

CME Group Inc Class A CME ★★ 22 Apr 2025 21:30, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment¹
265.56 USD 22 Apr 2025	245.00 USD 14 Feb 2025 19:54, UTC	1.08	93.04 USD Bil 23 Apr 2025	Wide	Large Value	Low	Exemplary	 2 Apr 2025 05:00, UTC

Sector

 Financial Services

Industry

Financial Data & Stock Exchanges

Business Description

Based in Chicago, CME Group operates exchanges giving investors, suppliers, and businesses the ability to trade futures and derivatives based on interest rates, equity indexes, foreign currencies, energy, metals, and commodities. The Chicago Mercantile Exchange was founded in 1898 and in 2002 completed its IPO. Since then, CME Group has consolidated parts of the industry by merging with crosstown rival CBOT Holdings in 2007 before acquiring Nymex Holdings in 2008 and NEX in 2018. In addition, the company has a 27% stake in S&P Dow Jones Indices, making the Chicago Mercantile Exchange the exclusive venue to trade and clear S&P futures contracts. Through CME's acquisition of NEX, it also expanded into cash foreign exchange, fixed-income trading, and collateral optimization.

Key stats: CME did an excellent job of managing its costs during the quarter. Operating expenses increased just 1.1% from last year to \$534.3 million. CME benefits from a mostly fixed cost structure, allowing the benefit of higher trading revenue to drop directly down to the bottom line.

Business Strategy & Outlook Michael Miller, CFA, Equity Analyst, 14 Feb 2025

CME Group enjoyed favorable market conditions in 2024 as volatility across multiple asset classes drove increased trading volume, leading to strong revenue growth. Before 2023, the most significant headwind for the company had been the impact that low short-term interest rates had on its interest-rate futures, which are its largest source of revenue. When interest rates are expected to stay low, there is less need for interest-rate hedging and less incentive for speculation, creating a drag on CME's trading volume. However, since 2023 this complacency has been replaced by heightened uncertainty, swinging interest-rate futures volume from a cyclical low to a cyclical high, driving accelerated growth. That said, we think this tailwind has mostly played out, and we expect interest-rate futures growth to be slower as conditions normalize.

CME has also benefited from increased retail interest in the equity markets. These markets saw a surge in trading volume in 2020 and 2021, with equity derivative products seeing a larger and more durable increase. CME's equity index futures business has produced impressive performance as a result, with multiple years of double-digit revenue growth. We do not expect a return to these levels of growth, but the broader adoption of futures by smaller traders and the success of CME's smaller micro futures should provide a permanent tailwind to CME's equity business.

CME has a dominant position in many of the contracts that trade in its exchange and is well diversified across multiple product lines. In the long term, we anticipate that the company will continue to benefit from secular growth in the need to hedge commodity, energy, and interest-rate exposure. CME also has a history of generating incremental growth through the introduction of new futures contracts, like the Micro E-mini S&P 500 contract. However, the company is facing new competition from FMX, which launched its interest-rate futures exchange in September 2024. We expect CME's strong competitive advantages to protect it, and FMX's initial volume has been very low, but this is the first direct competitive threat the firm has faced in years and will bear monitoring.

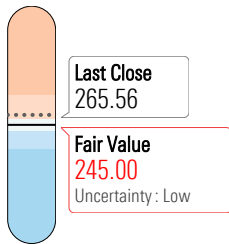
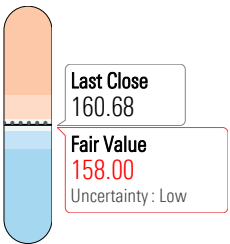
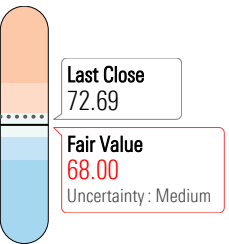
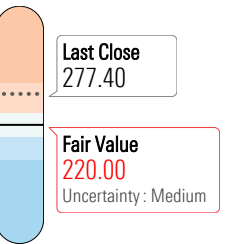
Bulls Say Michael Miller, CFA, Equity Analyst, 14 Feb 2025

- CME has assembled a diverse set of derivative products in interest rates, equities, commodities, metals, and foreign currency. Weakness in one product is often offset by strength in another.
- CME has been able drive trading volume growth by successfully introducing new futures contracts, like the Micro E-mini S&P 500 and SOFR futures.
- CME stands to be a beneficiary of uncertainty around interest rates as increased volatility drives more trading volume in its interest-rate futures contracts.

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Competitors

	CME Group Inc Class A CME	Intercontinental Exchange Inc ICE	Nasdaq Inc NDAQ	Deutsche Boerse AG DB1
				
Economic Moat	Wide	Wide	Narrow	Wide
Currency	USD	USD	USD	EUR
Fair Value	245.00 14 Feb 2025 19:54, UTC	158.00 11 Feb 2025 21:27, UTC	68.00 24 Feb 2025 22:02, UTC	220.00 27 Nov 2024 14:57, UTC
1-Star Price	306.25	197.50	91.80	297.00
5-Star Price	196.00	126.40	47.60	154.00
Assessment	Overvalued 22 Apr 2025	Fairly Valued 22 Apr 2025	Fairly Valued 22 Apr 2025	Overvalued 22 Apr 2025
Morningstar Rating	★★ 22 Apr 2025 21:30, UTC	★★★ 22 Apr 2025 21:28, UTC	★★★ 22 Apr 2025 21:26, UTC	★★ 23 Apr 2025 00:34, UTC
Analyst	Michael Miller, Equity Analyst	Michael Miller, Equity Analyst	Michael Miller, Equity Analyst	Niklas Kammer, Equity Analyst
Capital Allocation	Exemplary	Exemplary	Standard	Standard
Price/Fair Value	1.08	1.02	1.07	1.26
Price/Sales	15.59	7.87	5.69	7.28
Price/Book	3.61	3.34	3.74	4.73
Price/Earning	303.18	26.47	25.78	24.42
Dividend Yield	3.95%	1.14%	1.32%	1.37%
Market Cap	95.70 Bil	92.31 Bil	41.81 Bil	50.98 Bil
52-Week Range	190.70—273.42	124.34—177.45	58.10—84.15	175.90—284.70
Investment Style	Large Value	Large Blend	Mid Blend	Large Growth

Bears Say Michael Miller, CFA, Equity Analyst, 14 Feb 2025

- Unlike its peers, CME is still mostly a transactional business, leaving its results more exposed to market forces.
- CME is benefiting from unusually high volatility in multiple markets. A return to normal conditions will create headwinds for the firm.
- The cash fixed-income and foreign-exchange trading businesses CME acquired during its purchase of NEX have seen stagnant to declining revenue.

Economic Moat Michael Miller, CFA, Equity Analyst, 23 Aug 2024

CME Group has achieved a wide moat rating as a result of its position as a leading venue for trading US futures contracts. More than 95% of US interest-rate futures trade on CME's exchange, the company has exclusive licenses to issue futures contracts on the S&P 500, Russell 2000, and Nasdaq indexes, and

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it is the dominant venue for trading West Texas Intermediate oil futures. We see its strong competitive advantages allowing CME to earn excess returns on capital for the foreseeable future.

CME's position in the US futures market has proved durable as attempts by NYSE Liffe and ELX to enter the US interest-rate futures market failed to gain traction despite having contracts similar to CME's. This is because competition among futures exchanges is largely dependent on implicit trading costs and collateral efficiencies, not the transaction fees the exchanges charge themselves. For example, the minimum tick size for CME 10-year Treasury futures contracts is \$15.625 per contract compared with transaction fees that range from \$0.30 to \$0.75. Even if another exchange charges less than CME, a 1-tick-size worse execution on even a fraction of contracts would wipe out any savings to the customer from lower transaction fees. This gives CME considerable pricing power and has allowed the firm to enjoy an operating margin that has historically been around 60%.

The ability to trade on an exchange efficiently is dependent on the amount of liquidity present on the exchange already. This creates powerful network effects as the number of traders that already utilize CME's exchanges ensures that its contracts have good liquidity, increasing their value to other customers. A potential competitor would need to attract a critical mass of trading volume before it could offer its customers comparable execution to CME, a difficult prospect as its initial user base would need to be willing to accept higher trading costs during the startup process. This process would be even further complicated by CME's model as a vertically integrated clearinghouse and the restrictiveness of futures contracts. Contracts purchased at CME's exchanges cannot be closed at another exchange and vice-versa. This keeps CME's liquidity pools captive to its exchanges and creates additional barriers to potential competitors.

The firm's clearinghouse also benefits from network effects. If one of CME's customer's fails to settle a contract, the exchange will step in and close out the transaction after seizing the collateral of the defaulted counterparty. Any potential losses by the counterparty are covered by a waterfall structure in which CME first covers the losses up to a certain amount. After CME's contributions hit their limit, any remaining shortfall is then covered by a guaranty fund paid for by the clearinghouse members or direct assessments on the clearinghouse members. This substantially reduces the systemic risk for investors and helps attract additional trading volume to exchanges. However, like other clearinghouses CME's potential contribution to the risk pool is limited, with total potential payments capping out at only \$250 million. The majority of the potential credit risk is split among the clearinghouse members themselves with the guaranty fund and potential assessments adding up to just under \$22 billion at the end of 2020. As a result, the risk mitigation provided to investors is tied to the number and size of the clearinghouse members at a clearinghouse, not just the financial strength of the clearinghouse. Additionally, it is more efficient for collateral purposes for clearinghouse members to participate in as few clearinghouses as possible. This discourages the introduction of new clearinghouses, as a new entrant provides little risk mitigation to its members until it can establish a user base. This adds

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additional challenges for a new exchange to enter the market using the same vertically integrated model clearinghouse model as CME.

CME also benefits from intangible assets as a result of its 27% ownership stake in S&P Dow Jones Indices. In addition to receiving revenue from every S&P 500 license, this ownership stake practically ensures that CME Group has an exclusive license to issue the S&P 500 E-mini and E-micro futures contracts. In addition, CME's position in S&P futures likely contributed to the exchange's ability to attract additional equity index futures license agreements for the Nasdaq and Russell 2000 indexes, which returned to CME Group in 2017. These two futures products are licensed from other exchanges but trade on the CME. It is much more efficient for customers to trade two different equity index futures on the same exchange as this allows futures traders to net their positions out when posting collateral. For example, if a trader opens a long S&P futures position and is short the Nasdaq futures contract on the CME, the exchange can record the offsetting contract positions and reduce the amount of collateral they need to post. Additionally, like other exchanges, CME has been able to increasingly monetize the trading data generated on its exchange. This data is proprietary and is highly valuable to investors. The firm has considerable pricing power for its data services as the lack of competition in many of its products means it is an exclusive source of data.

When looking at CME's ability to generate excess economic returns from its moat, we focus on its adjusted returns on invested capital excluding acquisition-related intangibles. While not a regular acquirer, CME has considerable amounts of intangible assets on its balance sheet from its purchases of CBOT and Nymex in 2007 and 2008, respectively, and NEX in 2018. CME does not amortize the intangible assets it acquired from CBOT and Nymex, instead choosing to leave them on the balance sheet, inflating its invested capital. Despite this, we do not see a large pool of intangible assets from past acquisitions as impairing our belief that CME has established maintainable competitive advantages in its business model.

Fair Value and Profit Drivers Michael Miller, CFA, Equity Analyst, 14 Feb 2025

We are raising our fair value estimate for CME to \$245 from \$225 per share, which translates to about 24.4 times our 2025 projected earnings. We use a 7.5% cost of equity.

We project that CME's revenue will grow at an average annual rate of around 3% from a cyclically strong 2024 to 2029. While we expect CME's overall trading volume to grow at a relatively stable rate, we believe there will be some significant fluctuations in the trading volumes of futures tied to specific asset classes. We expect volume for interest-rate futures to decrease in 2025 and 2026, as 2024 benefited from significant interest-rate uncertainty, which drove unusually high trading volume.

We expect volumes for equity futures to remain high as volatile markets have led to strong trading volumes for the complex. That said, we do expect volume to remain relatively flat, as market volatility

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normalizes. Lower volumes for equity futures should be mitigated by higher average revenue per contract as the company benefits from recent price increases and improved product mix. Additionally, broader investor awareness and availability of derivative products will likely mean that CME's equity futures volumes will remain well above their prepandemic levels, retaining the surge in volume that occurred from 2020 to 2022. All in all, we expect CME's transactional revenue to increase at an average rate of just under 2.5% over the next five years, with the firm's interest-rate and equity futures lagging firmwide average.

We also project that CME will be able to increase its data revenue by midsingle digits per year for the next five years, particularly as the firm enjoys strong pricing power for its data products. The company should also see falling interest income on client collateral in 2025 and beyond, as lower interest rates act as a headwind.

In the long run, we expect modest revenue growth and a stable cost structure to drive midsingle digit earnings growth. We anticipate operating margin to increase to about 63.2% by 2028 from 61.6% in 2023.

Risk and Uncertainty Michael Miller, CFA, Equity Analyst, 14 Feb 2025

Our Morningstar Uncertainty Rating for CME Group is Low. Unlike some of its peers, CME Group's revenue is still primarily transactional with more than 80% of revenue in 2024 coming from trading fees. The amount of trading volume any given futures contract experiences is heavily influenced by the amount of volatility in the underlying asset class. Large spikes in volatility generally lead to higher trading volume for CME while low volatility leads to lower trading volumes. As a result, CME's revenue from an individual product line can fluctuate significantly from quarter to quarter. However, CME is well diversified across multiple different asset classes, which stabilizes its total revenue over longer periods of time. CME has not seen a decline in annual revenue since 2012 despite its transactional nature.

It should also be noted that CME's revenue is affected by market volatility, not market directionality. The company can benefit from volatility to the downside, creating the potential for countercyclicality in its business. That said, the company does generate interest income from client collateral, giving it some direct interest-rate exposure.

CME is facing a new competitor in its interest-rate futures business with the entrance of FMX. While CME does enjoy powerful network effects and a strong competitive moat, which we expect will protect its business from significant disruption, this is a new point of uncertainty as the firm has generally not had real competitors in many of its product categories.

CME holds limited environmental, social, and governance-related risk, and we do not see this risk as material enough to alter our rating. CME offers futures contracts tied to oil and other petroleum products on its exchange. This exposes CME to the risk of reduced demand if global oil consumption

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declines as a result of environmental concerns. However, less than 13% of CME's revenue in 2023 came from its energy futures, which includes its natural gas contracts.

Capital Allocation Michael Miller, CFA, Equity Analyst, 14 Feb 2025

In our view, CME Group deserves an Exemplary Capital Allocation Rating. Its balance sheet is strong, with \$26.5 billion in equity against only \$3.3 billion in debt. CME also has ample liquidity with almost \$2.9 billion in cash on its balance sheet at the end of December 2024. There is some latent credit risk in the firm's clearinghouse business, and revenue can fluctuate based on market volatility. However, the strength of the balance sheet leaves CME well positioned to withstand any future issues and offers the flexibility to make further organic and inorganic investments in the business.

CME typically returns the majority of its operating cash flow to investors in the form of dividend payments. A regular quarterly dividend is supplemented with an annual discretionary cash payout. We like this structure for CME since it does not commit the company to making excessively large dividend payments; it can simply reduce the size of or eliminate the special distribution if the company needs to conserve capital. Given the potential for volatility in CME's earnings, due to their exposure to market forces, we think this dividend structure is a strong fit for the company.

While CME does supplement organic investment with acquisitions, these purchases have historically been rare. The CBOT and Nymex deals were major acquisitions but were completed in 2007 and 2008, respectively. Given the ensuing crisis, these deals were not well timed. However, combining the best trading products from these competitors was strategically important, and we believe the acquisitions widened the company's moat. While it is possible that CME overpaid for CBOT and Nymex given the timing of the deals, we believe the company has been able to make good use of these assets to increase shareholder value.

After an extended period of no major acquisitions, CME Group agreed to purchase NEX for \$5.5 billion in 2018 for a combination of shares and cash. We think the deal made good strategic sense with NEX's fixed-income trading business, BrokerTec, and its collateral optimization services seeming like particularly strong fits for CME given its core strengths. That said, recent results from the acquired business lines have been disappointing, with revenue falling despite generally favorable market conditions. Despite this failure we still believe that CME's strong balance sheet, good distribution policy, and capital investment discipline justify an Exemplary rating.

Analyst Notes Archive

CME Group: Increasing Our Fair Value Estimate; Lowering Our Uncertainty Rating Michael Miller, CFA, Equity Analyst, 14 Feb 2025

CME Group has been enjoying a string of strong results as the firm sees strong futures trading activity

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across its business. Trading volume rose 11% in 2024 with interest rate and commodity futures setting new all-time highs. Why it matters: Normally, CME's broad diversification across multiple asset classes limits how much overall growth the firm sees as success in one segment is offset by weakness in another. However, 2024 saw broad strength across almost every part of CME's business. We still expect revenue growth to normalize down into the midsingle digits, which is in line with the firm's long-term average, but so long as uncertainty and volatility persist in the market CME will be a direct beneficiary. The bottom line: Returning to wide-moat CME after earnings, we are increasing our fair value estimate to \$245 and changing our Uncertainty Rating to Low. Following the increase in our fair value estimate, we now see the shares as fairly valued. Around one third of the positive adjustment comes from building in fewer interest rate cuts into our expectations for 2025. CME generates income from client collateral, which scales with interest rates. We had expected falling interest rates to be more of headwind to the firm's near-term results. CME's positive rate exposure increases the possibility of countercyclical behavior already present in CME's business. This has been to the firm's benefit recently as uncertainty around rising long rates and stubborn inflation have left the firm largely untouched. Big picture: CME's trading fee revenue is affected by market volatility, not market directionality. The company can benefit from volatility to the downside, as demand for hedging increases. The collapse of Silicon Valley Bank was a major boost to interest rate futures volume.

CME Earnings: Strong Energy and Commodity Futures Volume Drives Average Pricing and Revenue Higher Michael Miller, CFA, Equity Analyst, 12 Feb 2025

CME's fourth-quarter results were a solid end to a strong 2024 thanks to strong market activity across multiple futures markets. Revenue increased 6% from the year-ago quarter to \$1.5 billion, and earnings per share increased 7.1% to \$2.40 despite a higher effective tax rate. Why it matters: CME saw solid trading activity across its various asset classes, but energy and commodity futures were the clear standouts. Total trading volume was effectively unchanged, but energy and agricultural futures volume increased 16.7% and 19.%, respectively. This mix shift toward energy and agricultural futures works in CME's favor, as these contracts carry higher average fees than its interest-rate or equity futures. The average rate per contract rose to \$0.701 from \$0.682 last year, offsetting flat overall volume. Trading volume in January showed similar patterns, with energy futures hitting their highest monthly volume since the pandemic at 3.23 million contracts per day. The bottom line: As we incorporate these results, we expect to increase our \$225 fair value estimate for wide-moat CME by a mid-single-digit percentage. We see the shares as only slightly overvalued following their strong performance Feb. 12. CME's shares tend to be sensitive to interest-rate expectations, as the firm benefits from higher interest rates through interest on client collateral. While expectations for interest-rate cuts in 2025 have diminished, our projections still include rates declining over time. Key stats: CME expects 2025 adjusted operating expenses, excluding licensing fees, to come in at \$1.65 billion and for total capital expenditure to be \$90 million. This seems reasonable to us. Disciplined expense management has historically been a strength

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CME Group Earnings: Volume Growth Offsets Lower Average Pricing to Drive Double-Digit Revenue Growth

Michael Miller, CFA, Equity Analyst, 23 Oct 2024

Wide-moat-rated CME group reported strong third-quarter earnings that were in line with our expectations as the company benefits from strong trading volume in multiple major asset classes. Net revenue increased 18% from last year and 3.4% from last quarter to \$1.58 billion. Meanwhile, diluted earnings per share increased to \$2.50 from \$2.06 last year. While these were strong results, they were not surprising as the firm’s monthly trading volume reports had built up expectations heading into the earnings release. As we incorporate these results, we do not expect to materially alter our \$225 fair value estimate for CME. We see the shares as fairly valued at the current price. Transaction and clearing fees, the primary drivers of CME’s revenue, rose 19.5% from last year to \$1.3 billion. The increase in transaction revenue was due to strong trading volume growth, as the firm’s average rate per contract declined modestly year over year. Volume growth was broad, with all of CME’s asset classes seeing double-digit growth, leading the firmwide average daily volume to increase 26.6% from last year to 28.3 million contracts per day. There were areas of particular strength, with the firm’s interest-rate futures, which CME is best known for, seeing a 35.7% increase in ADV to 14.9 million contracts per day. Uncertainty about interest rates continues to be a major tailwind for the firm’s results. We expect normalization at some point, but interest-rate volatility has proved to be a long-lasting phenomenon, to CME’s benefit. That said, CME will face a new competitor in this market in the form of FMX. We expect CME’s substantial competitive advantages to protect its business, but new competitive forces will likely be at least a modest headwind to interest-rate futures volume growth or fee increases for those products.

CME Group Earnings: Strong Trading Volume Across All Asset Classes Drives Double-Digit EPS Growth

Michael Miller, CFA, Equity Analyst, 24 Jul 2024

Wide-moat-rated CME Group reported strong second-quarter earnings as the company enjoyed high trading volume growth across all asset classes. Revenue increased 12.7% from last year and 3% from last quarter to \$1.53 billion. Meanwhile, diluted earnings per share increased 13% from last year to \$2.42, though the company did benefit from one extra trading day in the quarter. As we incorporate these results, we do not expect to materially alter our \$225 fair value estimate. We see the company as modestly undervalued at the current price, though we note that once interest rates begin to decline the firm will face headwinds on earnings growth. Transaction and clearing fees, which provide the bulk of CME’s revenue, increased 11.8% from last year to \$1.25 billion. The increase was entirely driven by higher futures and options trading volume, which increased 13.5% to 25.9 million contracts per day. Additionally, the increase in volume was broad, with all of CME’s asset classes showing strong increases in activity. CME’s interest rate futures, the firm’s largest product category, were particularly

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strong and saw a 14.4% increase in volume to 12.9 million contracts per day. That said, we see the firm as a beneficiary of the uncertainty surrounding interest rates and inflation, and we do expect some normalization if that uncertainty is settled. On the other hand, the sharp increase in trading volume was partially offset by lower pricing, with the firm's average rate per contract falling to \$0.708 from \$0.724. The decrease can be explained by a mix shift and strong trading volume growth. CME uses volume-based pricing for some of its trading fees, meaning that higher volume does place downward pressure on fees. CME enjoys a commanding competitive position, and we do not expect the company to face pricing pressure from competitive forces for the foreseeable future.

CME Group Earnings: Interest Rate and Inflation Uncertainty Keep Interest Rate Futures Volume

High Michael Miller, CFA, Equity Analyst, 24 Apr 2024

Wide-moat-rated CME Group reported solid earnings that were in line with our expectations as the company benefits from strong futures trading volume, particularly for the firm's energy and commodity futures. Revenue increased 3.2% from last year to \$1.49 billion, while earnings per share fell to \$2.35 from \$2.43. The drop in earnings per share was entirely due to a decrease in nonoperating investment income. This was a stronger quarter than the year-over-year comparisons imply. The first quarter of 2023 benefited from the regional banking crisis, which caused a sharp temporary spike in interest rate futures trading. As we incorporate these results, we do not plan to materially alter our \$225 fair value estimate for CME, and we see the shares as only slightly undervalued. Transaction and clearing fees, which are the main drivers of CME's revenue, increased 0.7% from last year to \$1.21 billion. Higher average pricing was offset by slightly lower volume, which fell 2% from last year to 26.4 million contracts per day. Interest rate futures volume was strong at 13.8 million contracts per day, 3.7% higher than last quarter, but failed to match last year's performance during the failure of Silicon Valley bank. While this quarter lacked an event-driven boost like 2023, general uncertainty around interest rates and inflation is likely acting as a temporary tailwind to results, and we do expect some normalization in the future. The firm's physical commodity futures delivered another strong quarter, continuing a positive trend after several unimpressive years. Energy and agricultural futures volume both increased 16%, to 2.4 million and 1.6 million contracts per day, respectively. CME's commodity futures carry higher average fees than its interest rate or equity futures, and the strong performance of these asset classes helped push average revenue contract up to \$0.695 from \$0.664 last year.

CME Earnings: High Interest-Rate Futures Volume Drives Strong Growth

Michael Miller, CFA, Equity Analyst, 14 Feb 2024

Wide-moat CME Group reported strong fourth-quarter results as volatile fixed-income markets drove higher volume for the firm's interest-rate futures. Revenue increased 19% from last year and 7.6% from last quarter to \$1.44 billion. Diluted earnings per share increased 23.4% from last year to \$2.37. As we incorporate these results, we do not plan to materially alter our \$220 fair value estimate. We see the

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CME★★22 Apr 2025 21:30, UTC

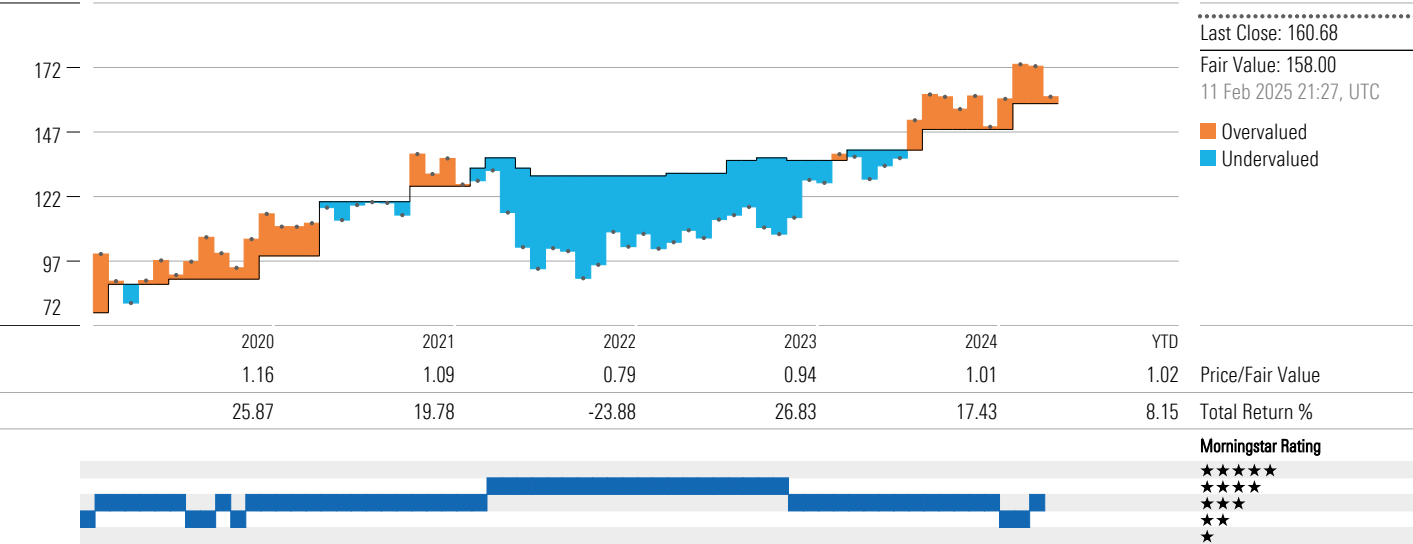
Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment¹
265.56 USD 22 Apr 2025	245.00 USD 14 Feb 2025 19:54, UTC	1.08	93.04 USD Bil 23 Apr 2025	 Wide	 Large Value	Low	Exemplary	 2 Apr 2025 05:00, UTC

shares as fairly valued.Transaction and clearing fees, which are the primary source of CME’s revenue, rose 20.7% from last year to \$1.18 billion. The increase in transaction revenue was due to better average pricing and higher average daily volume, which was up 17% from last year to 25.5 million contracts per day. The largest driver of the increase in volume was CME’s interest-rate futures, which benefited from uncertainty around the Federal Reserve’s interest-rate plans. Interest-rate volume was 13.3 million contracts per day, up more than 35% from 9.8 million per day last year. We do think events are temporarily boosting CME’s results, and we expect some normalization, but the firm’s new cross-margin program with the Depository Trust & Clearing Corp. should provide a more durable tailwind to the asset class.While not as large of a driver as interest-rate futures, the firm’s commodity futures are also showing a resurgence after several years of unimpressive performance. The momentum seen in CME’s third-quarter results continued in the fourth quarter, with average daily volume for energy and agricultural futures increasing 18% and 25.4%, respectively, from last year. This had positive ramifications for CME’s average pricing, since its commodity futures carry fees that are well above the firmwide average. Average revenue per contract was up 4.8% from last year to \$0.682, though mix shift will continue to influence this metric. ■■

CME Group Inc Class A CME ★★ 22 Apr 2025 21:30, UTC

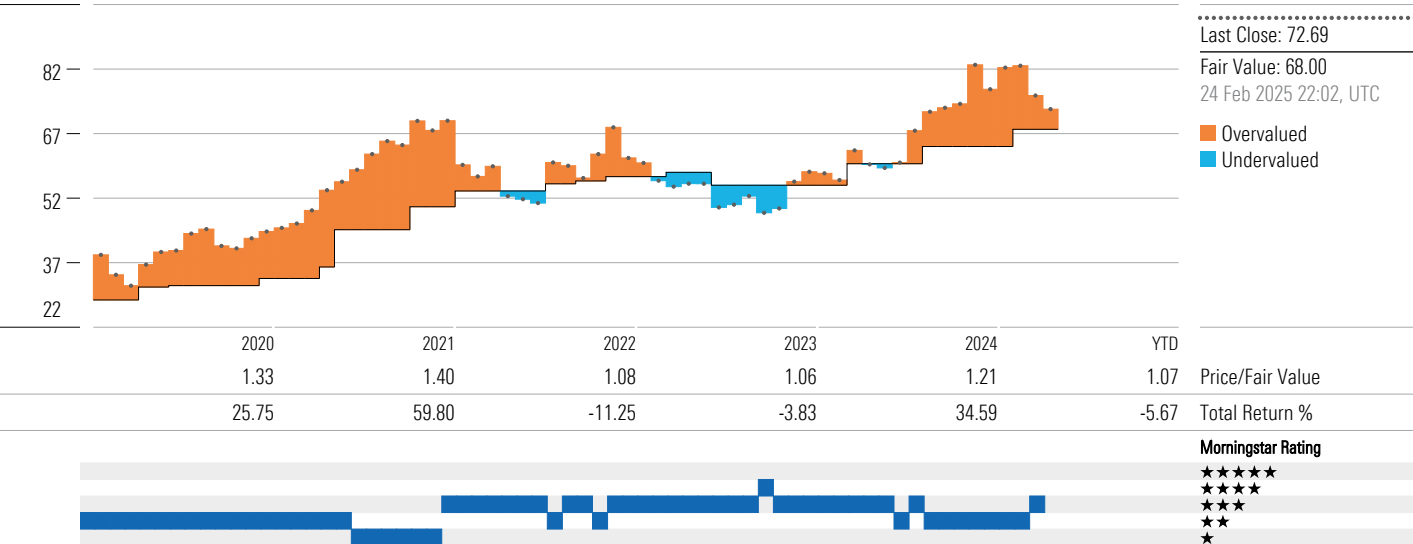
Competitors Price vs. Fair Value

Intercontinental Exchange Inc ICE



Total Return % as of 22 Apr 2025. Last Close as of 22 Apr 2025. Fair Value as of 11 Feb 2025 21:27, UTC.

Nasdaq Inc NDAQ

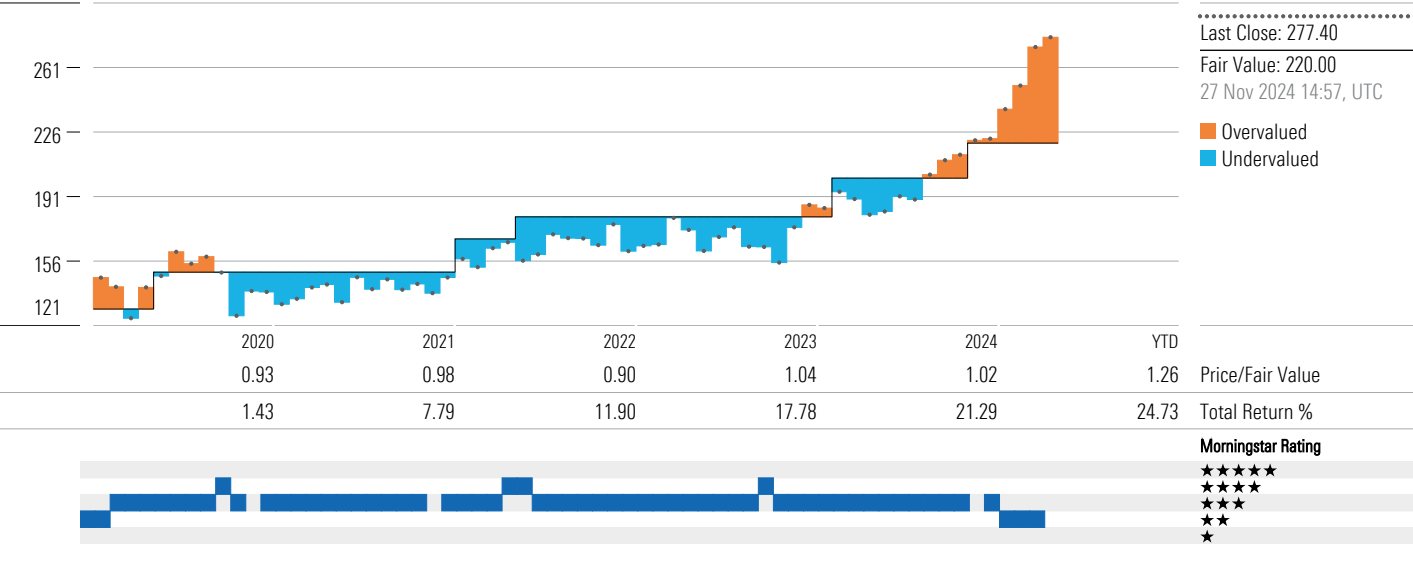


Total Return % as of 22 Apr 2025. Last Close as of 22 Apr 2025. Fair Value as of 24 Feb 2025 22:02, UTC.

CME Group Inc Class A CME★★22 Apr 2025 21:30, UTC

Competitors Price vs. Fair Value

Deutsche Boerse AG DB1



Total Return % as of 22 Apr 2025. Last Close as of 22 Apr 2025. Fair Value as of 27 Nov 2024 14:57, UTC.

CME Group Inc Class A CME ★★ 22 Apr 2025 21:30, UTC

Last Price 265.56 USD 22 Apr 2025	Fair Value Estimate 245.00 USD 14 Feb 2025 19:54, UTC	Price/FVE 1.08	Market Cap 93.04 USD Bil 23 Apr 2025	Economic Moat™ Wide	Equity Style Box Large Value	Uncertainty Low	Capital Allocation Exemplary	ESG Risk Rating Assessment¹ 2 Apr 2025 05:00, UTC
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Morningstar Valuation Model Summary

Financials as of 13 Feb 2025

Fiscal Year, ends 31 Dec	Actual			Forecast				
	2022	2023	2024	2025	2026	2027	2028	2029
Revenue (USD Mil)	5,019	5,579	6,130	6,248	6,337	6,564	6,823	7,095
Operating Income (USD Mil)	3,016	3,436	3,932	4,023	4,056	4,213	4,400	4,597
EBITDA (USD Mil)	4,016	4,666	5,055	5,184	5,187	5,329	5,555	5,797
Adjusted EBITDA (USD Mil)	4,016	4,666	5,055	5,184	5,187	5,329	5,555	5,797
Net Income (USD Mil)	2,657	3,186	3,526	3,614	3,623	3,729	3,900	4,084
Adjusted Net Income (USD Mil)	2,657	3,186	3,526	3,614	3,623	3,729	3,900	4,084
Free Cash Flow To The Firm (USD Mil)	2,709	3,497	3,877	3,617	3,563	3,646	3,770	3,945
Weighted Average Diluted Shares Outstanding (Mil)	359	360	360	360	360	360	360	360
Earnings Per Share (Diluted) (USD)	7.40	8.86	9.80	10.04	10.07	10.36	10.84	11.34
Adjusted Earnings Per Share (Diluted) (USD)	7.40	8.86	9.80	10.04	10.07	10.36	10.84	11.34
Dividends Per Share (USD)	8.50	9.65	9.65	9.50	9.60	9.80	10.30	10.80

Margins & Returns as of 13 Feb 2025

	3 Year Avg	Actual			Forecast					5 Year Avg
		2022	2023	2024	2025	2026	2027	2028	2029	
Operating Margin %	75.6	60.1	61.6	64.1	64.4	64.0	64.2	64.5	64.8	76.6
EBITDA Margin %	2.8	80.0	83.6	82.5	83.0	81.9	81.2	81.4	81.7	8.8
Adjusted EBITDA Margin %	—	80.0	83.6	82.5	83.0	81.9	81.2	81.4	81.7	81.8
Net Margin %	55.8	52.9	57.1	57.5	57.9	57.2	56.8	57.2	57.6	57.3
Adjusted Net Margin %	55.9	52.9	57.1	57.5	57.9	57.2	56.8	57.2	57.6	57.3
Free Cash Flow To The Firm Margin %	60.0	54.0	62.7	63.2	57.9	56.2	55.5	55.3	55.6	56.1

Growth & Ratios as of 13 Feb 2025

	3 Year CAGR	Actual			Forecast					2029 5 Year CAGR
		2022	2023	2024	2025	2026	2027	2028	2029	
Revenue Growth %	9.3	7.0	11.2	9.9	1.9	1.4	3.6	4.0	4.0	3.0
Operating Income Growth %	14.1	14.0	13.9	14.4	2.3	0.8	3.9	4.4	4.5	3.2
EBITDA Growth %	8.9	2.3	16.2	8.3	2.6	0.1	2.7	4.2	4.4	2.8
Adjusted EBITDA Growth %	8.8	2.3	16.2	8.3	2.6	0.1	2.7	4.2	4.4	2.8
Earnings Per Share Growth %	10.3	1.4	19.8	10.5	2.5	0.2	2.9	4.6	4.7	3.0
Adjusted Earnings Per Share Growth %	10.3	1.4	19.8	10.5	2.5	0.2	2.9	4.6	4.7	3.0

Valuation as of 13 Feb 2025

	Actual			Forecast				
	2022	2023	2024	2025	2026	2027	2028	2029
Price/Earning	22.7	23.8	23.7	26.5	26.4	25.6	24.5	23.4
Price/Sales	12.1	13.6	13.6	15.3	15.1	14.6	14.0	13.5
Price/Book	2.2	2.8	3.2	3.6	3.6	3.5	3.5	3.5
Price/Cash Flow	—	—	—	—	—	—	—	—
EV/EBITDA	15.4	16.5	16.7	18.5	18.5	18.0	17.3	16.6
EV/EBIT	20.5	22.4	21.5	23.9	23.7	22.8	21.8	20.9
Dividend Yield %	5.1	4.6	4.2	3.6	3.6	3.7	3.9	4.1
Dividend Payout %	114.9	108.9	98.5	94.6	95.4	94.6	95.1	95.2
Free Cash Flow Yield %	—	—	—	—	—	—	—	—

Operating Performance / Profitability as of 13 Feb 2025

Fiscal Year, ends 31 Dec	Actual			Forecast				
	2022	2023	2024	2025	2026	2027	2028	2029
ROA %	1.5	2.5	2.6	2.6	2.5	2.6	2.7	2.7
ROE %	9.9	11.9	13.3	13.6	13.5	13.8	14.3	14.9
ROIC %	8.4	9.9	26.7	-78.2	-74.5	-73.3	-72.7	-72.3

CME Group Inc Class A CME ★★

22 Apr 2025 21:30, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment ¹
265.56 USD 22 Apr 2025	245.00 USD 14 Feb 2025 19:54, UTC	1.08	93.04 USD Bil 23 Apr 2025	Wide	Large Value	Low	Exemplary	 2 Apr 2025 05:00, UTC

Financial Leverage (Reporting Currency)

Fiscal Year, ends 31 Dec	Actual			Forecast				
	2022	2023	2024	2025	2026	2027	2028	2029
Debt/Capital %	5.4	4.3	—	6.1	5.8	5.5	5.2	4.9
Assets/Equity	6.5	4.9	5.2	5.2	5.3	5.3	5.4	5.5
Net Debt/EBITDA	0.2	0.1	—	0.5	0.4	0.4	0.3	0.2
Total Debt/EBITDA	0.9	0.7	—	1.1	1.1	1.1	1.0	0.9
EBITDA/ Net Interest Expense	24.7	29.3	31.4	32.3	35.7	37.4	39.8	42.4

Forecast Revisions as of 14 Feb 2025

Prior data as of 23 Aug 2024	2025		2026		2027	
	Current	Prior	Current	Prior	Current	Prior
Fair Value Estimate Change (Trading Currency)	245.00	226.94	—	—	—	—
Revenue (USD Mil)	6,248	6,014	6,337	6,014	6,564	6,190
Operating Income (USD Mil)	4,023	3,831	4,056	3,781	4,213	3,885
EBITDA (USD Mil)	5,184	4,952	5,187	4,824	5,329	4,901
Net Income (USD Mil)	3,614	3,373	3,623	3,290	3,729	3,347
Earnings Per Share (Diluted) (USD)	10.04	9.38	10.07	9.15	10.36	9.31
Adjusted Earnings Per Share (Diluted) (USD)	10.04	9.38	10.07	9.15	10.36	9.31
Dividends Per Share (USD)	9.50	8.90	9.60	8.70	9.80	8.80

Key Valuation Drivers as of 13 Feb 2025

Cost of Equity %	7.5
Pre-Tax Cost of Debt %	5.8
Weighted Average Cost of Capital %	7.3
Long-Run Tax Rate %	23.0
Stage II EBI Growth Rate %	6.0
Stage II Investment Rate %	5.0
Perpetuity Year	20

Additional estimates and scenarios available for download at <https://pitchbook.com/>.

Discounted Cash Flow Valuation as of 13 Feb 2025

	USD Mil
Present Value Stage I	15,032
Present Value Stage II	39,621
Present Value Stage III	36,972
Total Firm Value	91,626
Cash and Equivalents	2,306
Debt	5,997
Other Adjustments	0
Equity Value	87,935
Projected Diluted Shares	360
Fair Value per Share (USD)	245.00

CME Group Inc Class A CME ★★ 22 Apr 2025 21:30, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment¹
265.56 USD 22 Apr 2025	245.00 USD 14 Feb 2025 19:54, UTC	1.08	93.04 USD Bil 23 Apr 2025	Wide	Large Value	Low	Exemplary	 2 Apr 2025 05:00, UTC

ESG Risk Rating Breakdown

Exposure

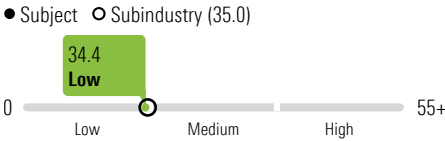
Company Exposure¹	34.4
– Manageable Risk	32.8
Unmanageable Risk²	1.6

Management

Manageable Risk	32.8
– Managed Risk³	16.4
Management Gap⁴	16.4

Overall Unmanaged Risk

18.0



- ▶ Exposure represents a company's vulnerability to ESG risks driven by their business model
- ▶ Exposure is assessed at the Subindustry level and then specified at the company level
- ▶ Scoring ranges from 0-55+ with categories of low, medium, and high-risk exposure

- ▶ Management measures a company's ability to manage ESG risks through its commitments and actions
- ▶ Management assesses a company's efficiency on ESG programs, practices, and policies
- ▶ Management score ranges from 0-100% showing how much manageable risk a company is managing

ESG Risk Rating



ESG Risk Ratings measure the degree to which a company's value is impacted by environmental, social, and governance risks, by evaluating the company's ability to manage the ESG risks it faces.

1. A company's Exposure to material ESG issues 2. Unmanageable Risk refers to risks that are inherent to a particular business model that cannot be managed by programs or initiatives 3. Managed Risk = Manageable Risk multiplied by a Management score of 50.0% 4. Management Gap assesses risks that are not managed, but are considered manageable 5. ESG Risk Rating Assessment = Overall Unmanaged Risk = Management Gap plus Unmanageable Risk

ESG Risk Rating Assessment⁵



ESG Risk Rating is of Apr 02, 2025. Highest Controversy Level is as of Apr 08, 2025. Sustainalytics Subindustry: Financial Exchanges and Data Services. Sustainalytics provides Morningstar with company ESG ratings and metrics on a monthly basis and as such, the ratings in Morningstar may not necessarily reflect current Sustainalytics' scores for the company. For the most up to date rating and more information, please visit: sustainalytics.com/esg-ratings/.

Peer Analysis 02 Apr 2025

Company Name	Exposure	Management	ESG Risk Rating
CME Group Inc	34.4 Low 0 —●— 55+	50.0 Average 100 —●— 0	18.0 Low 0 —●— 40+
Nasdaq Inc	36.7 Medium 0 —●— 55+	66.0 Strong 100 —●— 0	13.6 Low 0 —●— 40+
Intercontinental Exchange Inc	37.5 Medium 0 —●— 55+	52.2 Strong 100 —●— 0	18.9 Low 0 —●— 40+
Evercore Inc	41.0 Medium 0 —●— 55+	38.3 Average 100 —●— 0	25.9 Medium 0 —●— 40+
Deutsche Boerse AG	37.3 Medium 0 —●— 55+	73.5 Strong 100 —●— 0	11.2 Low 0 —●— 40+

Appendix

Historical Morningstar Rating

CME Group Inc Class A CME 22 Apr 2025 21:30, UTC

Dec 2025	Nov 2025	Oct 2025	Sep 2025	Aug 2025	Jul 2025	Jun 2025	May 2025	Apr 2025	Mar 2025	Feb 2025	Jan 2025
—	—	—	—	—	—	—	—	★★	★★	★★★	★★★
Dec 2024	Nov 2024	Oct 2024	Sep 2024	Aug 2024	Jul 2024	Jun 2024	May 2024	Apr 2024	Mar 2024	Feb 2024	Jan 2024
★★★	★★★	★★★	★★★	★★★	★★★★	★★★★	★★★	★★★	★★★	★★★	★★★
Dec 2023	Nov 2023	Oct 2023	Sep 2023	Aug 2023	Jul 2023	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023
★★★	★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
Dec 2022	Nov 2022	Oct 2022	Sep 2022	Aug 2022	Jul 2022	Jun 2022	May 2022	Apr 2022	Mar 2022	Feb 2022	Jan 2022
★★★★	★★★★	★★★★	★★★★	★★★	★★★	★★★	★★★	★★★	★★	★★	★★
Dec 2021	Nov 2021	Oct 2021	Sep 2021	Aug 2021	Jul 2021	Jun 2021	May 2021	Apr 2021	Mar 2021	Feb 2021	Jan 2021
★★	★★	★★	★★★	★★★	★★★	★★	★★	—	★★	★★	★★
Dec 2020	Nov 2020	Oct 2020	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020
★★	★★★	★★★	★★★	★★★	★★★	★★★	★★	★★	★★★	★★	★

Intercontinental Exchange Inc ICE 22 Apr 2025 21:28, UTC

Dec 2025	Nov 2025	Oct 2025	Sep 2025	Aug 2025	Jul 2025	Jun 2025	May 2025	Apr 2025	Mar 2025	Feb 2025	Jan 2025
—	—	—	—	—	—	—	—	★★★	★★	★★	★★★
Dec 2024	Nov 2024	Oct 2024	Sep 2024	Aug 2024	Jul 2024	Jun 2024	May 2024	Apr 2024	Mar 2024	Feb 2024	Jan 2024
★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2023	Nov 2023	Oct 2023	Sep 2023	Aug 2023	Jul 2023	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023
★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
Dec 2022	Nov 2022	Oct 2022	Sep 2022	Aug 2022	Jul 2022	Jun 2022	May 2022	Apr 2022	Mar 2022	Feb 2022	Jan 2022
★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★	★★★	★★★
Dec 2021	Nov 2021	Oct 2021	Sep 2021	Aug 2021	Jul 2021	Jun 2021	May 2021	Apr 2021	Mar 2021	Feb 2021	Jan 2021
★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2020	Nov 2020	Oct 2020	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020
★★★	★★	★★★	★★	★★	★★★	★★★	★★★	★★★	★★★	★★★	★★

Nasdaq Inc NDAQ 22 Apr 2025 21:26, UTC

Dec 2025	Nov 2025	Oct 2025	Sep 2025	Aug 2025	Jul 2025	Jun 2025	May 2025	Apr 2025	Mar 2025	Feb 2025	Jan 2025
—	—	—	—	—	—	—	—	★★★	★★	★★	★★
Dec 2024	Nov 2024	Oct 2024	Sep 2024	Aug 2024	Jul 2024	Jun 2024	May 2024	Apr 2024	Mar 2024	Feb 2024	Jan 2024
★★	★★	★★	★★	★★★	★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2023	Nov 2023	Oct 2023	Sep 2023	Aug 2023	Jul 2023	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023
★★★	★★★	★★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2022	Nov 2022	Oct 2022	Sep 2022	Aug 2022	Jul 2022	Jun 2022	May 2022	Apr 2022	Mar 2022	Feb 2022	Jan 2022
★★★	★★	★★★	★★★	★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2021	Nov 2021	Oct 2021	Sep 2021	Aug 2021	Jul 2021	Jun 2021	May 2021	Apr 2021	Mar 2021	Feb 2021	Jan 2021
★	★	★	★	★	★	★★	★★	★★	★★	★★	★★
Dec 2020	Nov 2020	Oct 2020	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020
★★	★★	★★	★★	★★	★★	★★	★★	★★	★★	★★	★★

Deutsche Boerse AG DB1 23 Apr 2025 00:34, UTC

Dec 2025 —	Nov 2025 —	Oct 2025 —	Sep 2025 —	Aug 2025 —	Jul 2025 —	Jun 2025 —	May 2025 —	Apr 2025 ★★	Mar 2025 ★★	Feb 2025 ★★	Jan 2025 ★★★
Dec 2024 —	Nov 2024 ★★★	Oct 2024 ★★★	Sep 2024 ★★★	Aug 2024 ★★★	Jul 2024 ★★★	Jun 2024 ★★★	May 2024 ★★★	Apr 2024 ★★★	Mar 2024 ★★★	Feb 2024 ★★★	Jan 2024 ★★★
Dec 2023 ★★★	Nov 2023 ★★★	Oct 2023 ★★★★	Sep 2023 ★★★	Aug 2023 ★★★	Jul 2023 ★★★	Jun 2023 ★★★	May 2023 ★★★	Apr 2023 ★★★	Mar 2023 ★★★	Feb 2023 ★★★	Jan 2023 ★★★
Dec 2022 ★★★	Nov 2022 ★★★	Oct 2022 ★★★	Sep 2022 ★★★	Aug 2022 ★★★	Jul 2022 ★★★	Jun 2022 ★★★★	May 2022 ★★★★	Apr 2022 ★★★	Mar 2022 ★★★	Feb 2022 ★★★	Jan 2022 ★★★
Dec 2021 —	Nov 2021 ★★★	Oct 2021 ★★★	Sep 2021 ★★★	Aug 2021 ★★★	Jul 2021 ★★★	Jun 2021 ★★★	May 2021 ★★★	Apr 2021 ★★★	Mar 2021 ★★★	Feb 2021 ★★★	Jan 2021 ★★★
Dec 2020 —	Nov 2020 ★★★	Oct 2020 ★★★★	Sep 2020 ★★★	Aug 2020 ★★★	Jul 2020 ★★★	Jun 2020 ★★★	May 2020 ★★★	Apr 2020 ★★★	Mar 2020 ★★★	Feb 2020 ★★	Jan 2020 ★★

Research Methodology for Valuing Companies

Overview

At the heart of our valuation system is a detailed projection of a company's future cash flows, resulting from our analysts' research. Analysts create custom industry and company assumptions to feed income statement, balance sheet, and capital investment assumptions into our globally standardized, proprietary discounted cash flow, or DCF, modeling templates. We use scenario analysis, in-depth competitive advantage analysis, and a variety of other analytical tools to augment this process. Moreover, we think analyzing valuation through discounted cash flows presents a better lens for viewing cyclical companies, high-growth firms, businesses with finite lives (e.g., mines), or companies expected to generate negative earnings over the next few years. That said, we don't dismiss multiples altogether but rather use them as supporting cross-checks for our DCF-based fair value estimates. We also acknowledge that DCF models offer their own challenges (including a potential proliferation of estimated inputs and the possibility that the method may miss short-term market-price movements), but we believe these negatives are mitigated by deep analysis and our long-term approach.

Morningstar's equity research group ("we," "our") believes that a company's intrinsic worth results from the future cash flows it can generate. The Morningstar Rating for stocks identifies stocks trading at a discount or premium to their intrinsic worth—or fair value estimate, in Morningstar terminology. Five-star stocks sell for the biggest risk adjusted discount to their fair values, whereas 1-star stocks trade at premiums to their intrinsic worth.

Four key components drive the Morningstar rating: (1) our assessment of the firm's economic moat, (2) our estimate of the stock's fair value, (3) our uncertainty around that fair value estimate and (4) the current market price. This process ultimately culminates in our single-point star rating.

1. Economic Moat

The concept of an economic moat plays a vital role not only in our qualitative assessment of a firm's long-term investment potential, but also in the actual calculation of our fair value estimates. An economic moat is a structural feature that allows a firm to sustain excess profits over a long period of time. We define economic profits as re-

turns on invested capital (or ROIC) over and above our estimate of a firm's cost of capital, or weighted average cost of capital (or WACC). Without a moat, profits are more susceptible to competition. We have identified five sources of economic moats: intangible assets, switching costs, network effect, cost advantage, and efficient scale.

Companies with a narrow moat are those we believe are more likely than not to achieve normalized excess returns for at least the next 10 years. Wide-moat companies are those in which we have very high confidence that excess returns will remain for 10 years, with excess returns more likely than not to remain for at least 20 years. The longer a firm generates economic profits, the higher its intrinsic value. We believe low-quality, no-moat companies will see their normalized returns gravitate toward the firm's cost of capital more quickly than companies with moats.

When considering a company's moat, we also assess whether there is a substantial threat of value destruction, stemming from risks related to ESG, industry disruption, financial health, or other idiosyncratic issues. In this context, a risk is considered potentially value destructive if its occurrence would eliminate a firm's economic profit on a cumulative or midcycle basis. If we deem the probability of occurrence sufficiently high, we would not characterize the company as possessing an economic moat.

2. Estimated Fair Value

Combining our analysts' financial forecasts with the firm's economic moat helps us assess how long returns on invested capital are likely to exceed the firm's cost of capital. Returns of firms with a wide economic moat rating are assumed to fade to the perpetuity period over a longer period of time than the returns of narrow-moat firms, and both will fade slower than no-moat firms, increasing our estimate of their intrinsic value.

Our model is divided into three distinct stages:

Stage I: Explicit Forecast

In this stage, which can last five to 10 years, analysts make full financial statement forecasts, including items such as revenue, profit margins, tax rates, changes in working capital accounts, and capital spending. Based on these projections, we calculate earnings before interest, after taxes (EBIT) and the net new investment (NNI) to de-

rive our annual free cash flow forecast.

Stage II: Fade

The second stage of our model is the period it will take the company's return on new invested capital—the return on capital of the next dollar invested ("RONIC")—to decline (or rise) to its cost of capital. During the Stage II period, we use a formula to approximate cash flows in lieu of explicitly modeling the income statement, balance sheet, and cash flow statement as we do in Stage I. The length of the second stage depends on the strength of the company's economic moat. We forecast this period to last anywhere from one year (for companies with no economic moat) to 10–15 years or more (for wide-moat companies). During this period, cash flows are forecast using four assumptions: an average growth rate for EBIT over the period, a normalized investment rate, average return on new invested capital (RONIC), and the number of years until perpetuity, when excess returns cease. The investment rate and return on new invested capital decline until a perpetuity value is calculated. In the case of firms that do not earn their cost of capital, we assume marginal ROICs rise to the firm's cost of capital (usually attributable to less reinvestment), and we may truncate the second stage.

Stage III: Perpetuity

Once a company's marginal ROIC hits its cost of capital, we calculate a continuing value, using a standard perpetuity formula. At perpetuity, we assume that any growth or decline or investment in the business neither creates nor destroys value and that any new investment provides a return in line with estimated WACC.

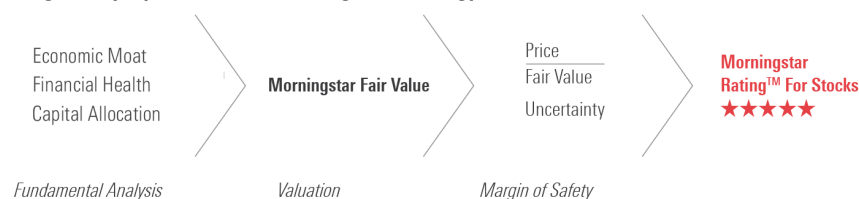
Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows. Because we are modeling free cash flow to the firm—representing cash available to provide a return to all capital providers—we discount future cash flows using the WACC, which is a weighted average of the costs of equity, debt, and preferred stock (and any other funding sources), using expected future proportionate long-term, market-value weights.

3. Uncertainty Around That Fair Value Estimate

Morningstar's Uncertainty Rating is designed to capture the range of potential outcomes for a company's intrinsic value. This rating is used to assign the margin of safety required before investing, which in turn explicitly drives our stock star rating system. The Uncertainty Rating is aimed at identifying the confidence we should have in assigning a fair value estimate for a given stock.

Our Uncertainty Rating is meant to take into account anything that can increase the potential dispersion of future outcomes for the intrinsic value of a company, and any-

Morningstar Equity Research Star Rating Methodology



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thing that can affect our ability to accurately predict these outcomes. The rating begins with a suggested rating produced by a quantitative process based on the trailing 12-month standard deviation of daily stock returns. An analyst overlay is then applied, with analysts using the suggested rating, historical rating data, and their own knowledge of the company to inform them as they make the final Uncertainty Rating decision. Ultimately, the rating decision rests with the analyst. Analysts take into account many characteristics when making their final decision, including cyclical factors, operational and financial factors such as leverage, company-specific events, ESG risks, and anything else that might increase the potential dispersion of future outcomes and our ability to estimate those outcomes.

Our recommended margin of safety—the discount to fair value demanded before we'd recommend buying or selling the stock—widens as our uncertainty of the estimated value of the equity increases. The more uncertain we are about the potential dispersion of outcomes, the greater the discount we require relative to our estimate of the value of the firm before we would recommend the purchase of the shares. In addition, the Uncertainty Rating provides guidance in portfolio construction based on risk tolerance.

Our Uncertainty Ratings are: Low, Medium, High, Very High, and Extreme.

Margin of Safety		
Qualitative Analysis	★★★★★ Rating	★ Rating
Uncertainty Ratings		
Low	20% Discount	25% Premium
Medium	30% Discount	35% Premium
High	40% Discount	55% Premium
Very High	50% Discount	75% Premium
Extreme	75% Discount	300% Premium

Our uncertainty rating is based on the interquartile range, or the middle 50% of potential outcomes, covering the 25th percentile–75th percentile. This means that when a stock hits 5 stars, we expect there is a 75% chance that the intrinsic value of that stock lies above the current market price. Similarly, when a stock hits 1 star, we expect there is a 75% chance that the intrinsic value of that stock lies below the current market price.

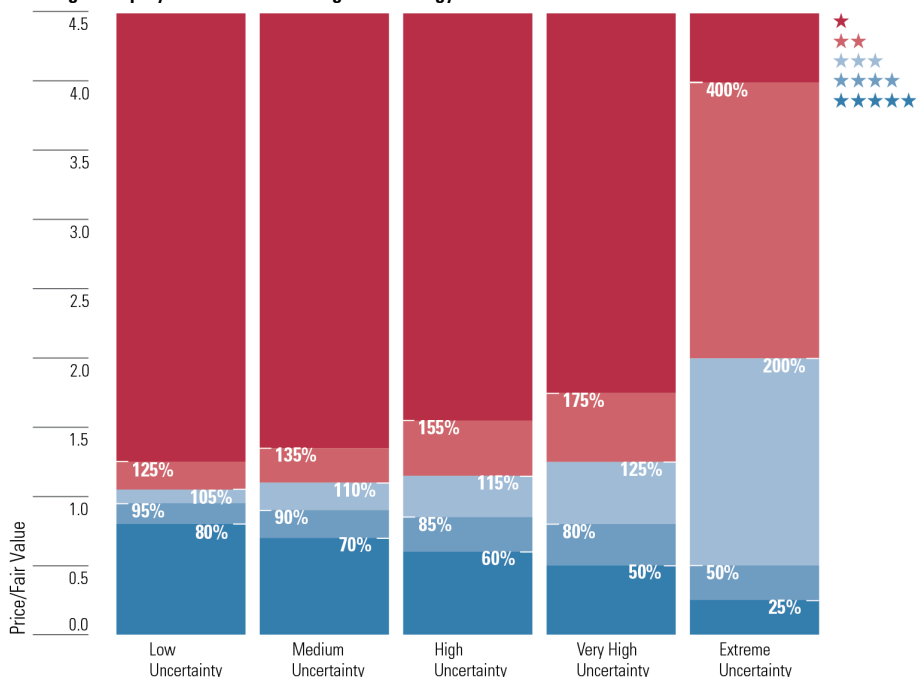
4. Market Price

The market prices used in this analysis and noted in the report come from exchange on which the stock is listed which we believe is a reliable source.

For more details about our methodology, please go to <https://shareholders.morningstar.com>

Morningstar Star Rating for Stocks

Morningstar Equity Research Star Rating Methodology



Once we determine the fair value estimate of a stock, we compare it with the stock's current market price on a daily basis, and the star rating is automatically re-calculated at the market close on every day the market on which the stock is listed is open. Our analysts keep close tabs on the companies they follow, and, based on thorough and ongoing analysis, raise or lower their fair value estimates as warranted.

Please note, there is no predefined distribution of stars. That is, the percentage of stocks that earn 5 stars can fluctuate daily, so the star ratings, in the aggregate, can serve as a gauge of the broader market's valuation. When there are many 5-star stocks, the stock market as a whole is more undervalued, in our opinion, than when very few companies garner our highest rating.

We expect that if our base-case assumptions are true the market price will converge on our fair value estimate over time generally within three years (although it is impossible to predict the exact time frame in which market prices may adjust).

Our star ratings are guideposts to a broad audience and individuals must consider their own specific investment goals, risk tolerance, tax situation, time horizon, income needs, and complete investment portfolio, among other factors.

The Morningstar Star Ratings for stocks are defined below:

★★★★★ We believe appreciation beyond a fair risk ad-

justed return is highly likely over a multiyear time frame. Scenario analysis developed by our analysts indicates that the current market price represents an excessively pessimistic outlook, limiting downside risk and maximizing upside potential.

★★★★ We believe appreciation beyond a fair risk-adjusted return is likely.

★★★ Indicates our belief that investors are likely to receive a fair risk-adjusted return (approximately cost of equity).

★★ We believe investors are likely to receive a less than fair risk-adjusted return.

★ Indicates a high probability of undesirable risk-adjusted returns from the current market price over a multiyear time frame, based on our analysis. Scenario analysis by our analysts indicates that the market is pricing in an excessively optimistic outlook, limiting upside potential and leaving the investor exposed to Capital loss.

Other Definitions

Last Price: Price of the stock as of the close of the market of the last trading day before date of the report.

Capital Allocation Rating: Our Capital Allocation (or Stewardship) Rating represents our assessment of the quality of management's capital allocation, with particular emphasis on the firm's balance sheet, investments, and shareholder distributions. Analysts consider compan-

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ies' investment strategy and valuation, balance sheet management, and dividend and share buyback policies. Corporate governance factors are only considered if they are likely to materially impact shareholder value, though either the balance sheet, investment, or shareholder distributions. Analysts assign one of three ratings: "Exemplary", "Standard", or "Poor". Analysts judge Capital Allocation from an equity holder's perspective. Ratings are determined on a forward looking and absolute basis. The Standard rating is most common as most managers will exhibit neither exceptionally strong nor poor capital allocation.

Capital Allocation (or Stewardship) analysis published prior to Dec. 9, 2020, was determined using a different process. Beyond investment strategy, financial leverage, and dividend and share buyback policies, analysts also considered execution, compensation, related party transactions, and accounting practices in the rating.

Capital Allocation Rating: Our Capital Allocation (or Stewardship) Rating represents our assessment of the quality of management's capital allocation, with particular emphasis on the firm's balance sheet, investments, and shareholder distributions. Analysts consider companies' investment strategy and valuation, balance sheet management, and dividend and share buyback policies. Corporate governance factors are only considered if they are likely to materially impact shareholder value, though either the balance sheet, investment, or shareholder distributions. Analysts assign one of three ratings: "Exemplary", "Standard", or "Poor". Analysts judge Capital Allocation from an equity holder's perspective. Ratings are determined on a forward looking and absolute basis. The Standard rating is most common as most managers will exhibit neither exceptionally strong nor poor capital allocation.

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Sustainalytics ESG Risk Rating Assessment: The ESG Risk Rating Assessment is provided by Sustainalytics; a Morningstar company.

Sustainalytics' ESG Risk Ratings measure the degree to which company's economic value at risk is driven by environment, social and governance (ESG) factors.

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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