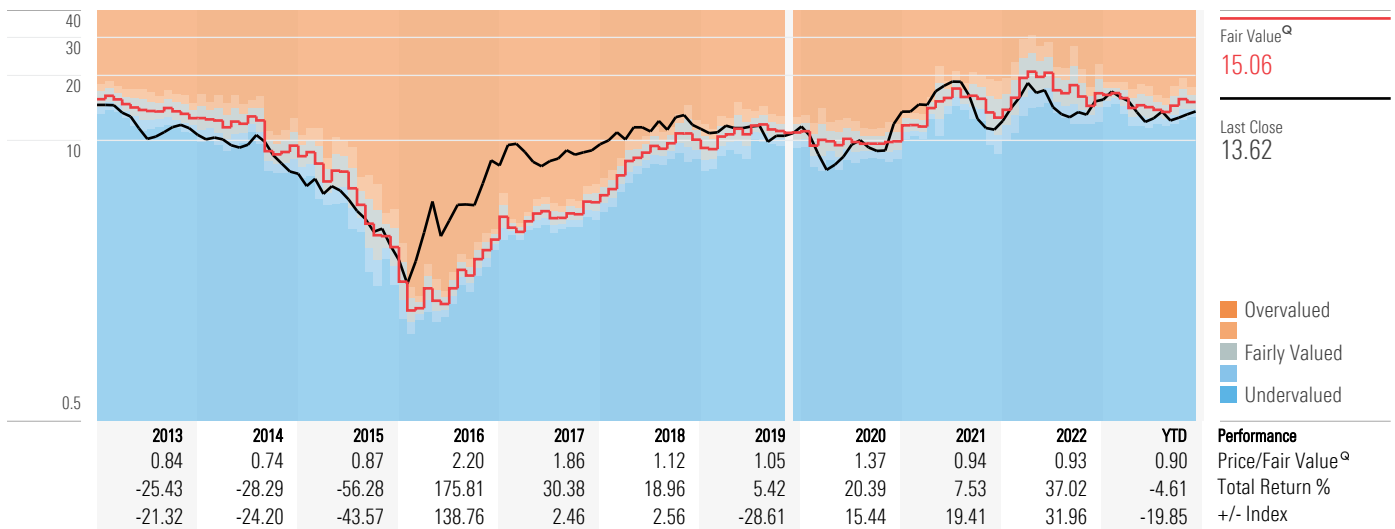


Vale SA XVALO ★★★★★ Q 29 Nov 2023, 23:39 UTC

Economic Moat ^Q	Uncertainty ^Q	Price/Fair Value ^Q	ESG Risk Rating Assessment ¹	Trailing Dividend Yield %	Market Cap	Investment Style	Sector	Industry
None	High	0.9	1 Nov 2023 05:00, UTC	8.58	58.8947 Bil	Large Value	Basic Materials	Other Industrial Metals & Mining



As of 29 Nov 2023 | Index: Morningstar Brazil GR BRL. Fair Value data as of 29 Nov 2023, 23:39 UTC.

¹The ESG Risk Rating Assessment is a representation of Sustainalytics' ESG Risk Rating. Lee Davidson, Chief Analytics Officer for Morningstar, Inc, oversees the methodology that supports Quantitative Fair Value Estimates and Quantitative Star Ratings. Mr. Davidson is guided by the Morningstar, Inc. Code of Ethics in carrying out his responsibilities. For information regarding Conflicts of Interests, visit <http://global.morningstar.com/equitydisclosures>.

Key Metrics as of 24 Nov 2023

Metrics		Percentile in Sector
Earnings Yield (%)	13.9	92.0
Sales Yield (%)	61.0	62.0
Book Value Yield (%)	58.6	40.0
Return on Assets (%)*	11.0	93.0
Revenue(Bil)*	40.7	99.0
Market Value (Bil)	65.2	99.0
Enterprise Value (Bil)	77.7	99.0
EV/MV Ratio	1.2	71.0
Volatility TTM (%)	27.8	26.0
Drawdown TTM (%)	30.8	32.0
Volume (Mil)	22.7	98.0

*30 Sep 2023

Business Description

Vale is a large global miner and the world's largest producer of iron ore and pellets. In recent years the company has sold noncore assets such as its fertilizer, coal, and steel operations to concentrate on iron ore, nickel, and copper. Earnings are dominated by the bulk materials division, primarily iron ore and iron ore pellets. The base metals division is much smaller, consisting of nickel mines and smelters along with copper mines producing copper in concentrate. Vale has agreed to sell a minority 13% stake in its base metals business, which is expected to become effective early in 2024, and which is likely the first step in separating base metals and iron ore.

yield is 14.06%, and its maximum trailing 12-month average volume (primary share) is 36,601,789 shares. The earnings yield falls at the 92nd percentile in the basic materials sector while the volume is at the 95th percentile. Over the past year, the company's earnings yield has been between 8.42% and 26.24%; its volume has ranged between 22,704,307 shares and 36,601,789 shares.

Valuation ^Q as of 30 Nov 2023

Morningstar maintains a 4-star quantitative star rating for Vale, derived from the firm's valuation and uncertainty scores.

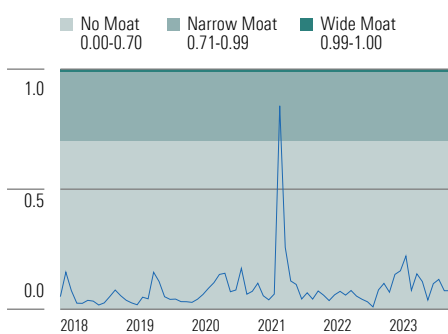
The company's shares last closed at 13.62, below our quantitative fair value estimate of 15.06. These shares have traded between a 25.16% discount and 6.39% premium to their fair value estimate over the past year. In Morningstar's equity coverage universe for this methodology, the company's valuation rating lands at the 84th percentile; in the basic materials sector, the firm's score lies at the 93rd percentile (meaning the shares are more undervalued than 93% of stocks in the sector). Furthermore, Vale maintains a quantitative valuation uncertainty rating of High.

Economic Moat ^Q as of 29 Nov 2023

With a Morningstar quantitative moat rating of None, the quantitative moat score for Vale falls at the 7th percentile in the basic materials sector and at the 12th in the equity coverage universe. The company has maintained its None quantitative moat rating since after 11/23/2023, when it was downgraded from Narrow.

We also assign a Moderate quantitative financial health rating to Vale. The company's raw score on this metric, termed Distance to Default, ranks at the 45th percentile overall and 55th in the basic materials sector. Furthermore, this financial health rating has stayed Moderate over the last year. Supporting these ratings are the company's book value yield and enterprise value-to-market value ratio. The book value yield of 59.10%, ranks at the 48th percentile in the covered equity universe and at the 40th percentile among its peers. Meanwhile, its enterprise value-to-market value ratio of 1.19, falls at the 62nd percentile in the universe and the 71st percentile in the basic materials sector.

Economic Moat ^Q History as of 29 Nov 2023



The company has held this star rating since the previous rating of 3, which was last assigned on 11/24/2023. The uncertainty rating for Vale has remained High since the previous rating of Very High, which was last assigned on 11/23/2023.

The key factors behind these ratings are the company's earnings yield and volume. The earnings

Fundamentals as of 29 Nov 2023

The earnings per share for Vale is 2.1. The company earns a return on invested capital of 19.48%, falling at the 95th percentile in the basic materials sector. The firm maintains a dividend yield of 5.15%. We calculate the above figures over a trail-

Vale SA XVALO ★★★★★

Q 29 Nov 2023, 23:39 UTC

Economic Moat ^Q	Uncertainty ^Q	Price/Fair Value ^Q	ESG Risk Rating Assessment ¹	Trailing Dividend Yield %	Market Cap	Investment Style	Sector	Industry
None	High	0.9	1 Nov 2023 05:00, UTC	8.58	58.8947 Bil	Large Value	Basic Materials	Other Industrial Metals & Mining

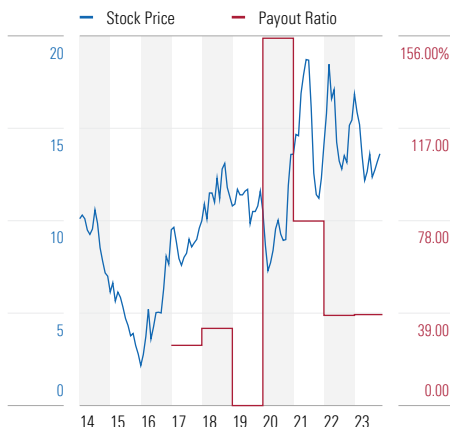
Earnings as of 24 Nov 2023

Earnings	%	Percentile in Sector
Dividend Yield*	5.2	73.0
Payout Ratio*	38.4	51.0
Price to Earnings	7.2	22.0
Price to Cash Flow	14.3	53.0
ROIC**	19.5	95.0

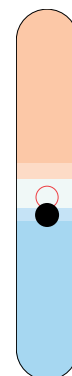
*31 Oct 2023

**30 Sep 2023

Dividends as of 29 Nov 2023



Valuation ^Q as of 29 Nov 2023

Fair Value ^Q
15.06Uncertainty ^Q :
HighLast Close
13.62

XVALO is Under Valued at a 10% discount.

Economic Moat ^Q

None

Financial Health ^Q

Moderate

1-Star Price ^Q

> 17.64

5-Star Price ^Q

< 12.85

ing 12-month period.

Examining valuation further, we find Vale holds a price-to-earnings ratio of 7.08, a figure greater than 21% of its sector peers. The company's price-to-free cash flow ratio is 14.02, greater than 52% of its sector peers. These values are calculated using the stock's price at last market close.

Contact

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<https://www.vale.com>

Financials as of 29 Nov 2023 (Fiscal Year End 31 Dec 2023)

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	YTD	Fiscal
47	35	23	27	34	37	37	40	55	44	29	Revenue (Bil)
17.34	8.99	2.54	8.43	11.41	13.07	15.02	19.59	30.84	17.79	10.02	Operating Income (Bil)
37.08	25.61	10.88	30.66	33.59	35.74	41.08	49.54	56.59	40.57	34.88	Operating Margin (%)
0.58	0.66	-12.13	3.98	5.51	6.86	-1.68	4.88	22.45	18.79	5.57	Net Income (Bil)
0.11	0.13	-2.33	0.77	1.05	1.32	-0.33	0.95	4.47	4.05	1.27	Diluted Earnings/Share
14.79	13.10	3.93	6.40	12.45	12.90	12.11	14.32	25.68	11.49	8.38	Operating Cash Flow (Bil)
-13.11	-11.78	-8.11	-4.95	-3.83	-3.78	-3.46	-4.23	-5.03	-5.45	-3.80	Capital Spending (Bil)
1.69	1.33	-4.18	1.45	8.62	9.12	8.65	10.10	20.65	6.04	4.57	Free Cash Flow (Bil)
5,153	5,153	5,197	5,197	5,197	5,178	5,128	5,133	5,017	4,642	4,391	Avg Shares Outstand(Mil)

Valuation as of 29 Nov 2023

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Current	Calendar
0.84	0.74	0.87	2.20	1.86	1.12	1.05	1.37	0.94	0.93	0.90	Price/Fair Value ^Q
1.58	1.05	0.55	1.63	1.73	1.87	1.80	2.42	1.25	1.73	1.63	Price/Sales
17.01	—	—	—	8.75	15.21	18.30	33.42	3.99	4.24	7.14	Price/Earnings
4.54	3.30	3.62	7.74	5.19	5.06	5.37	7.96	2.34	6.79	6.45	Price/Cash Flow
1.47	1.12	0.82	1.05	1.32	1.62	1.59	2.48	2.03	2.22	1.70	Price/Book

Operating Performance as of 29 Nov 2023 (Fiscal Year End 31 Dec 2023)

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Q3	Fiscal (%)
0.46	0.55	-11.83	4.25	5.56	7.32	-1.87	5.31	24.74	21.31	3.14	Return on Assets
1.19	1.81	-57.03	30.11	18.54	15.69	-4.0	12.88	63.93	53.42	7.39	Return on Equity
2.35	2.37	-23.57	11.42	12.29	12.19	0.53	11.61	44.01	36.88	5.53	Rtn on Invested Capital

Dividends as of 29 Nov 2023

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Current	Calendar (%)
2.79	1.89	0.98	0.17	1.33	0.49	1.41	2.41	14.65	7.58	1.17	Dividend Per Share
3.51	8.81	9.71	0.62	3.81	1.99	1.92	2.68	18.84	4.78	8.58	Trailing Dividend Yield
—	—	—	—	—	—	0.75	—	7.15	7.36	5.6	Buyback Yield

Appendix

Economic Moat [®]History as of 29 Nov 2023 (No Moat: 0.00-0.70, Narrow Moat: 0.70-0.99, Wide Moat: 0.99-1.00)

Year	January	February	March	April	May	June	July	August	September	October	November	December
2023	0.07	0.14	0.16	0.22	0.08	0.15	0.12	0.04	0.11	0.12	0.08	—
2022	0.06	0.04	0.06	0.07	0.06	0.08	0.05	0.04	0.03	0.01	0.08	0.11
2021	0.11	0.06	0.04	0.06	0.85	0.26	0.12	0.10	0.04	0.07	0.04	0.08
2020	0.03	0.04	0.06	0.09	0.11	0.14	0.15	0.07	0.08	0.17	0.06	0.07
2019	0.04	0.03	0.02	0.05	0.04	0.15	0.12	0.05	0.04	0.04	0.03	0.03
2018	0.05	0.15	0.08	0.03	0.02	0.04	0.03	0.02	0.03	0.05	0.08	0.06

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Quantitative Equity Ratings

Morningstar's quantitative equity ratings consist of: (i) Quantitative Fair Value Estimate, (ii) Quantitative Star Rating, (iii) Quantitative Uncertainty, (iv) Quantitative Economic Moat, and (v) Quantitative Financial Health (collectively the "Quantitative Ratings").

The Quantitative Ratings are calculated daily and derived from the analyst-driven ratings of a company's peers as determined by statistical algorithms. Morningstar, Inc. ("Morningstar", "we", "our") calculates Quantitative Ratings for companies whether or not it already provides analyst ratings and qualitative coverage. In some cases, the Quantitative Ratings may differ from the analyst ratings because a company's analyst-driven ratings can significantly differ from other companies in its peer group.

i. **Quantitative Fair Value Estimate:** Intended to represent Morningstar's estimate of the per share dollar amount that a company's equity is worth today. Morningstar calculates the Quantitative Fair Value Estimate using a statistical model derived from the Fair Value Estimate Morningstar's equity analysts assign to companies. Please go to <http://global.morningstar.com/equitydisclosures> for information about Fair Value Estimate Morningstar's equity analysts assign to companies.

ii. **Quantitative Economic Moat:** Intended to describe the strength of a firm's competitive position. It is calculated using an algorithm designed to predict the Economic Moat rating a Morningstar analyst would assign to the stock. The rating is expressed as Narrow, Wide, or None.

Narrow – assigned when the probability of a stock receiving a "Wide Moat" rating by an analyst is greater than 70% but less than 99%.

Wide – assigned when the probability of a stock receiving a "Wide Moat" rating by an analyst is greater than 99%.

None – assigned when the probability of an analyst receiving a "Wide Moat" rating by an analyst is less than 70%.

iii. **Quantitative Star Rating:** Intended to be the summary rating based on the combination of our Quantitative Fair Value Estimate, current market price, Quantitative Uncertainty Rating, and momentum. The rating is expressed as One-Star, Two-Star, Three-Star, Four-Star, and Five-Star.

★ – the stock is overvalued with a reasonable margin of safety.

*Log (Quant FVE/Price) < -1*Quantitative Uncertainty*

*Micro-Caps: Log (Quant FVE/Price) < -1.5*Quantitative Uncertainty*

★★ – the stock is somewhat overvalued.

*Log (Quant FVE/Price) between (-1*Quantitative Uncertainty, -0.5*Quantitative Uncertainty)*

*Micro-Caps: Log (Quant FVE/Price) between (-1.5*Quantitative Uncertainty, -0.75*Quantitative Uncertainty)*

★★★ – the stock is approximately fairly valued.

*Log (Quant FVE/Price) between (-0.5*Quantitative Uncertainty, 0.5*Quantitative Uncertainty)*

*Micro-Caps: Log (Quant FVE/Price) between (-0.75*Quantitative Uncertainty, 0.75*Quantitative Uncertainty)*

★★★★ – the stock is somewhat undervalued.

*Log (Quant FVE/Price) between (0.5*Quantitative Uncertainty, 1*Quantitative*

Uncertainty)

*Micro-Caps: Log (Quant FVE/Price) between (0.75*Quantitative Uncertainty, 1.5*Quantitative Uncertainty)*

★★★★★ – the stock is undervalued with a reasonable margin of safety.

*Log (Quant FVE/Price) > 1*Quantitative Uncertainty*

*Micro-Caps: Log (Quant FVE/Price) > 1.5*Quantitative Uncertainty*

After the initial calculation for the star rating, there is a final filtering step based on the momentum of the company. We rank the companies based on their 12-1 month momentum, then restrict those below the 30th percentile to a maximum of 3 stars.

iv. **Quantitative Uncertainty:** Intended to represent Morningstar's level of uncertainty about the accuracy of the Quantitative Fair Value Estimate. Generally, the lower the Quantitative Uncertainty, the narrower the potential range of outcomes for that particular company. The rating is expressed as Low, Medium, High, Very High, and Extreme.

Low – the interquartile range for possible fair values is less than 10%

Medium – the interquartile range for possible fair values is less than 15% but greater than 10%

High – the interquartile range for possible fair values is less than 35% but greater than 15%

Very High – the interquartile range for possible fair values is less than 80% but greater than 35%

Extreme – the interquartile range for possible fair values is greater than 80%

v. **Quantitative Financial Health:** Intended to reflect the probability that a firm will face financial distress in the near future. The calculation uses a predictive model designed to anticipate when a company may default on its financial obligations. The rating is expressed as Weak, Moderate, and Strong.

Weak – assigned when Quantitative Financial Health < 0.2

Moderate – assigned when Quantitative Financial Health is between 0.2 and 0.7

Strong – assigned when Quantitative Financial Health > 0.7

Other Definitions

i. **Last Close** – Price of the stock as of the close of the market of the last trading day before date of the report.

ii. **Quantitative Valuation** – Using the below terms, intended to denote the relationship between the security's **Last Price** and Morningstar's quantitative fair value estimate for that security.

Undervalued – Last Price is below Morningstar's quantitative fair value estimate.

Fairly Valued – Last Price is in line with Morningstar's quantitative fair value estimate.

Fairly Valued – Last Price is in line with Morningstar's quantitative fair value estimate.

Overvalued – Last Price is above Morningstar's quantitative fair value estimate.

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Based on their quantitative scores, companies are grouped into one of five Risk Categories (negligible, low, medium, high, severe). These risk categories are absolute, meaning that a 'high risk' assessment reflects a comparable degree

of unmanaged ESG risk across all subindustries covered.

The ESG Risk Rating Assessment is a visual representation of Sustainalytics ESG Risk Categories on a 1 to 5 scale. Companies with Negligible Risk = 5 Globes, Low Risk = 4, Medium Risk = 3 Globes, High Risk = 2 Globes, Severe Risk = 1 Globe. For more information, please visit sustainalytics.com/esg-ratings/

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