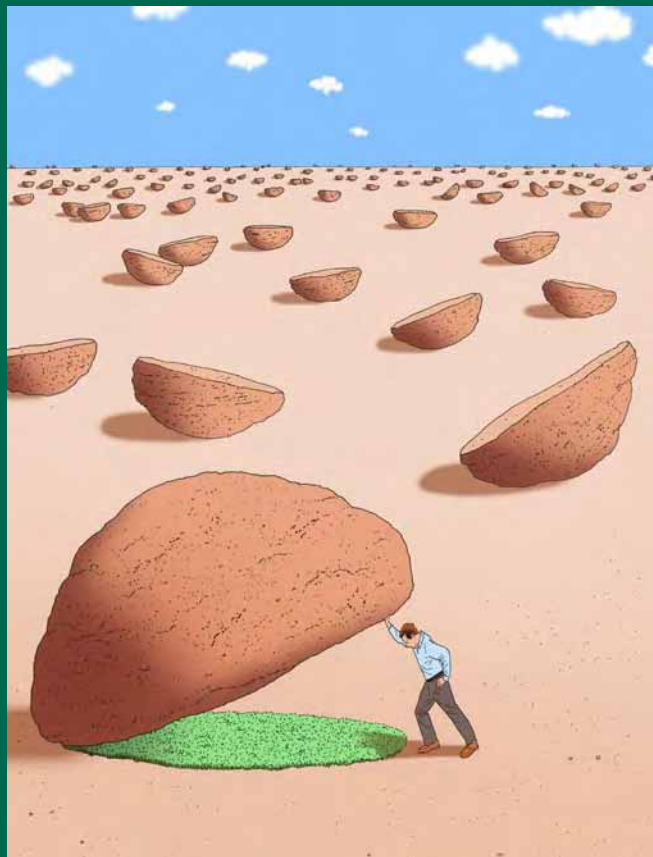


REPORT

THE 2010 VALUE CREATORS REPORT

Value Creation in Mining

More Than Commodity Prices



THE BOSTON CONSULTING GROUP

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THE 2010 VALUE CREATORS REPORT

Philip Krinks

Gustavo Nieponice

Tom King

Victor Scheibehenne

Thomas Vogt

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The Boston Consulting Group, Inc.

One Beacon Street

Boston, MA 02108

USA



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Executive Summary

Value Creation in Mining: More Than Commodity Prices, is based on the twelfth annual report in the Value Creators series published by The Boston Consulting Group. The series provides detailed empirical rankings of the world's top value creators and distills managerial lessons from their success. It also highlights key trends in the global economy and world capital markets and describes how these trends are likely to shape future priorities for value creation. Finally, it shares BCG's latest analytical tools and client experiences to help companies better manage value creation.

Addressing the challenges of value creation for mining companies, this report considers the performance of the industry over a ten-year period, identifying and understanding key drivers of superior performance in value creation. It also provides a set of questions to help mining executives assess their value-creation plans.

BCG analyzed the value creation performance of 37 top mining companies from 1999 through 2009. Our research shows that the mining and materials sector has created substantial value for shareholders, with strong commodity prices explaining about half of total shareholder return (TSR) during this period.

- ◇ On average, the sample delivered a ten-year TSR of 17.2 percent per year from 1999 through 2009, of which 9.7 percentage points were attributable to price increases.
- ◇ Apart from price increases, the remaining 7.5 percentage points of TSR are the result of a combination of volume growth (3.8 percentage points), margin improvement (3.1), and dividend yields (3.1) that was offset by dilution of existing equity holders (2.9). Two

other items, leverage and valuation multiples, together contributed a further 0.4 percentage points.

Some companies have greatly outperformed their peers, with the top ten performers delivering average annual returns in excess of 34 percent. Our research indicates that three factors were the major contributors to their strong performance:

- ◇ Production growth
- ◇ Capital management and discipline
- ◇ Increases in valuation multiples

Production growth is an important contributor to value creation. The top performers derived 5.9 percentage points of TSR annually from production growth, 2.1 percentage points more than the overall sample. M&A was a relevant driver of growth—but not always a driver of value creation.

- ◇ There is no evidence that acquisitive companies have created more value than companies that do not engage in M&A, which is somewhat surprising: the period under analysis was characterized by an economic environment supporting high commodity prices.
- ◇ This result is explained by the high acquisition premiums and the low synergies between mining operations. In addition, a large number of deals were stock transactions, which diminish the upside potential from increases in commodity prices.
- ◇ Unless acquirers are able to improve mine operations through superior technical skills, capture cost syner-

gies, and realize revenue benefits beyond what they have been able to achieve in the past, M&A will continue to bring more growth than value creation.

- ◇ Other avenues toward production growth—mine expansions and exploration (either in-house or through strategic investments in junior companies)—should, therefore, be pursued aggressively.

Growth should not come at any cost. To create value, growth must be both profitable and cost efficient.

- ◇ The strong price growth of 9.7 percentage points from 1999 through 2009 might seem to suggest a similarly healthy increase in profit margins. In reality, margin increases, held down by large increases in costs, contributed only 3.1 percentage points to TSR.
- ◇ The impact of good cost management on TSR tends to be forgotten in times of strong prices. But no matter what the forecast is for the trajectory of commodity prices, refocusing on cost management can prove highly rewarding.

Top performers balance their growth aspirations with strong capital management and discipline, avoiding excessive equity dilution or debt issuances and paying healthy dividends. Capital management items contributed 4.9 percentage points to the TSR of the top ten value creators, compared with 0.9 percentage points for the overall sample. The top ten derived an incremental 4.0 percentage points of TSR from this lever.

- ◇ To create value, growth cannot come from mining “tons at any cost.” Growth must come from quality tons at the right cost. Finding low-cost, low-capital ore bodies and mastering project conceptualization, development, and execution are key to ensuring that growth can be achieved in a capital-efficient way.
- ◇ Portfolio management is also essential to ensuring that capital-consuming businesses are divested and that resources are funneled toward operations that deliver higher returns on invested capital.

Understanding and closing valuation gaps with peers can also be powerful drivers of TSR. For top performers, increases in valuation multiples contributed 7.4

percentage points of TSR—7.7 percentage points more than the 0.3 percentage-point decline experienced by the overall sample. This differential reflects investor optimism about the higher growth potential of the top ten companies.

- ◇ A company’s valuation is driven largely by its outlook for cash flow growth and its perceived risk. For a sustained increase in multiples to occur, a company needs to fundamentally change its existing cash-flow-growth path and its risk levels, demonstrate a credible track record of shareholder-friendly capital-allocation decisions, and effectively communicate this message to investors.
- ◇ Some macroeconomic trends have bolstered the multiples of specific sectors, such as fertilizers. Companies can enhance their chances of success by taking advantage of the long-term supply-and-demand outlook for particular commodities.

Efficient production growth, capital discipline, and increases in valuation multiples are key levers for creating value beyond commodity prices, but there is no one-size-fits-all pathway to success.

- ◇ For each company, the pathway to differential value creation is uniquely related to its distinctive starting position and strategic context.
- ◇ Every mining company should adopt a thoughtful, fact-based, and tailored approach to achieving its value-creation goals.

About the Authors

Philip Krinks is a partner and managing director in the London office of The Boston Consulting Group and the firm’s global leader of the mining and metals sector; you may contact him by e-mail at krinks.philip@bcg.com. **Gustavo Nieponice** is a partner and managing director in BCG’s Santiago office and the firm’s Americas leader of the mining and metals sector; you may contact him by e-mail at nieponice.gustavo@bcg.com. **Tom King** is a partner and managing director, and **Victor Scheibehenne** is a principal, in the firm’s Toronto office; you may contact them by e-mail at king.tom@bcg.com and scheibehenne.victor@bcg.com, respectively. **Thomas Vogt** is a project leader in the firm’s Chicago office; you may contact him by e-mail at vogt.thomas@bcg.com.



The Top Value Creators

The global mining and materials sector is in good shape. So concludes The Boston Consulting Group's twelfth annual report in its Value Creators series. (See *Threading the Needle: Value Creation in a Low-Growth Economy*, BCG report, September 2010.) Few conclusions emerge more vividly than those that illustrate the relative performance of 14 industrial sectors over the previous five years, a period of comparatively moderate value creation.

Total shareholder return (TSR) for the total sample averaged 6.6 percent annually from 2005 through 2009—considerably lower than the long-term historical average of approximately 10 percent. Yet within this overall picture, mining and materials performed spectacularly, generating an average annual TSR of 18 percent. Except for three other industries—chemicals was closest at 12 percent—none generated even half that rate of TSR. (See Exhibit 1.)

This is evidence of a vibrant industrial sector. At the same time, it raises some questions. Did the industry simply get lucky during a short period when raw-material prices were buoyant? What do we know about successful companies in the sector that might offer lessons for others?

Defining the Sample

With these questions in mind, we extended the Value Creators analysis in two directions. We doubled the five-year window of analysis to ten years, examining data for the period from 1999 through 2009 to reflect the longer-term nature of the mining business. We also redefined the sample, focusing it solely on companies with mining

interests. We excluded, for instance, steel producers, aluminum companies that do not operate mines, and quarrying concerns. To define our sample, we identified all companies whose 2009 market value was at least \$5 billion and revenues were at least \$1 billion. Furthermore, inclusion in the sample required that at least 25 percent of their shares had been available on public capital markets and had been publicly listed for at least ten years (with reasonable data quality). The final sample comprised 37 companies, spread across a range of commodities and regions. (See Exhibit 2.)

These companies have either become significant producers in the past ten years or maintained their status as midsize or large mining companies.

The Ten-Year Findings

The evidence from these findings is unambiguous. The current upturn in the mining sector is more than a five-year blip. Mining companies have created remarkable value for their shareholders over a full decade. From 1999 through 2009, the 37 companies analyzed delivered an average annual TSR of 17 percent (weighted by market capitalization). (See Exhibit 3.) Certainly, increases in commodity prices and volume drove much of this growth. (See Exhibit 4.)

Sales growth was the largest single driver, contributing 13.5 percentage points of TSR annually. Most of this—9.7 percentage points—can be attributed to commodity price increases, but a significant portion came from increases in production, accounting for a further 3.8 percentage points. This production growth was attributable solely to acquisitions, suggesting that organic growth was barely

Exhibit 1. Mining and Materials Was the Number One Industry in the 2010 Value Creators Report

	Value creation =	Fundamental value +	Valuation multiple +	Cash flow contribution			
	TSR ¹ (%)	Sales growth (%)	Margin change (%)	Multiple change (%)	Dividend yield (%)	Share change (%)	Net debt change (%)
Mining and materials	18.0	10	4	11	3	3	1
Chemicals	12.0	6	1	5	3	0	0
Machinery and construction	11.8	9	3	1	2	1	0
Consumer goods	9.5	6	1	1	3	0	1
Utilities	8.6	9	4	2	4	2	0
Technology and telecommunications	6.7	7	1	2	2	1	0
Retail	4.2	8	0	5	2	0	1
Automotive and supply	3.9	1	6	10	2	3	0
Transportation and logistics	3.8	5	1	1	2	2	0
Pharmaceuticals and medical technology	3.5	9	1	6	2	1	1
Multibusiness	0.3	7	2	4	3	1	2
Travel and tourism	0.7	5	2	1	2	4	2
Media and publishing	1.5	4	0	6	3	0	2
Pulp and paper	1.7	1	1	0	3	2	1
Total sample	6.6	7	1	0	3	1	1

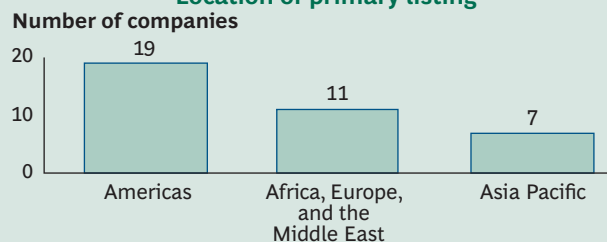
Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

Note: Decomposition is shown in percentage points of five-year average annual TSR; any apparent discrepancies in TSR totals are due to rounding.

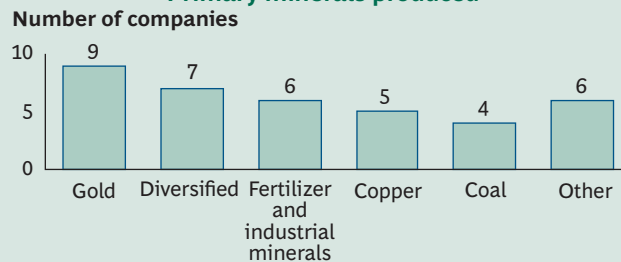
¹Five-year average annual TSR (2005–2009) for the weighted average of the respective sample.

Exhibit 2. The Sample Included a Total of 37 Companies

Location of primary listing



Primary minerals produced

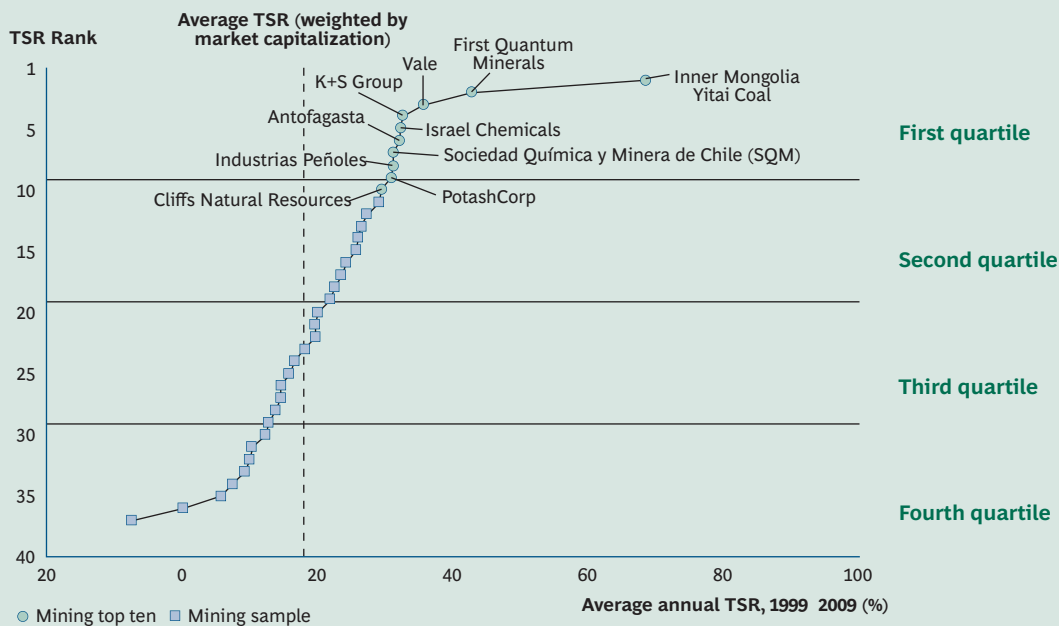


The sample

- ◇ Agrium
- ◇ Alcoa
- ◇ Anglo American
- ◇ AngloGold Ashanti
- ◇ Antofagasta
- ◇ Barrick Gold
- ◇ BHP Billiton
- ◇ Bumi Resources
- ◇ Cameco
- ◇ Cliffs Natural Resources
- ◇ Consol Energy
- ◇ Eramet
- ◇ First Quantum Minerals
- ◇ Freeport McMoRan Copper & Gold
- ◇ Gold Fields
- ◇ Goldcorp
- ◇ Grupo México
- ◇ Hindalco Industries
- ◇ Impala Platinum
- ◇ Industrias Peñoles
- ◇ Inner Mongolia Yitai Coal
- ◇ Israel Chemicals
- ◇ K+S Group
- ◇ KGHM Polska Miedź
- ◇ Kinross Gold
- ◇ Lihir Gold
- ◇ Lonmin
- ◇ Mosaic Company
- ◇ Newcrest Mining
- ◇ Newmont Mining
- ◇ PotashCorp
- ◇ Rio Tinto
- ◇ Sociedad Química y Minera de Chile (SQM)
- ◇ Teck Resources
- ◇ Vale
- ◇ Yamana Gold
- ◇ Yanzhou Coal Mining

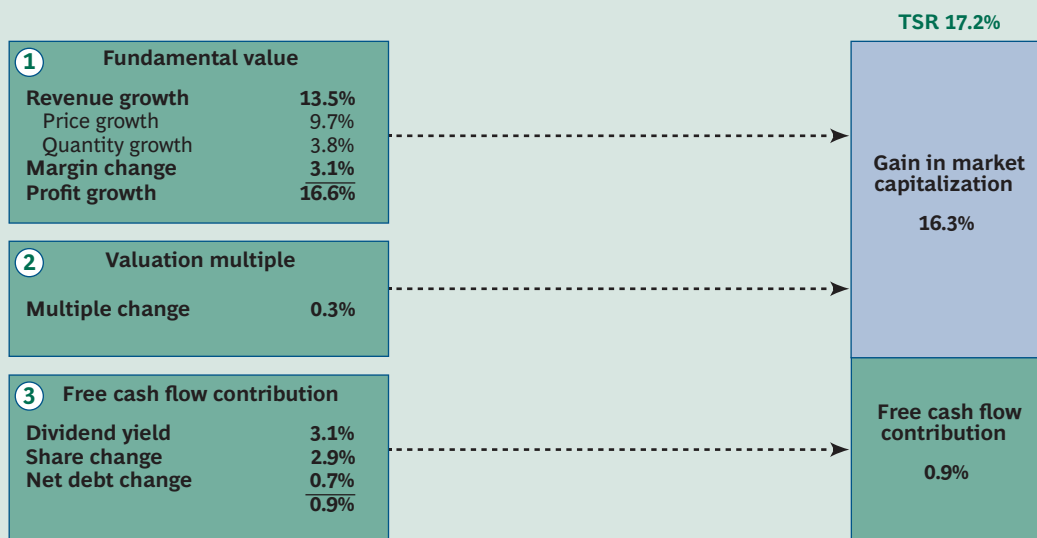
Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

Exhibit 3. Mining Companies Had an Average Annual Total Shareholder Return of 17 Percent



Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.
 Note: TSRs were derived from calendar year data.

Exhibit 4. BCG’s Model Allows Companies to Identify the Sources of Their Total Shareholder Return



Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.
 Note: This calculation is based on the sample average; the contribution of each factor is shown in percentage points of average annual TSR (1999–2009).

enough to cover the decrease in production from older mines.

Growth in profit margins—defined as earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by revenues—contributed an additional 3.1 percentage points of TSR annually. This might appear to be a low level of profitability growth in a period of such prosperity, but it reflects the rapid rise in unit costs, which increased by 8 percent annually.

Although rising commodity prices have benefited industry revenues, they have also led to increases in the cost of some supplies, including fuel, consequently constraining the growth of profit margins.

Dividend yields added 3.1 percentage points more to annual TSR, while stock issues that diluted the holdings of existing shareholders reduced TSR by 2.9 percentage points annually.

Changes in valuation multiples and net debt are two other components of TSR, each of which contributed less than 1 percentage point annually to TSR.

Introducing the Top Ten

As Exhibit 3 shows, the overall picture of prosperity conceals some sharp differences among the companies. Of the 37 companies, 9 recorded an average annual TSR in excess of 30 percent. At the other end of the scale, the TSRs of 7 companies were in single digits or showed an absolute decline during the period.

In order to identify the factors that distinguish the companies that did extremely well, we have focused closely on the ten leading value creators. (See Exhibit 5.) The average annual TSR of the top performers over this period was 34 percent—almost twice the average for the sector sample.

Exhibits 6 and 7 examine each component of TSR to compare the performance of the top ten with that of the entire sample. Exhibit 6 shows that \$100 invested in the top value creators in 1999 would have grown to almost \$2,000 by the end of 2009. This more rapid value creation was driven largely by three elements—production growth, capital management and discipline, and increases in valuation multiples.

Exhibit 5. The Mining and Materials Top Ten, 1999–2009

Rank	Company	Location	TSR ² (%)	Market value ³ (\$billions)	TSR Decomposition ¹					
					Sales growth (%)	Margin change (%)	Multiple change ⁴ (%)	Dividend yield (%)	Share change (%)	Net debt change (%)
1	Inner Mongolia Yitai Coal	China	68.8	6.3	36.9	20.2	1.5	4.3	0.0	5.8
2	First Quantum Minerals	Canada	42.9	6.1	47.4	3.8	-0.6	0.4	-11.4	3.4
3	Vale	Brazil	35.7	148.6	22.3	-0.8	9.2	5.4	-1.1	0.8
4	K+S Group	Germany	32.8	11.1	11.8	-2.6	21.9	4.6	1.0	-3.9
5	Israel Chemicals	Israel	32.5	17.4	9.8	1.2	9.1	5.9	-0.7	7.1
6	Antofagasta	U.K.	32.3	15.8	33.1	8.8	-19.4	4.6	0.0	5.3
7	Sociedad Química y Minera de Chile (SQM)	Chile	31.2	10.3	11.8	4.4	7.7	3.6	0.0	3.8
8	Industrias Peñoles	Mexico	31.2	8.7	14.9	4.9	2.1	5.3	0.1	3.8
9	PotashCorp	Canada	31.1	32.1	7.4	3.7	15.7	1.4	0.9	2.0
10	Cliffs Natural Resources	U.S.	29.7	6.0	21.2	4.3	6.6	1.3	-3.6	0.0

Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

Note: The sample comprises 37 global companies with a market valuation greater than \$5 billion, sales greater than \$1 billion, and a free float of at least 25 percent.

¹The contribution of each factor is shown in percentage points of the ten-year average annual TSR; any apparent discrepancies in TSR totals are due to rounding.

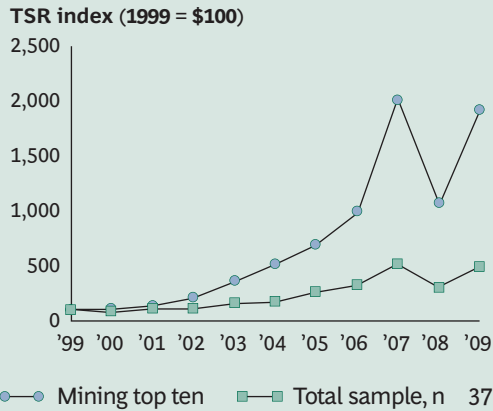
²Average annual TSR, 1999–2009.

³As of December 31, 2009.

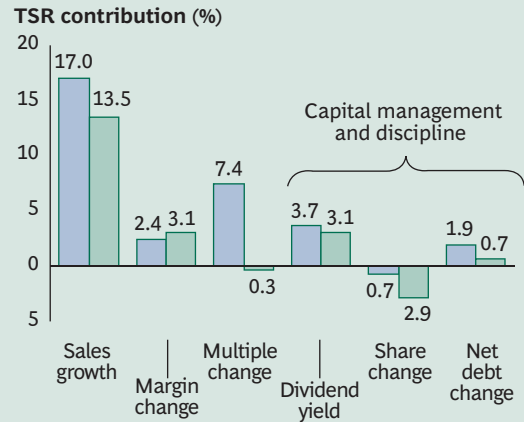
⁴Change in the EBITDA multiple.

Exhibit 6. The Value Creation of the Top Ten Compares Favorably with the Industry Sample, 1999–2009

Total shareholder return

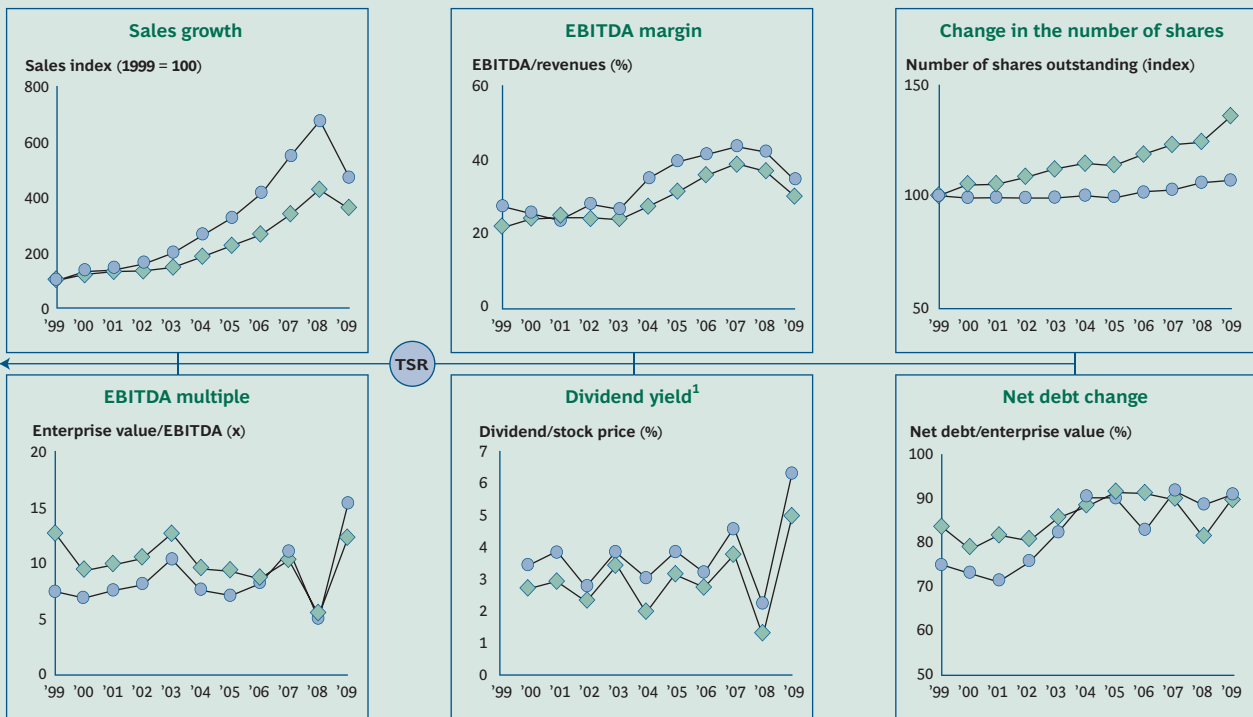


Ten-year TSR decomposition



Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.
 Note: The industry calculation is based on the sample average.

Exhibit 7. Value Creation at the Top Ten Versus the Industry Sample, 1999–2009



Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.
 Note: The industry calculation is based on the sample average.
¹Bumi Resources is not included in the 2003 calculations.

Many Pathways to Value Creation

Companies have applied different combinations of these levers in their pursuit of value creation. Some companies achieved success through rapid sales growth built on as-

tute investment in the right sectors. Others did so by strong capital management or by closing a valuation gap. The drivers of high TSR discussed above were also critical for the very largest companies in our sample. (See the sidebar “Winning Big: Mining’s Large-Cap Companies.”)

Winning Big Mining’s Large-Cap Companies

Nine of the companies included in the sample had a market capitalization that exceeded \$3 billion in 1999. This large-cap sample delivered average annual total shareholder return (TSR) of 15.1 percent from 1999 through 2009.

The three best performers in this group were Vale, BHP Billiton, and Freeport-McMoRan Copper & Gold. Their combined average TSR of 22.9 percent per year was almost 8 percentage points above the large-cap average. (See the exhibit below.) Compared with the nine large-cap companies, the performance of the three leaders is dramatically impressive:

- ◇ Faster sales growth (16.6 percentage points of TSR annually versus 12.1 percentage points, particularly in recent years)
- ◇ Higher growth in earnings before interest, taxes, depreciation, and amortization, or EBITDA margin, (4.8 versus 2.9 percentage points)

- ◇ Lower equity dilution (–1.4 versus –2.2 percentage points of dilution)
- ◇ Greater reduction in leverage (1.3 versus 0.2 percentage points)
- ◇ Higher dividend yields (3.6 versus 2.8 percentage points)

The reasons for the superior performance of the three leaders are consistent with those that explain how the top 10 value creators exceeded the performance of the aggregate sample of 37 studied in this report. The clear implication is that the drivers of superior performance can apply to companies of any size.

Mining’s Large-Cap Value Creators, 1999–2009

Rank	Company	Location	TSR ² (%)	Market value ³ (\$billions)	TSR Decomposition ¹					
					Sales growth (%)	Margin change (%)	Multiple change ⁴ (%)	Dividend yield (%)	Share change (%)	Net debt change (%)
1	Vale	Brazil	35.7	148.6	22.3	–0.8	9.2	5.4	–1.1	0.8
2	BHP Billiton	Australia	19.7	220.9	13.4	8.1	–6.0	2.8	0.0	1.4
3	Freeport-McMoRan Copper & Gold	U.S.	16.9	34.5	21.9	0.8	–3.0	2.7	–9.7	4.2
	The top three large-cap companies		22.9	404.1	16.6	4.8	–2.0	3.6	–1.4	1.3
	The large-cap sample		15.1	662.8	12.1	2.9	–0.7	2.8	–2.2	0.2

Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

Note: In 1999, nine global companies had a market capitalization greater than \$3 billion and a free float of at least 25 percent.

¹The contribution of each factor is shown in percentage points of the ten-year average annual TSR; any apparent discrepancies in TSR totals are due to rounding.

²Average annual TSR, 1999–2009.

³As of December 31, 2009.

⁴Change in the EBITDA multiple.



How They Did It

It is no surprise that commodity prices were an important driver of returns in the mining industry. Rapid increases in commodity prices from 2004 through 2009 made a significant contribution to the industry's prosperity and contributed around 9.7 percentage points annually toward sales growth in the decade covered by this report. Nevertheless, there were considerable variations in annual price growth among the various commodities, from a low of 2.1 percent for aluminum to highs around 15 percent for potash and iron ore. (See Exhibit 8.)

Despite these large variations in price growth, differences in price increases in the commodities the top performers produce do not differentiate the leaders from the sample average: the differences in price increases explain just 1.4 percentage points of the 17 percentage-point differential between these two groups. This is consistent with Exhibit 9, which shows that commodity exposure is ultimately not the determining factor in company performance. Our analysis shows substantial divergence among companies across the different commodity groups.

To influence the price lever through exposure to the right commodities, mining companies need to understand their long-term price outlook for those commodities. This is driven by the long-term outlook for supply and demand and the dynamics between them.

Getting this right demands a mastery of both supply-and-demand economics and corporate-portfolio management, as well as a clear perspective on the megatrends that influence the environment in which the company operates. These considerations are also closely related to issues of capital management and discipline and will be examined later in the report.

For diversified companies that mine a range of commodities, this translates into decisions related to where to weight their portfolios. Picking the metals with the best long-term economics increases the chances of a company's prospering over the long run. (See the sidebar "Diversify or Pure Play?")

Price growth is vastly outweighed by three other levers—production growth, capital management and discipline, and increases in valuation multiples—as the reason for or source of the "edge" enjoyed by the most successful companies in the rest of the sector. (See Exhibit 10.)

Production Volumes

Although companies have limited control over commodity prices, they can exert considerable influence over how much they produce.¹ During the decade under consideration, production increases contributed 5.9 percentage points of TSR annually for the top ten companies—2.1 percentage points more than the sample as a whole.

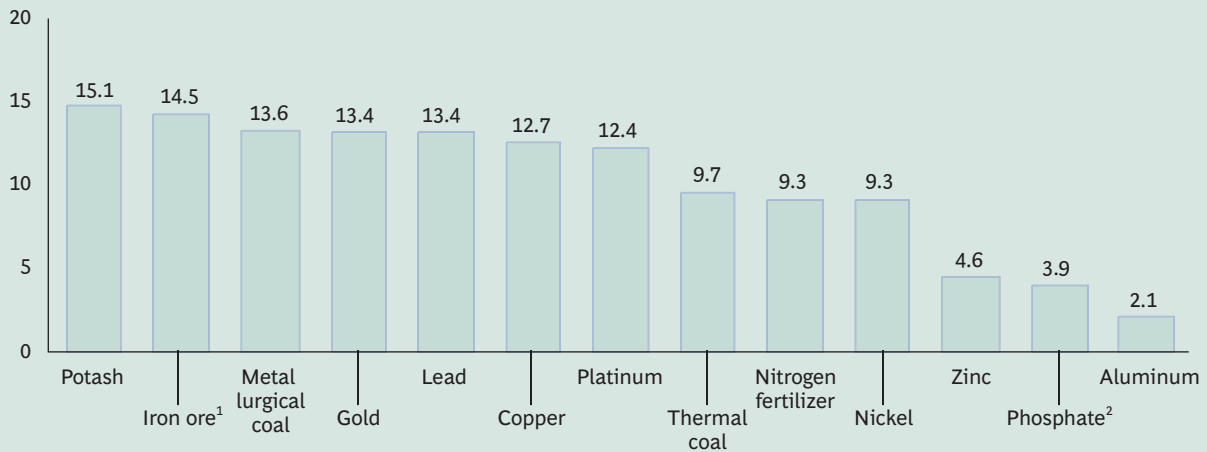
For the top ten, much of this growth took place before the surge in commodity prices that started in 2005 and was almost evenly balanced between organic growth and M&A. Top mining companies profitably grew production during this period by taking several approaches, including the following:

- ◇ **Expanding Existing Operations.** Growth at Industrias Peñoles was driven partly by the expansion of existing silver and gold mines in Mexico.

1. Note, however, that prices are partly determined by the total quantity supplied to the market.

Exhibit 8. Commodity Price Growth, 1999–2009

Average annual commodity price growth, 1999–2009 (%)



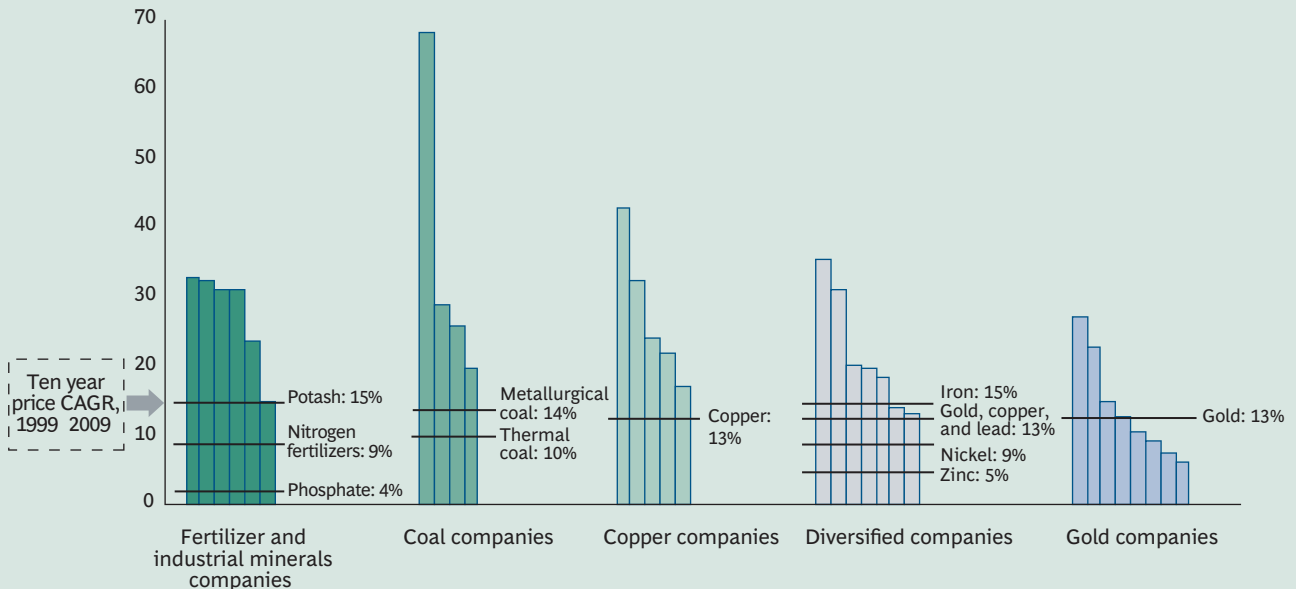
Sources: Thomson SDC Platinum; London Metal Exchange; Bloomberg; Australian Bureau of Agricultural and Resource Economics; Compustat; Steel Business Briefing; Macquarie Research, May 2010; RBC Capital Markets; BCG analysis.

¹Australian benchmark price for iron ore.

²Average of monoammonium phosphate (MAP) and diammonium phosphate (DAP) prices.

Exhibit 9. Commodity Exposure Is Not a Major Determinant of Total Shareholder Return

Annual TSR, 1999–2009 (%)



Sources: Thomson Reuters Datastream; BCG analysis.

Note: TSR is derived from calendar year data. Each bar represents a company. Companies that specialize in other metals such as aluminum and uranium are not shown. CAGR = compound annual growth rate.

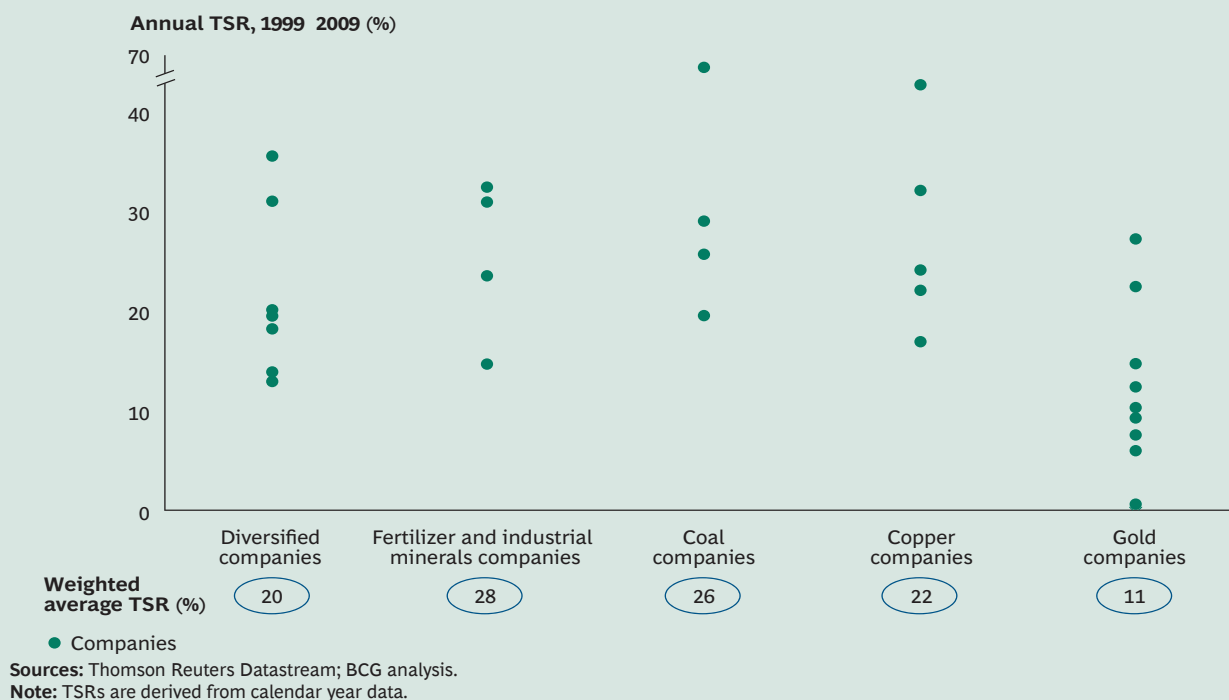
Diversify or Pure Play?

Diversify or concentrate? One commodity or many? It is a constant debate within the industry—one that inevitably echoes through corporate-strategy discussions. On the subject of growth in total shareholder return (TSR), the contest results in a draw, with no clear pattern of differentiation between diversified and pure-play companies. There is no clear benefit or evident disadvantage from diversification. (See the exhibit below.) Investors' preferences for one or the other (or the underlying commodity these companies produce) depend largely on investors'

desire for broad or sector-specific exposure, their tolerance of risk, and their view of the future prospects of individual companies.

Companies that specialize in certain products—fertilizer, coal, and copper—tended to perform better than the norm. Those that mine gold and aluminum generally did worse. The performance of diversified companies fell between that of those two groups.

There Is No Clear Difference Between the TSRs of Diversified and Pure-Play Companies



◆ Identifying and Advancing New Capital Projects.

Increases in production accounted for around 20 percentage points of TSR for Antofagasta and almost 40 percentage points of TSR for First Quantum Minerals. Both companies grew substantially faster than their peers and the market as a whole, in part because of new projects. Antofagasta developed new mines in Chile from 1999 through 2002, increasing its production base sevenfold and placing it perfectly to take advantage of the steady increase in copper prices from 2002 through 2007. First Quantum invested in Africa's

copper belt—Zambia and the Democratic Republic of the Congo—and in Mauritania, opening new mines in 2005, 2006, and 2007.

◆ Acquiring Projects and Mines in Anticipation of Demand Growth.

Vale's growth was driven by expanding its output of iron ore, of which it is the world's largest producer. From 1999 through 2007, Vale acquired several Brazilian iron-ore mines and enlarged its existing operations, nearly tripling production. This rate of production growth, which was faster than that of its

Exhibit 10. Three Levers for Superior Performance

TSR contribution (percentage points)	Top Ten	Sample	Difference	
Revenue growth	17.0	13.5	3.5	Production growth
Price growth	11.1	9.7	1.4	
Quantity growth	5.9	3.8	2.1	
Margin change	2.4	3.1	-0.7	
Profit growth	19.4	16.6	2.8	
Net debt change	1.9	0.7	1.2	Capital management and discipline
Dividend yield	3.7	3.1	0.6	
Share change	-0.7	-2.9	2.2	
Free-cash-flow contribution	4.9	0.9	4.0	
Multiple change	7.4	-0.3	7.7	Increases in valuation multiples
Valuation multiple	7.4	-0.3	7.7	
Residual term ¹	2.6	0.0	2.6	
Average annual TSR (%)	34.3	17.2	17.1	

Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.
¹A residual cross product exists as a result of the interaction of individual terms.

competitors, was responsible for generating more than half of Vale's total revenue growth in this period.

By contrast, organic growth was slightly negative for the overall sample. (See Exhibit 11.) This indicates that new production from organically developed operations was barely sufficient to offset the decline in output from existing mines. Results varied by commodity; for example, iron ore grew organically, but lead declined.

One important reason was a lack of investment in and focus on exploration during the 1990s, resulting in a slow-down in resource and reserve growth even among junior mining companies. This pressure was exacerbated by declines in ore quality at existing mines. Spending picked up early in the first decade of this century, but the long lead-times involved in turning successful exploration into production meant that companies seeking growth had to develop other strategies, such as pursuing acquisitions, while they waited for new mines to begin producing.

The Role of M&A

One consequence of the sample's low levels of organic growth was a rapid increase in M&A activity. In 1999,

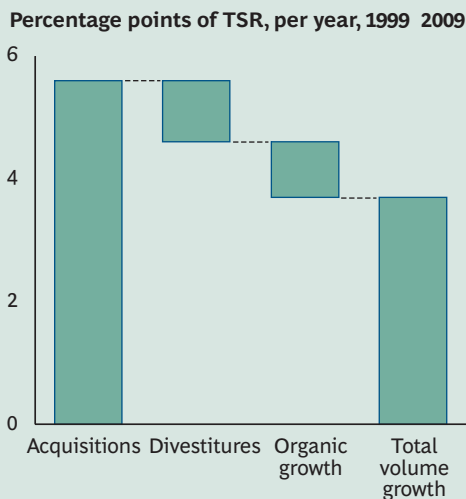
there were more than 100 mining companies whose annual revenues exceeded \$250 million. During the next decade, more than half of those companies were acquired. Takeover activity grew sharply among the companies in our sample. Their combined average annual expenditure on deals tripled from \$8.5 billion from 1999 through 2004 to about \$25 billion during the next five years. This trend continued into 2010, driven by a belief in strong demand from emerging economies, the perceived difficulty and long lead-time associated with organic development, and a desire to deploy large accumulated cash reserves.

Some companies have made highly effective use of M&A. Anticipating growing demand, Vale consolidated its position as the leading iron-mining company and enjoyed average annual TSR of 35.7 percent from 1999 through 2009. Together with organic growth, Vale's acquisitions enabled it to expand production capacity faster than its competitors. Keeping a tight focus on cost control, Vale also managed to maintain margins during this period.

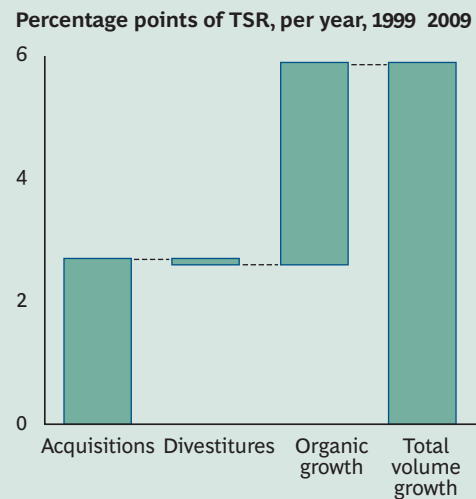
M&A is not always associated with value creation despite some significant increases in market capitalization following such transactions. In fact, even though the years from 1999 through 2009 have seen extraordinary commodity-price increases, there is no evidence that acquisitive com-

Exhibit 11. M&A Was the Primary Driver of Volume Growth

The sample as a whole relied on M&A for volume growth...



...but the top ten grew production volume both organically and through M&A



Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

panies consistently create more value than their counterparts that make no acquisitions. (See Exhibit 12.)

There are several reasons for this. Transactions during this period attracted high acquisition premiums, averaging 38 percent of prebid market value and eating heavily into the financial benefits of such deals. (See Exhibit 13.) This would be less of a problem in an industry in which mergers are accompanied by sizable synergies. In mining, this benefit does not apply. Our estimates show that synergies tend to average only 5 to 6 percent of market capitalization—considerably less than the premiums paid.

In addition, around 40 percent of the value of these transactions was funded through stock or hybrid stock-and-cash deals, meaning that the acquiring stockholders got a smaller piece of a larger business. These stockholders, therefore, did not increase their net exposure to a commodity, and they missed out on the value created by the unexpected rise in commodity prices later in the decade.

Cash deals have, by contrast, been generally beneficial for acquiring shareholders. If prices increase beyond market expectations, such deals do well. This was precisely what happened from 1999 through 2004, when companies that

did cash-only acquisitions had a median annual TSR in the following five years of 25 percent. However, companies that did stock-only acquisitions had a median annual TSR of 11 percent over the same period. Obviously, cash deals also have a potential downside. Should commodity prices suddenly decrease, acquisitions paid for in cash will suffer reduced cash-generating capacity while the acquirer remains liable for any debt raised as part of the deal.

For many companies, M&A is no more guaranteed a source of sustained success than reliance on rising commodity prices. Looking forward, mining companies will need to make organic growth a part of their growth agenda. This is certainly not an easy option, but getting it right can generate serious rewards.

Active portfolio management is also critical, with divestitures playing an important role equal to that of acquisitions. For example, diversified mining companies did well moving away from gold and toward iron ore during this period. Similarly, Anglo American was rewarded by investors for its astute divestment of noncore assets and for its renewed focus on mining. An essential ingredient in active portfolio management is a clear understanding of the expected contribution and capital requirements of each part of the portfolio.

Exhibit 12. There Is No Correlation Between Acquired Value and Total Shareholder Return

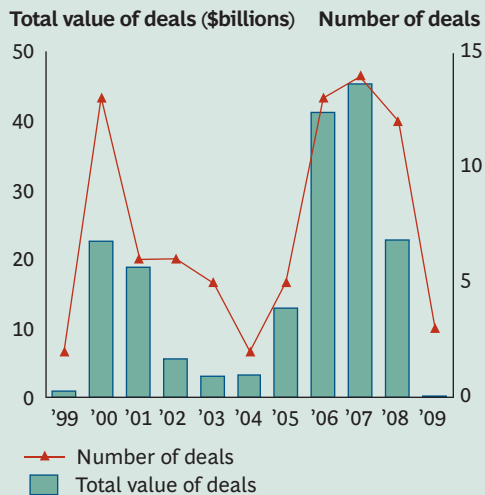


Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

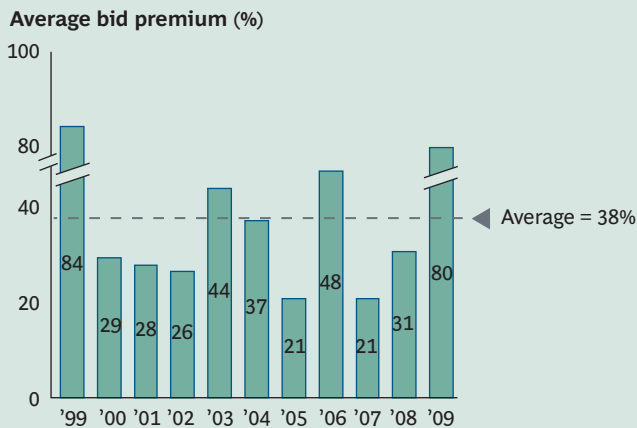
^aIncludes all acquisitions through which majority control was obtained.

Exhibit 13. From 2005 through 2007, the Value of Acquisitions Rose Sharply, Though Bid Premiums Were Steady

Deal volumes within our sample increased significantly...



...while bid premiums averaged 38 percent during the past decade¹



Sources: Thomson SDC Platinum; Zephyr; BCG analysis.

Note: N = 81 deals.

¹The bid premium is the percentage by which the amount offered exceeds the prebid market value of the acquired company.

Capital Management and Discipline

Capital management and discipline—the prudent management of the capital required to support a business (for example, through the sale of equity or debt) and the use of the resulting free cash flows (for example, share buybacks, debt repayment, and dividends)—help explain a further 4.9 percentage points of TSR annually for the top ten performers. This is 4.0 percentage points higher than that of the sample, which derived just 0.9 percentage points annually from this lever.

A significant difference was that most of the top ten avoided diluting the holdings of existing shareholders through new share issues, contributing 2.2 percentage points to their TSR. A further 1.2 percentage-point differential reflected the greater ability of the top companies to reduce their leverage. The remaining 0.6 percentage points were explained by higher dividend yields.

Industrias Peñoles, for example, delivered a 31.2 percent TSR annually from 1999 through 2009. The company undertook diligent, continued exploration throughout the cycle. This enabled it to both maintain its reserve base and expand production from existing and new mines without needing to make major acquisitions or dilute the holdings of existing shareholders. Peñoles was, therefore, well placed to benefit from the rise in commodity prices, allowing it to pay a healthy average annual dividend of 5.3 percent and also reduce its leverage.

A contrasting example from the gold industry demonstrates the negative effects of insufficient capital discipline. In a sector characterized by large acquisitions, a particular gold company grew rapidly from a minor to a significant industry position: through a series of large transactions, it increased revenues nearly tenfold across the decade. However, this growth came at the expense of existing shareholders, whose shares were diluted in order to finance the deals. Each transaction was accompanied by a negative announcement effect—early warning of value being destroyed, inevitably leading to a long-term TSR that was lower than the industry average.

Increases in Valuation Multiples

The expansion of valuation multiples sharply differentiated the top ten performers from the rest of the sample,

adding 7.4 percentage points annually to their TSR. This effect was particularly strong for Vale and the fertilizer and industrial minerals companies in the top ten. By contrast, the overall sample showed an average annual decrease of 0.3 percentage points.

Valuation multiples are driven largely by a company's outlook for cash flow growth and its perceived risk. Although some multiples, such as that of the fertilizer sector over the past decade, were boosted by macroeconomic trends, companies can also take action and help themselves. If a company fundamentally changes its existing growth path or risk level, credibly demonstrates a track record of value creation, and effectively communicates this message to investors, growth in its valuation multiple can follow.

The top ten started the period with an EV-to-EBITDA (enterprise value—the sum of the market value of equity and debt—divided by earnings before interest, taxes, depreciation, and amortization) multiple of 7.4 compared with 12.7 for the total sample. By 2009, the top ten had achieved a multiple of 15.2 compared with 12.3 for the total sample. These benefits were not spread evenly across the top ten companies, however.

The anticipation of increased demand for fertilizers meant that the four companies with interests in this sector—K+S Group, PotashCorp, Israel Chemicals, and Sociedad Química y Minera de Chile (SQM)—performed particularly well. These companies increased their EV-to-EBITDA multiples from 6.5 to 21.4, contributing an average of 13 percentage points annually to their TSR. Companies such as K+S benefited from the buoyant outlook for fertilizer demand, underpinned by investor expectations of strong long-term demand for agricultural products from emerging economies. K+S also helped its own multiple by undertaking consolidating acquisitions in fertilizer and salt.

Vale, an outstanding performer in several different areas, derived 9.2 percentage points of TSR from multiple expansion, closing the valuation gap with its peers. This appears to reflect Vale's strong outlook for cash flow growth, which is based on a large project pipeline and a record of delivering on promises and making successful acquisitions. Vale's locations within and exposure to the fast-growing economies of countries such as Brazil, Russia, India, and China also underpins investor optimism.



Emerging Themes and Recommendations

The rise of the global challengers—emerging-market companies that have become serious global competitors—has been a feature of many sectors in recent years. Mining is no exception. In fact, seven of our top ten value creators are from, or have significant operations in, emerging economies.

This will have profound consequences for established players. The decade to come will see considerable changes in the competitive landscape, and, if established players expect not merely to survive but also to prosper in this environment, they will have to know how to respond to the new challengers.

As a group, emerging-market companies performed extremely well from 1999 through 2009. Their average annual TSR was 27 percent, almost double the 14 percent mean that was achieved by companies from established markets during the same period (albeit from a different starting point). The challengers achieved their superior performance through higher sales growth, stronger multiple expansion, and higher dividend yields. (See Exhibit 14.)

The following elements are among those that underpin the success of global challengers in the mining industry:

- ◇ Strong organic growth, such as that shown by Antofagasta and First Quantum, from new low-cost discoveries and mine expansions
- ◇ Exposure to locations with underdeveloped resource bases
- ◇ Increasingly professional management

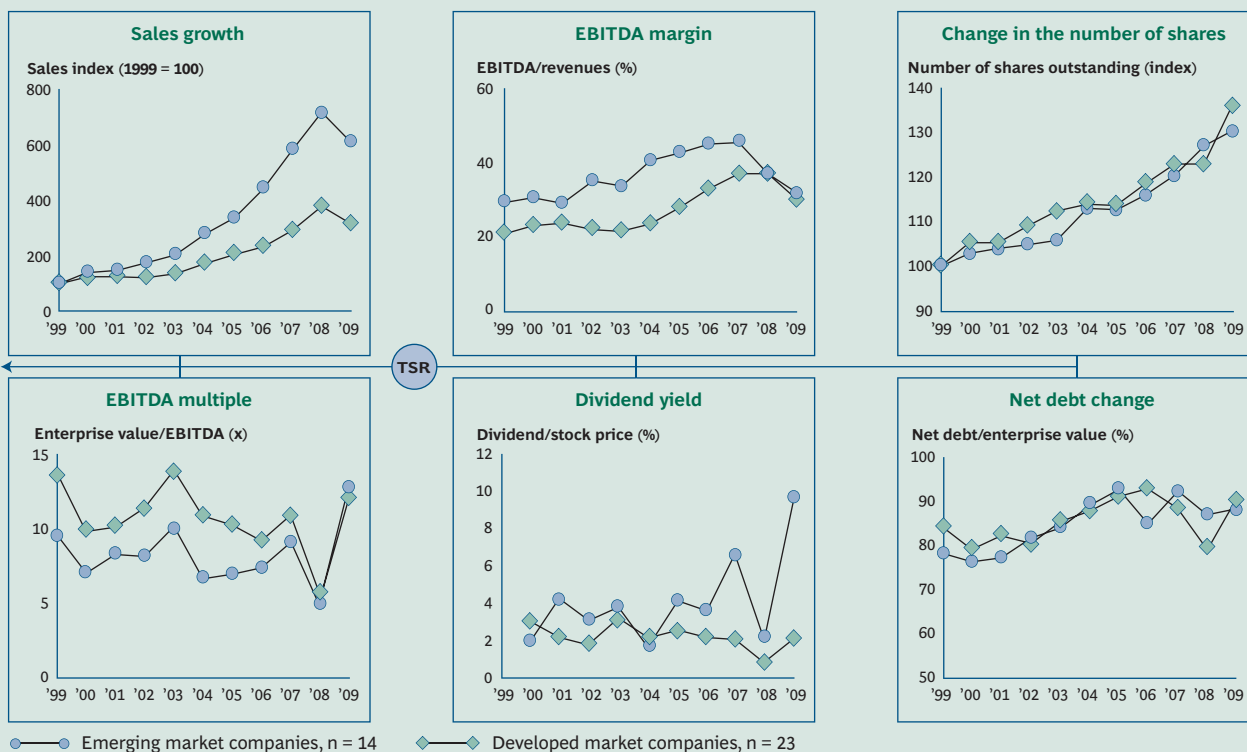
- ◇ Physical proximity, such as that enjoyed by Chinese coal companies, to high-demand end markets
- ◇ Global capital flows into emerging markets

The list of challengers continues to grow. Several high-performing companies, including MMC Norilsk Nickel and Vedanta, have conducted initial public offerings since 1999. Had these companies been continuously listed from 1999 through 2009, instead of arriving during that period, ten of them would have met the size, value, and free-float criteria for inclusion in our sample. Five of these are from China. Their rise has been facilitated by large increases in local stock-market indexes and domestic Chinese-investor interest in mining stocks. (See Exhibit 15.)

The global challengers also enjoy built-in advantages in a market where competition for resources and reserves is both more intensive and increasingly global. Deposits are being discovered and exploited in ever more remote regions. Emerging-market companies are likely to have some advantages operating in these regions. Companies from established markets should be aware of these changes. They need to know that these challengers are coming—and in many cases have already arrived—and that their arrival is changing their industry.

At the same time, established companies, which may not be able to follow the challengers' value-creation model, have to be realistic when setting TSR targets during their strategic-planning process. It is not sensible—and may be downright damaging—for established-market companies to aim for the sort of returns being achieved by some emerging-market companies. Those companies are at a very different stage in their development, and they operate in a different policy and value-creation context.

Exhibit 14. Emerging-Market Companies Have Outperformed Their Developed-Market Peers



Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

Exhibit 15. In the Last Five Years, Many New Value Creators Have Appeared, Particularly in China

Rank	Company	Country	Market value ¹ 2009 (\$billions)	Net sales 2009 (\$billions)	TSR ² (%)	Year of Initial Public Offering
1	Zhongjin Gold	China	6.8	2.7	79.8	2003
2	Zijin Mining Group	China	13.9	3.0	63.0	2003
3	Exxaro Resources ³	South Africa	5.0	2.0	60.7	2006
4	Shanxi Xishan Coal and Electricity	China	14.2	1.8	55.3	2000
5	Shanxi Guoyang New Energy	China	6.8	2.9	51.4	2003
6	Jiangxi Copper	China	17.8	7.5	50.1	2002
7	Vedanta Resources	U.K.	12.2	6.6	48.3	2003
8	MMC Norilsk Nickel	Russia	25.1	10.2	28.8	2001
9	Xstrata	U.K.	52.6	22.7	19.8	2002
10	Peabody Energy	U.S.	12.1	6.0	19.7	2001

Sources: Thomson Reuters Datastream; Thomson Reuters Worldscope; Bloomberg; annual reports; BCG analysis.

Note: N = 49 global companies with a market valuation greater than \$5 billion and net sales greater than \$1 billion.

¹As of December 31, 2009.

²Average annual TSR, 2004–2009.

³Kumba Resources was relisted as Exxaro in November 2006 after the unbundling of Kumba's iron-ore assets.

Looking to the Future

The outlook for returns remains uncertain. Some observers expect that demand from Chinese and other emerging-market customers, combined with high costs and delays in bringing on new supply, will create a strong environment. If inflation picks up, companies will find that it is critical to manage costs, inventory, and pricing strategy.

Other observers believe that the global economy is entering a below-average growth cycle. In that case, it would become more difficult to sustain historically strong TSRs because of pressures on value drivers such as price, margins, valuation multiples, and volume growth.

The role of cash payouts and capital discipline would become even more important. On the other hand, such an environment would also depress valuations (especially for more leveraged companies) and therefore create attractive M&A opportunities for potential acquirers.

All mining companies need to determine how they can build on their impressive value-creation results in order to achieve positive outcomes for their investors. It is a matter of being realistic, consistently adding a few percentage points to their TSR each year over what might otherwise be expected. So how do you do this?

Recommendations

Every mining company—the newly emergent global challenger just as much as the established enterprise—needs to have a clear plan for differential value creation, beyond relying on commodity prices. The self-interrogation inherent in the planning process of any good company is, of course, part of this process. How robust are your value creation plans? The following series of questions, which every mining executive team should be able to answer, are designed to help you assess your company's situation:

- ◇ Do we have a clear strategy for differential value creation, beyond commodity price changes?
- ◇ What level of performance do investors expect of our company? Does the company have a TSR gap to fill? And, if so, do we have a clear picture of how to fill it?

- ◇ What is the projected TSR contribution of each mine, business unit, and commodity group?

Profitable production growth, through both organic means and M&A, should be a key element of any value-creation plan. Growth must create value. Achieving this takes a balance of strong capital discipline and a clear focus on long-term strategic goals.

Organic growth is difficult and time consuming, but it can be a tremendous value-creation lever. Doing it correctly requires an unerring focus on efficiency and flexibility complemented by a strong understanding of long-term market forces.

Companies need to combine four attributes to generate superior returns from organic investments: effectiveness in exploration, competitiveness in the junior market, the ability to conceptualize and develop projects, and the ability to manage “frontier” regions.

Effectiveness in Exploration. A complex challenge because of the long-term investment needed and the difficulty of implementing metrics for measuring success, this is a potential source of genuine competitive edge.

Competitiveness in the Junior Market. Most projects coming into production have, at some point, been in the hands of a junior company, so companies that develop the intelligence and agility to play in the junior market will gain a clear edge.

The Ability to Conceptualize and Develop Projects. Poor conceptualization and lack of discipline in project management and development can lead to huge losses of value between the generation of an idea and the opening of a mine. Companies need a sound project-development-and-execution system to ensure that different disciplines—including operations—coordinate their efforts from the conceptual through the feasibility stages and that reviews are conducted with due preparation and alignment. Similar coordination is needed to ensure that the contributions of all contractors are seamlessly integrated during the construction phase of a project.

The Ability to Manage Frontier Regions. The search for new reserves increasingly occurs in frontier locations such as the emerging nations of Asia and Africa, and they involve high risk and significant cultural challenges. Com-

panies need to develop the competencies to manage stakes, develop projects, and build partnerships in these regions.

Companies should ask themselves these questions:

- ◇ Is our strategy aligned with our exploration programs and relationships with juniors, resources, reserves, and investment positions? Where are there gaps?
- ◇ Does our strategy give adequate consideration to the growth of emerging economies—as customers, exploration and production locations, and competitors? Does our organization have the capabilities to operate in such locations and, if not, do we have a plan for acquiring or developing these capabilities?
- ◇ Are we certain that we are getting the most out of our organic-development pipeline? Are we achieving excellence in every project stage—from idea to execution?

M&A can be, as the experience of some companies over the past decade has shown, a fruitful source of production growth. Opportunities for superior performance exist at every stage of the M&A cycle. Yet too many deals destroy value or are neutral at best.

Avoiding pitfalls and making the best of M&A can be achieved by getting several things right. A company's starting point is a clear portfolio strategy, with an equally strong grasp on both acquisition and divestiture. Add to that sound corporate-development processes and market intelligence, and your company will be on its way to finding the right deals.

Getting the pricing and timing of those deals right and retaining capital discipline are critical to ensuring that value is created rather than destroyed. This discipline includes being willing to walk away from deals rather than being dragged into seeking growth simply for growth's sake.

Once a deal is done, a process must be designed to integrate the acquired company and ensure the delivery of the strategic logic of the deal. Decisions must be made regarding how much to integrate, how the roles of various headquarters should change, and how to bridge differences in corporate cultures.

After all this, companies need to improve their newly acquired assets. This involves identifying and executing opportunities across the entire value chain, including sourcing, mine operations, asset management, logistics, and marketing. They should ask the following questions:

- ◇ How confident are we of our ability to add value across the M&A process, beyond just providing capital? Do we have a clear picture of how we create differential value for our shareholders that they could not replicate themselves?
- ◇ How do we ensure that we keep our heads clear during a time of euphoria, still aggressively pursuing value creation?

Expansion is not the sole means of creating value. Improving the efficiency of existing operations can also drive improvements in profitability. Our experience suggests that although most mine sites have some form of improvement program under way, the improvement targets tend to be arbitrary, and the programs rarely take full advantage of opportunities across divisional or mine site boundaries. This means that money is left on the table.

Mining companies have many improvement levers available to them. Most productive operations have bottlenecks somewhere. Identifying and removing them—“debottlenecking”—will enable greater, more efficient production. Intelligent investments in maintenance enhance mine assets and optimize long-term value. Streamlining your company's supply chain on the basis of an end-to-end analysis of costs can yield real opportunities, including opportunities to reduce costs to customers and suppliers—costs that may ultimately be borne by you.

Procurement and sourcing will also offer opportunities for improvement. This is not just a matter of “beating up” suppliers. Procurement can be used to drive process efficiency, innovation, and reduce the total cost of ownership. Better marketing can help maximize price realization in minerals your company produces, while safety and environmental improvements improve the risk-adjusted value of your operations. Companies should ask the following questions:

- ◇ How much value are we leaving on the table at our existing operations? Do we know which sites have the

greatest opportunity for improvement and how to access this potential?

- ◇ Which of our competitors' operations would we most like to emulate? How effectively do we learn from observing how our competitors operate their assets?
- ◇ How do we evaluate our improvement opportunities? Are improvements thought of in value creation terms rather than simply short-term cost reductions (which may be hiding longer-term cost increases)?

Prudent capital management and discipline can also be a significant differentiating aspect of value creation. Management teams need to apply the capital management lens to their strategic plans to ensure that they are creating value. The ill effects associated with equity dilution mean that stockholders may prefer moderate but less dilutive plans over those that promise high growth accompanied by dilution. Value may also be created for stockholders by reconsidering hurdle rates and project pipelines using this lens. In the absence of value-creating growth options, alternatives such as share buybacks and dividend increases need to be considered. Companies should ask the following questions:

- ◇ How will our strategic plans be financed? Does this require dilutive equity issuances, and if so, is sufficient value created to justify this dilution?
- ◇ How do we ensure that our cash balances are put to effective, value-creating use? Are our investment-review processes sufficiently rigorous and accurate?

Furthermore, you need to keep your investors' confidence in your stock and to convince the markets that your company has an effective value-creation strategy. Investors

are the ultimate customers for your company's stocks and bonds—both the final beneficiaries of value creation and the key determinants of how these securities are valued. Yet investors are not homogeneous. Understanding who your company's investors are—as well as who they might be in future—and what they want is the first step toward increasing its valuation multiple.

This can bring immense benefits. In 2009, the multiples of the highest-rated companies of each commodity group were at least twice those of the lowest. In gold and fertilizers, the ratio was 4 to 1. Closing this gap even slightly represents a large value-creation opportunity for companies with low multiples. This is a complex task, but the benefits that it can bring mean that it should certainly not be overlooked. Companies should ask the following questions:

- ◇ What is our current investor mix (growth versus value)? How well does this fit our strategy and potential?
- ◇ Is our company favorably valued relative to its peers? How consistently do we meet earnings expectations? Do we have a clearly articulated value-creation story, and do investors support it? Have we been able to demonstrate a track record of good capital management?

Answers to these questions should lead to a strategy that will put your company on the road to success—even in the hugely demanding markets of today and the next decade—positioning it, to the greatest extent possible, to anticipate and respond to events.



Value Creation Questions for Mining Executives

A Recap

In conclusion, we offer a set of 15 questions that will help mining executives assess the effectiveness of their value-creation plans.

- ◇ Do we have a clear strategy for differential value creation beyond commodity price changes?
- ◇ What level of performance do investors expect of our company? Does the company have a TSR gap to fill? And, if so, do we have a clear picture of how to fill it?
- ◇ What is the projected TSR contribution of each mine, business unit, and commodity group?
- ◇ Is our strategy aligned with our exploration programs and relationships with juniors, resources, reserves, and investment positions? Where are there gaps?
- ◇ Does our strategy give adequate consideration to the growth of emerging economies—as customers, exploration and production locations, and competitors? Does our organization have the capabilities to operate in such locations and, if not, do we have a plan for acquiring or developing these capabilities?
- ◇ Are we certain that we are getting the most out of our organic-development pipeline? Are we achieving excellence in every project stage—from idea to execution?
- ◇ How confident are we of our ability to add value across the M&A process, beyond just providing capital? Do we have a clear picture of how we create differential value for our shareholders that they could not replicate themselves?
- ◇ How do we ensure that we keep our heads clear during a time of euphoria, still aggressively pursuing value creation?
- ◇ How much value are we leaving on the table at our existing operations? Do we know which sites have the greatest opportunity for improvement and how to access this potential?
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- ◇ Is our company favorably valued relative to its peers? How consistently do we meet earnings expectations? Do we have a clearly articulated value-creation story, and do investors support it? Have we been able to demonstrate a track record of good capital management?



For Further Reading

The Boston Consulting Group publishes many reports and articles that may be of interest to mining management teams. Recent examples include the publications listed here.

Threading the Needle: Value Creation in a Low-Growth Economy

The BCG 2010 Value Creators Report, September 2010

Investors' Priorities in the Postdownturn Economy

An article by The Boston Consulting Group, July 2010

Accelerating Out of the Great Recession: Seize the Opportunities in M&A

A report by The Boston Consulting Group, June 2010

The African Challengers: Global Competitors Emerge from the Overlooked Continent

A Focus by The Boston Consulting Group, May 2010

Searching for Sustainability: Value Creation in an Era of Diminished Expectation

The BCG 2009 Value Creators Report, October 2009

The Business of Sustainability: Imperatives, Advantages, and Actions

A report by The Boston Consulting Group, September 2009

Winning in a Downturn: Managing Working Capital

A Focus by The Boston Consulting Group, August 2009

Real-World PMI: Learning from Company Experiences

A Focus by The Boston Consulting Group, June 2009

The 2009 BCG 100 New Global Challengers: How Companies from Rapidly Developing Economies Are Contending for Global Leadership

A report by The Boston Consulting Group, January 2009

Extracting Profits from the Crisis: Opportunities and Threats for Mining Companies

BCG Perspectives, November 2008

Eyes Wide Open: Managing the Risks of Acquisitions in Rapidly Developing Economies

A Focus by The Boston Consulting Group, January 2008

Avoiding the Cash Trap: The Challenges of Value Creation When Profits Are High

The BCG 2007 Value Creators Report, September 2007



Note to the Reader

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For Further Contact

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Philip Krinks

*Partner and Managing Director
Mining Sector Leader—Worldwide*
BCG London
+44 207 753 5353
krinks.philip@bcg.com

Gustavo Nieponice

*Partner and Managing Director
Mining Sector Leader—Americas*
BCG Santiago
+56 2 338 9600
nieponice.gustavo@bcg.com

Tom King

Partner and Managing Director
BCG Toronto
+1 416 955 4200
king.tom@bcg.com

Victor Scheibehenne

Principal
BCG Toronto
+1 416 955 4200
scheibehenne.victor@bcg.com

Thomas Vogt

Project Leader
BCG Chicago
+1 312 993 3300
vogt.thomas@bcg.com

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