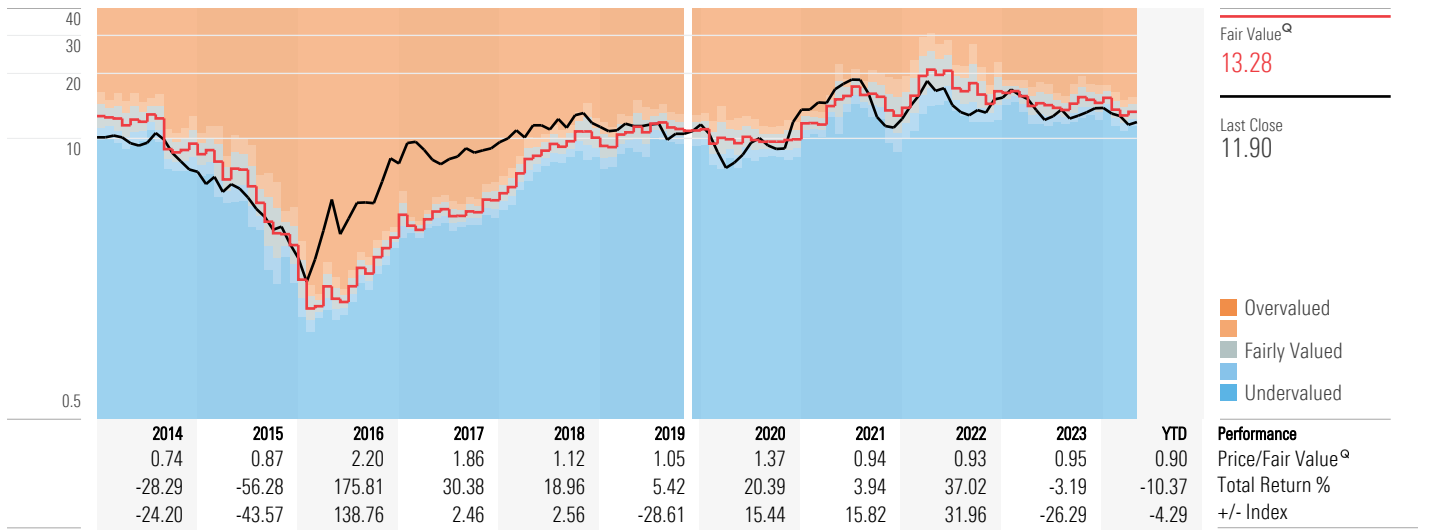


Vale SA XVALO ★★★★★ Q 24 Apr 2024, 22:34 UTC

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	3 Apr 2024 05:00, UTC	10.86	48.8001 Bil	Large Value	Basic Materials	Other Industrial Metals & Mining



As of 24 Apr 2024 | Index: Morningstar Brazil GR BRL. Fair Value data as of 24 Apr 2024, 22:34 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 23 Apr 2024

Metrics		Percentile in Sector
Earnings Yield (%)	15.0	95.0
Sales Yield (%)	78.3	69.0
Book Value Yield (%)	75.5	51.0
Return on Assets (%)*	8.8	89.0
Revenue(Bil)*	41.8	99.0
Market Value (Bil)	52.4	99.0
Enterprise Value (Bil)	65.6	99.0
EV/MV Ratio	1.3	76.0
Volatility TTM (%)	24.5	19.0
Drawdown TTM (%)	23.9	24.0
Volume (Mil)	22.9	98.0

*31 Dec 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 energy transition metals, its base metals business, which is expected to become effective in 2024, and which is likely the first step in separating base metals and iron ore.

Valuation ^Q as of 24 Apr 2024

Vale achieves a 4-star quantitative star rating based on Morningstar's equity model. This reflects the company's valuation and uncertainty scores under this assessment system. The Quantitative Fair Value estimate is 13.23, above the previous closing price of 11.69. The stock has been trading between a 25.16% discount and 0.57% premium to its quantitative fair value over the past year. The stock's current valuation rating sits at the 75th percentile in the coverage universe and 86th percentile in the basic materials sector (higher percentile indicates more undervalued). The quantitative uncertainty rating for Vale is High. Our quantitative star rating last differed from the current rating on 03/14/2024; the uncertainty rating last differed on 04/19/2024. The previous ratings were 3 and Medium, respectively. The main drivers of the company's valuation and uncertainty are its earnings yield and volume. The earnings yield of 14.99% falls at the 93rd percentile in the equity universe and the 95th percentile in its sector. The trailing 12-month average volume

(primary share) of 22,924,337 shares corresponds to the 95th percentile overall and the 95th percentile in the industry.

Economic Moat ^Q as of 24 Apr 2024

Quantitatively, we do not believe Vale has an economic moat. Its moat score of 0.04 sits below the 5th percentile in the basic materials sector. Furthermore, this rating last differed from its previous rating of Narrow on 11/23/2023, when the company's moat score fell from its maximum of 0.73 (score of 1 indicates greatest economic moat). The company also maintains a quantitative financial health rating of Moderate. Its score sits at the 49th percentile overall and the 64th percentile in the sector.

Examining the company's financials and market statistics, we find these ratings are principally driven by its book value yield and enterprise value-to-market value ratio. The book value yield is 75.50%, sitting at the 51st percentile in the basic materials sector. The company's enterprise value-to-market value ratio is 1.25, corresponding to the 67th percentile in the equity coverage universe and the 76th percentile in the sector.

Fundamentals as of 24 Apr 2024

Vale maintains earnings per share of 1.83. The company further earns a return on invested capital of 16.65%. The shares offer a dividend yield of 11.18%. These values are calculated over a trailing 12-month period. As of last market close, Vale has a price-to-earnings ratio of 6.8, falling below the 15th percentile in its sector (where a lower percentile means a lower ratio) and ranging between 4 and 7.64 over the past year. The company's price-to-free cash flow ratio is 7.51, falling at the 25th percentile in its

Vale SA XVALO ★★★★★ Q 24 Apr 2024, 22:34 UTC

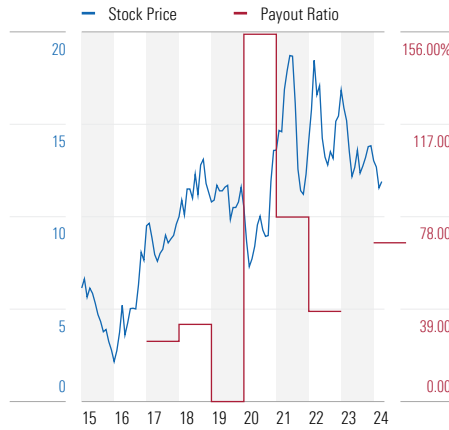
Economic Moat ^Q	Uncertainty ^Q	Price/Fair Value ^Q	ESG Risk Rating Assessment ¹	Trailing Dividend Yield %	Market Cap	Investment Style	Sector	Industry
None	High	0.9	3 Apr 2024 05:00, UTC	10.86	48.8001 Bil	Large Value	Basic Materials	Other Industrial Metals & Mining

Earnings as of 23 Apr 2024

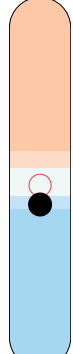
Earnings	%	Percentile in Sector
Dividend Yield*	11.2	95.0
Payout Ratio*	67.0	73.0
Price to Earnings	6.8	15.0
Price to Cash Flow	7.5	25.0
ROIC**	16.7	94.0

*28 Mar 2024
**31 Dec 2023

Dividends as of 24 Apr 2024



Valuation ^Q as of 24 Apr 2024



Fair Value ^Q
13.28

Uncertainty ^Q :
High

Last Close
11.90

XVALO is Undervalued at a 10% discount.

Economic Moat ^Q
None

Financial Health ^Q
Moderate

1-Star Price ^Q
> 15.51

5-Star Price ^Q
< 11.37

sector and ranging between 7.38 and 14.97 over the past year.

Contact

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<https://www.vale.com>

Financials as of 24 Apr 2024 (Fiscal Year End 31 Dec 2024)

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	YTD	Fiscal
35	23	27	34	37	37	40	55	44	42	42	Revenue (Bil)
8.99	2.54	8.43	11.41	13.07	15.02	19.59	30.84	17.79	15.86	15.86	Operating Income (Bil)
25.61	10.88	30.66	33.59	35.74	41.08	49.54	56.59	40.57	37.95	37.95	Operating Margin (%)
0.66	-12.13	3.98	5.51	6.86	-1.68	4.88	22.45	18.79	7.98	7.98	Net Income (Bil)
0.13	-2.33	0.77	1.05	1.32	-0.33	0.95	4.47	4.05	1.83	1.83	Diluted Earnings/Share
13.10	3.93	6.40	12.45	12.90	12.11	14.32	25.68	11.49	13.17	13.17	Operating Cash Flow (Bil)
-11.78	-8.11	-4.95	-3.83	-3.78	-3.46	-4.23	-5.03	-5.45	-5.92	-5.92	Capital Spending (Bil)
1.33	-4.18	1.45	8.62	9.12	8.65	10.10	20.65	6.04	7.25	7.25	Free Cash Flow (Bil)
5,153	5,197	5,197	5,197	5,178	5,128	5,133	5,017	4,642	4,370	4,370	Avg Shares Outstand(Mil)

Valuation as of 24 Apr 2024

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Current	Calendar
0.74	0.87	2.20	1.86	1.12	1.05	1.37	0.94	0.93	0.95	0.90	Price/Fair Value ^Q
1.05	0.55	1.63	1.73	1.87	1.80	2.42	1.25	1.73	1.67	1.33	Price/Sales
—	—	—	8.75	15.21	18.30	33.42	3.99	4.24	7.29	6.96	Price/Earnings
3.30	3.62	7.74	5.19	5.06	5.37	7.96	2.34	6.79	6.59	4.23	Price/Cash Flow
1.12	0.82	1.05	1.32	1.62	1.59	2.48	2.03	2.22	1.73	1.38	Price/Book

Operating Performance as of 24 Apr 2024 (Fiscal Year End 31 Dec 2024)

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Q3	Fiscal (%)
0.55	-11.83	4.25	5.56	7.32	-1.87	5.31	24.74	21.31	8.82	2.64	Return on Assets
1.81	-57.03	30.11	18.54	15.69	-4.0	12.88	63.93	53.42	21.2	6.24	Return on Equity
2.37	-23.57	11.42	12.29	12.19	0.53	11.61	44.01	36.88	16.65	5.26	Rtn on Invested Capital

Dividends as of 24 Apr 2024

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Current	Calendar (%)
1.89	0.98	0.17	1.33	0.49	1.41	2.41	14.65	7.58	6.08	1.62	Dividend Per Share
8.81	9.71	0.62	3.81	1.99	1.92	2.68	18.84	4.78	—	10.86	Trailing Dividend Yield
—	—	—	—	—	0.75	—	7.15	7.36	—	5.12	Buyback Yield

Appendix

Economic Moat [®]History as of 24 Apr 2024 (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
2024	0.06	0.01	0.02	0.05	—	—	—	—	—	—	—	—
2023	0.07	0.14	0.16	0.22	0.08	0.15	0.12	0.04	0.11	0.12	0.09	0.16
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

Quantitative Equity Report Overview

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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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Sustainalytics analyzes over 1,300 data points to assess a company's exposure to and management of ESG risks. In other words, ESG Risk Ratings measures a company's unmanaged ESG Risks represented as a quantitative score.

Unmanaged Risk is measured on an open-ended scale starting at zero (no risk) with lower scores representing less unmanaged risk and, for 95% of cases, the unmanaged ESG Risk score is below 50.

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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