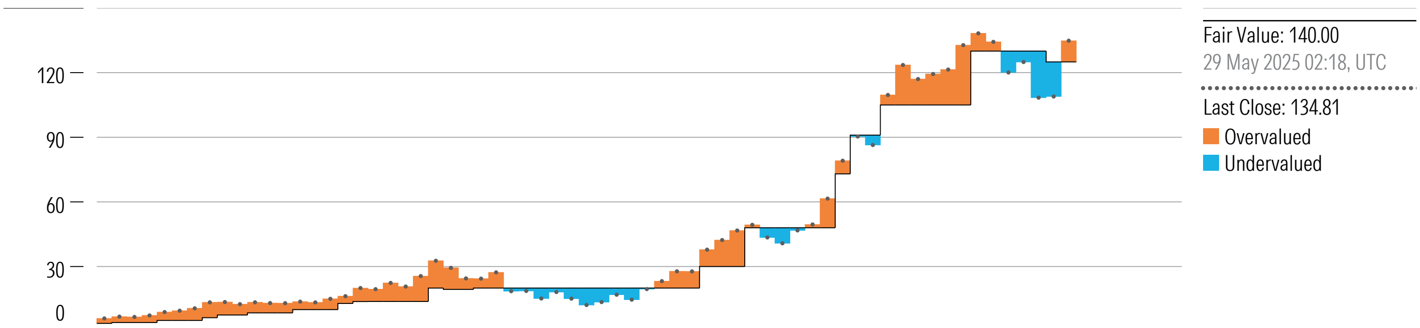
Morningstar Equity Analyst Report | Report as of 29 May 2025 02:25, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 1 of 24

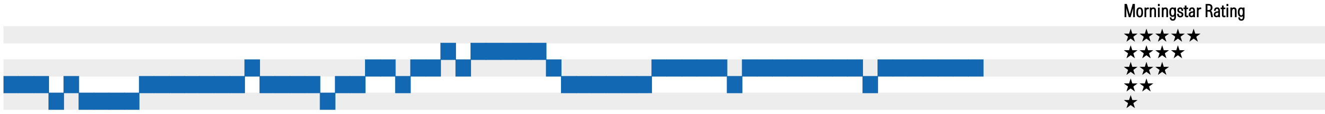
NVIDIA Corp NVDA ★★★ 29 May 2025 02:21, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
134.81 USD 28 May 2025	140.00 USD 29 May 2025 02:18, UTC	0.96	3.29 USD Tril 28 May 2025	Wide	Large Growth	Very High	Exemplary	7 May 2025 05:00, UTC

Price vs. Fair Value



	2020	2021	2022	2023	2024	YTD	
	1.54	1.52	0.73	1.03	1.03	0.96	Price/Fair Value
	122.20	125.41	-50.26	238.98	171.24	0.39	Total Return %



Total Return % as of 28 May 2025. Last Close as of 28 May 2025. Fair Value as of 29 May 2025 02:18, UTC.

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The primary analyst covering this company does not own its stock.

[1]The ESG Risk Rating Assessment is a representation of Sustainalytics' ESG Risk Rating.

Nvidia Earnings: Export Controls Aren't Slowing It Down; Raising Fair Value to $140 From $125

Analyst Note Brian Colello, CPA, Strategist, 29 May 2025

Nvidia reported fiscal first-quarter revenue of $44.1 billion, ahead of guidance and up 69% from the year-ago period. Second-quarter revenue guidance of $45 billion would represent 50% year-over-year growth. Both figures incorporate lost revenue from China due to US export controls.

Why it matters: We're encouraged by Nvidia's revenue growth despite being blocked from selling H20 products (custom-built for China's artificial intelligence market). This caused a $4.5 billion inventory write-off and foregone revenue of $2.5 billion and $8.0 billion in the first and second quarters, respectively.

- First-quarter data center revenue of $39.1 billion was up 73% year over year, as almost 70% of revenue came from Nvidia's latest Blackwell products. Of this revenue, $4.6 billion came from H20 sold into China before the restrictions were enacted on April 9, 2025.
- Nvidia's gaming revenue was a bright spot, up 48% sequentially and up 42% year over year, as new gaming products based on the Blackwell architecture were well-adopted.

The bottom line: We raise our fair value estimate for wide-moat Nvidia to $140 per share from $125 as Blackwell supply (and revenue) expanded faster than we anticipated and should support higher long-term AI revenue. We retain our Very High Morningstar Uncertainty Rating.

- Shares rose about 5% after hours following the results and appear fairly valued, as we think the

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Sector	Industry
Technology	Semiconductors

Business Description

Nvidia is a leading developer of graphics processing units. Traditionally, GPUs were used to enhance the experience on computing platforms, most notably in gaming applications on PCs. GPU use cases have since emerged as important semiconductors used in artificial intelligence. Nvidia not only offers AI GPUs, but also a software platform, Cuda, used for AI model development and training. Nvidia is also expanding its data center networking solutions, helping to tie GPUs together to handle complex workloads.

market was similarly impressed by Blackwell and calmed by Nvidia's ability to grow despite China export controls.

Coming up: Nvidia expects revenue in the July quarter to increase about 3% sequentially, with modest growth across all segments. Growth would have been 14% sequentially and 77% year over year if Nvidia were allowed to sell $8.0 billion of H20 products into China as desired.

Business Strategy & Outlook Brian Colello, CPA, Strategist, 29 May 2025

Nvidia has a wide economic moat, thanks to its market leadership in graphics processing units, or GPUs, hardware and software tools needed to enable the exponentially growing market around artificial intelligence. In the long run, we expect tech titans to strive to find second-sources or in-house solutions to diversify away from Nvidia in AI, but most likely, these efforts will chip away at, but not supplant, Nvidia's AI dominance.

Nvidia's GPUs handle parallel processing workloads, using many cores to efficiently process data at the same time. In contrast, central processing units, or CPUs, such as Intel's processors for PCs and servers, or Apple's processors for its Macs and iPhones, process the data of "0's and 1's" in a serial fashion. The wheelhouse of GPUs has been the gaming market, and Nvidia's GPU graphics cards have long been considered best of breed.

More recently, parallel processing has emerged as a near-requirement to accelerate AI workloads. Nvidia took an early lead in AI GPU hardware, but more important, developed a proprietary software platform, Cuda, and these tools allow AI developers to build their models with Nvidia. We believe Nvidia not only has a hardware lead, but benefits from high customer switching costs around Cuda, making it unlikely for another chip designer to emerge as a leader in AI training. Nvidia's expansion into networking has been all the more impressive, creating another avenue that will make it hard for AI customers to withdraw from Nvidia over time.

We think Nvidia's prospects will be tied to the AI market, for better or worse, for quite some time. We expect leading cloud vendors to continue to invest in in-house, while AMD is also working on GPUs and AI accelerators for the data center. However, we view Nvidia's GPUs and Cuda as the industry leaders, and the firm's massive valuation will hinge on whether, and for how long, the company can stay ahead of the rest of the pack.

Bulls Say Brian Colello, CPA, Strategist, 29 May 2025

- Nvidia's GPUs offer industry-leading parallel processing, which was historically needed in PC gaming applications, but has expanded into crypto mining, AI, and perhaps future applications too.
- Nvidia's data center GPUs and Cuda software platform have established the company as the dominant vendor for AI model training, which is a use case that should rise exponentially in the years ahead.

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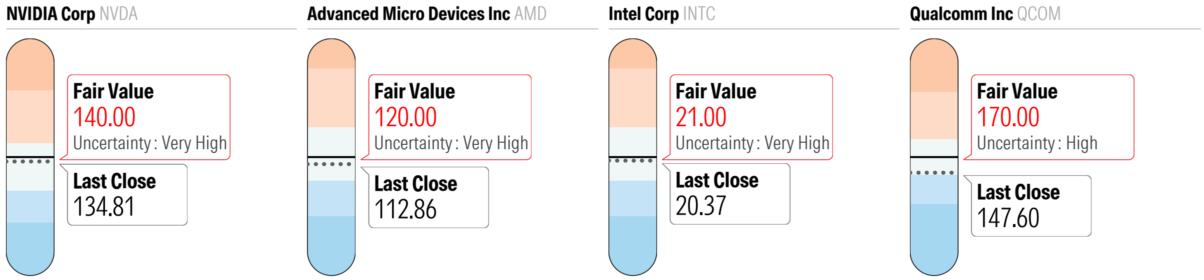
Competitors



	NVIDIA Corp NVDA	Advanced Micro Devices Inc AMD	Intel Corp INTC	Qualcomm Inc QCOM
Economic Moat	Wide	Narrow	None	Narrow
Currency	USD	USD	USD	USD
Fair Value	140.00 29 May 2025 02:18, UTC	120.00 16 Apr 2025 19:18, UTC	21.00 2 Aug 2024 03:48, UTC	170.00 1 May 2025 00:54, UTC
1-Star Price	245.00	210.00	36.75	263.50
5-Star Price	70.00	60.00	10.50	102.00
Assessment	Fairly Valued 28 May 2025	Fairly Valued 28 May 2025	Fairly Valued 28 May 2025	Fairly Valued 28 May 2025
Morningstar Rating	★★★29 May 2025 02:21, UTC	★★★28 May 2025 21:32, UTC	★★★28 May 2025 21:34, UTC	★★★28 May 2025 21:31, UTC
Analyst	Brian Colello, Strategist	Brian Colello, Strategist	Brian Colello, Strategist	Brian Colello, Strategist
Capital Allocation	Exemplary	Exemplary	Standard	Standard
Price/Fair Value	0.96	0.94	0.97	0.87
Price/Sales	25.75	6.74	1.67	3.95
Price/Book	41.81	3.21	0.90	5.90
Price/Earning	46.09	78.42	—	15.25
Dividend Yield	—	0.00%	1.23%	2.30%
Market Cap	3,287.69 Bil	182.99 Bil	88.85 Bil	162.06 Bil
52-Week Range	86.62—153.13	76.48—187.28	17.67—37.16	120.80—230.63
Investment Style	Large Growth	Large Blend	Large Blend	Large Value

- Nvidia is expanding nicely within AI, not just supplying industry-leading GPUs but also moving into networking, software, and services.

Bears Say Brian Colello, CPA, Strategist, 29 May 2025

- Nvidia is a leading AI chip vendor today, but other powerful chipmakers and tech titans are focused on in-house chip development.
- Although Cuda is a leader in AI training software and tools today, leading cloud vendors would likely prefer to see greater competition in this space and may shift to alternative open-source tools if they were to arise.
- Geopolitics have entered the AI space, most notably limiting Nvidia's AI opportunities in China. We are skeptical that Nvidia's China AI business will be allowed to recover, regardless of the US administration.

Economic Moat Brian Colello, CPA, Strategist, 29 May 2025

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We assign Nvidia a wide economic moat rating, thanks to intangible assets around its graphics processing units and, increasingly, switching costs around its proprietary software, such as its Cuda platform for AI tools, which enables developers to use Nvidia's GPUs to build AI models.

Nvidia was an early leader and designer of GPUs, which were originally developed to offload graphic processing tasks on PCs and gaming consoles. Nvidia has emerged as the clear market share leader in discrete GPUs. We attribute Nvidia's leadership to intangible assets associated with GPU design, as well as the associated software, frameworks, and tools required by developers to work with these GPUs. Introductions such as ray-tracing technology and the use of AI tensor cores in gaming applications are signs, in our view, that Nvidia has not lost its GPU leadership in any way.

GPUs perform parallel processing, in contrast to the serial processing performed by central processing units used to run the software and applications on PCs, smartphones, and many other types of devices. CPU examples include Intel's and AMD's PC and server processors, as well as Apple's and Qualcomm's smartphone processors. These CPUs conduct serial processing of 0's and 1's in a particular order to run an instruction set to run software and perform functions. In contrast, parallel processing does not need to run in a linear order. This is particularly useful, for example, when capturing an image. A GPU often has more cores than a CPU and performs simpler processing (such as capturing the data within a single image pixel) but throws many more cores at the image to catch all the data quickly. If CPUs were to conduct this task, they would have to capture the pixels in order—one can envision the CPU starting at the top and working its way down the image, while the GPU takes a snapshot in full.

In our view, the nature of parallel processing in GPUs is at the heart of Nvidia's dominance in its various end markets. PC graphics were the initial key application, allowing for more robust and immersive gaming over the past couple of decades. In the past decade, however, the parallel processing of GPUs was also found to more efficiently run the matrix multiplication algorithms needed to power AI models.

AI development has two key phases. The first is AI training. Using an image recognition example, developers might feed 50,000 images into a model, labeling them as either a picture of a cat, or not a cat. The model will look for the various aspects of each image and determine the scores and weights that are most common within a "cat" image. This may be an image with whiskers (although mice have whiskers too) or one with pointy ears (although the ears of a fox are also pointy), but a combination of all these factors may lead the model to effectively recognize cats in future images.

The second AI phase is inference, where the AI model decides on an image, based on its prior training. In the cat example, the user would feed an unlabeled image into the model, and the model provides an output of whether it recognizes a cat or not.

Similar techniques are used in large language models associated with generative AI. In these cases, LLMs are fed with massive amounts of data, which may come from the internet, research papers, databases, and so on Based on this data, the LLM determines scores and weights associated with language, and which words are associated with one another.

GPUs are best suited to make these many billions of calculations needed for LLMs to predict the next word in a query (GPT-3 was trained on 175 billion parameters, for example). More important, Nvidia made shrewd moves to build and expand the Cuda software platform, creating and hosting a variety of libraries, compilers, frameworks, and development tools that allowed AI professionals to build their models. Cuda is proprietary to Nvidia and only runs on Nvidia GPUs, and we believe this hardware plus software integration has created high customer switching costs in AI that contribute to Nvidia's wide moat.

Even if a chip competitor were to build a GPU on par with Nvidia, we surmise that the code and models built on Cuda to date would not be ported over to another GPU, giving Nvidia an incumbency advantage. It is conceivable that alternatives may emerge that might never touch Cuda or an Nvidia GPU, but Nvidia had virtually no competition in this arena at the dawn of AI so any enterprise building an LLM but waiting for alternatives would have been left in the dust.

In AI inference, we believe that a variety of chip solutions will be used over time to detect the patterns and provide the output associated with AI models, but GPUs might be best suited for these tasks today. In a bullish scenario for GPU vendors, it's possible that GPUs might not only dominate AI training, but the vast majority of AI inference too.

Beyond Nvidia's AI prowess today, which we believe is exceptionally strong, we think the company is making the proper moves to widen its moat even further. Nvidia's software efforts with Cuda remain impressive, while Nvidia expanded into networking solutions, most notably with its acquisition of Mellanox for InfiniBand and, more recently, with its Spectrum Ethernet products. We don't want to discount Nvidia's know-how here either. Many AI models don't run on solo GPUs, but rather a connected system of many GPUs running in tandem. Nvidia's proprietary NVLink products do a good job of connecting Nvidia GPUs together to run these larger models.

Looking at the competitive landscape, AMD is a well-capitalized chipmaker with GPU expertise, although we view the company as being in a position of weakness on the software front. Here, we think switching costs around Cuda will keep Nvidia ahead of AMD for the foreseeable future, although the key valuation question for both companies centers around how much business AMD can chip away from Nvidia in the years ahead.

Perhaps the biggest threat might be from in-house chip solutions from hyperscalers, such as Google's tensor processing units, or TPUs, Amazon's Trainium and Inferentia chips, or Microsoft's and Meta Platform's chips in development. There's no guarantee that any of these chips will be superior to Nvidia's GPUs across a wide range of applications, but it's likely that each of these in-house chips might perform specific workloads better than a general AI GPU from Nvidia or others.

However, we believe that cloud computing companies will have to offer their enterprise customers a full menu of GPUs and accelerators so that they can run AI workloads. Amazon and Google may use Trainium and TPUs to train their own AI models, respectively, but we think they may struggle to encourage a host of enterprise customers to optimize their AI models for these in-house semis. Doing so would prevent these enterprise customers from switching among cloud providers, and enterprises typically loathe to be locked into a single vendor. Thus, neutral merchant GPU vendors will likely be demanded by enterprise customers, and again, we foresee Nvidia remaining at the head of the pack for quite some time.

Fair Value and Profit Drivers Brian Colello, CPA, Strategist, 29 May 2025

Our fair value estimate is $140 per share. This fair value estimate implies an equity value of roughly $3.3 trillion. Our fair value estimate implies a fiscal 2026 (ending January 2026 or effectively calendar 2025) price/adjusted earnings multiple of 33 times and a fiscal 2027 forward price/adjusted earnings multiple of 26 times.

Our fair value estimate, and Nvidia's stock price, will be driven by its prospects in the data center, or DC, and AI GPUs, for better or worse. Nvidia's DC business has achieved exponential growth already, rising from $3 billion in fiscal 2020 to $115 billion in fiscal 2025. DC revenue remains supply-constrained and near-term revenue will rise as more supply comes online. We model $79 billion of DC revenue in the first half of fiscal 2026, in line with results/guidance. We then model incremental quarterly revenue growth of about $4.5 billion per quarter in the October 2025 and January 2026 quarters, as we expect additional chip supply to come online to satisfy insatiable AI demand. In turn, this brings our fiscal 2026 DC revenue estimate to $172 billion. We then model 25% growth to $216 billion in fiscal 2027, and 15% growth to $248 billion in fiscal 2028, resulting in a 29% CAGR from fiscal 2026 to fiscal 2028. This CAGR would have been higher without the restrictions on H20 sales into China, and we do not assume a recovery in the medium- or long-term in Nvidia's China business.

The main driver of this tremendous growth is an ongoing increase in capital expenditures in data centers at leading enterprise and cloud computing customers. We think it is reasonable that Nvidia may face an inventory correction or a pause in AI demand at some point in the medium term thereafter, so we model only 2% growth in fiscal 2029. Excluding this one-year blip that we model, we anticipate average annual DC growth of 10%-12% thereafter and consider this to be a reasonable long-term growth rate as AI matures. Toward the end of this decade, we think that cloud computing revenue at the hyperscalers can grow at a low-teens rate, capital expenditures as a percentage of revenue remains at consistent levels at these hyperscalers, and thus we model Nvidia's revenue growth to be on par with these cloud computing growth rates.

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In gaming, which was formerly Nvidia's largest business, we model $17 billion of revenue in fiscal 2026. We suspect that Nvidia may introduce a PC CPU in fiscal 2027, boosting revenue in this segment (if such revenue is in fact reported here) to $22 billion. We model 10% average annual revenue growth in gaming thereafter, bringing the total business to nearly $30 billion in fiscal 2030.

We have high hopes for Nvidia's automotive business as greater processing power will be required in active safety systems and autonomous driving. We model $2.6 billion of revenue in fiscal 2026 and revenue growing at a 20% CAGR over the next decade to $10.8 billion of revenue in fiscal 2035.

In summation, Nvidia achieved 126% and 114% revenue growth in fiscal 2024 and fiscal 2025, respectively. While these percentages will represent peak growth rates, we still anticipate robust growth for Nvidia in the years ahead. We model a three-year CAGR of 29% for Nvidia and long term, midcycle growth in the low teens thereafter.

Nvidia's massive DC growth has been gross margin-accretive, as GAAP gross margin expanded from 57% in fiscal 2023 to 75% in fiscal 2025. We model a near-term dip in GAAP gross margin to 70% in fiscal 2026 as Blackwell is a more costly product to ramp up and Nvidia writes off H20 products targeted for China. However, Nvidia expects mid-70% gross margins exiting fiscal 2026. In the long-run, we anticipate that gross margin will compress modestly to the low-70% to high-60% range, as Nvidia will still be able to retain most of its pricing power in DC products, thanks to the high switching costs associated with the Cuda platform.

Nvidia earned an exceptional 62% GAAP operating margin in fiscal 2025, as it prospered from significant operating leverage during the AI boom. We anticipate that GAAP operating margins will be 59% in fiscal 2026 (again with a headwind from the lost revenue from China) and stay in the high-50% range thereafter.

Risk and Uncertainty Brian Colello, CPA, Strategist, 29 May 2025

We assign Nvidia with a Morningstar Uncertainty Rating of Very High due to the nascency of the AI market. In our view, Nvidia's valuation will be tied to its ability to grow within AI, for better or worse. Nvidia is an industry leader in GPUs used in AI model training, while carving out a good portion of demand for chips used in AI inference workloads (which involves running a model to make a prediction or output).

We see a host of tech leaders vying for Nvidia's leading AI position. We think it is inevitable that leading hyperscale vendors, such as Amazon's AWS, Microsoft, Google, and Meta Platforms will seek to reduce their reliance on Nvidia and diversify their semiconductor and software supplier base, including the development of in-house solutions. Google's TPUs and Amazon's Trainium and Inferentia chips were designed with AI workloads in mind, while Microsoft and Meta have announced semiconductor design plans. Among existing semis vendors, AMD is quickly expanding its GPU lineup to serve these cloud leaders.

We also foresee geopolitical risk and uncertainty, most notably with US restrictions that have prevented Nvidia, at various times, from selling its AI products into China. We don't foresee a recovery in AI sales into China, and we can't rule out restrictions on Nvidia selling into certain other nations either.

Capital Allocation Brian Colello, CPA, Strategist, 29 May 2025

We assign Nvidia an Exemplary Capital Allocation Rating, which reflects our assessment of a sound balance sheet, exceptional investments associated with the firm's strategy and execution, and attractive and appropriate shareholder distribution policies.

Nvidia is in outstanding financial health. As of April 2025, the company held $53.7 billion in cash and investments, as compared with $8.5 billion in short-term and long-term debt. We think the firm generates sufficient cash flow and has ample resources to meet its debt obligations, capital expenditure requirements, potential acquisitions, and shareholder returns.

We remain impressed with Nvidia's prescient investments in GPUs, networking semis, and software, as the company spent the past decade (if not longer) laying the groundwork to emerge as the clear leader in AI training GPUs and associated software and tools. We now believe that Nvidia benefits from hefty switching costs in the data center. Even if AMD or another competitor could build a semiconductor that is comparable with Nvidia's data center GPUs, we surmise that AI developers will stick with Nvidia because such AI models were built with Cuda.

On the M&A front, the deal that stands out is Nvidia's acquisition of Mellanox Technologies for $6.9 billion in early 2020. Mellanox sells networking products that focus on efficient data transfer in data centers via its InfiniBand technology. Nvidia has deployed InfiniBand masterfully while expanding its networking product lineup into Ethernet-based devices.

In September 2020, Nvidia attempted to acquire ARM Holdings from the SoftBank Group in a transaction valued at $40 billion. Nvidia's hope was to steer ARM toward the development of data center products while incorporating Nvidia's AI expertise. The deal immediately faced pushback from ARM's licensee customers and regulatory challenges and was terminated in February 2022. We don't think the failed merger was a dealbreaker for Nvidia, as the company continues to license IP from ARM and has recently launched its "Grace" line of ARM-based CPUs for the data center.

Management initiated a quarterly dividend in the fourth quarter of fiscal 2013 to return excess cash to shareholders, but the payout is rather immaterial today. Most of Nvidia's distributions to shareholders come in the form of share repurchases.

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Nvidia: Lowering our Fair Value to $125 From $130 Due to Heightened China Restrictions Brian Colello, CPA,Strategist,16 Apr 2025

Nvidia expects to incur $5.5 billion of writeoffs associated with its H20 artificial intelligence GPU, as the US has restricted its export to China. The H20 was crafted specifically for the Chinese market to allow Nvidia to circumvent prior US restrictions. Shares fell about 6% after hours. Why it matters: The US government has placed another round of restrictions on Nvidia as the country strives to lead the AI race. China has shrunk to about 10% of Nvidia's revenue from 20%, and we now expect it to go to close to zero and we don't foresee a turnaround any time soon. The $5.5 billion of writeoffs will relate to inventory and purchase commitments for the H20, as we assume that these less capable chips might not find a home with customers in developed markets. The bottom line: We lower our fair value estimate for wide-moat Nvidia to $125 from $130 as we cut our revenue estimates to exclude China now and in the future. We retain our Very High Uncertainty Rating. Shares appear undervalued to us, as tariff concerns are likely weighing on the stock. We lower our revenue estimates for the July quarter by 10% and carry forward our pre-existing growth rates across a smaller revenue base. Partially offsetting these cuts is an increase in our long-term revenue estimates as we remain optimistic about AI buildouts in developed markets. Tariffs and geopolitical tensions remain a near-term and long-term concern for Nvidia and other chipmakers, while the future of AI expansion isn't crystal clear either. These factors, among others, underpin our very high uncertainty rating. China is just one of many moving pieces. Coming up: We expect to gain more insight into these restrictions, along with tariffs and the overall state of AI spending, during Nvidia's earnings call in late May. In the meantime, we doubt that businesses are slowing their AI investments, which might support ongoing AI GPU sales through 2025.

Tech Hardware Supply Chains Hit by Current Tariffs, Services Exempt Currently but Face Risks Eric Compton, CFA,Director,3 Apr 2025

On April 2, US President Donald Trump announced wide ranging tariffs, affecting countries across the globe. Technology stocks were hit hard in the aftermath, particularly those with hardware exposures. Why it matters: Technology hardware supply chains are global and often concentrated in Asia. Increasing the costs of these supply chains will present immediate issues for hardware providers, through lower margins, lower demand, or a combination of both. Hardware supply chains are concentrated in Asia, with notable concentrations in China (34% additional tariff rate), Taiwan (32%), South Korea (25%), Japan (24%), Singapore (10%), Malaysia (24%), Thailand (36%), and the Philippines (17%). While supply chains are global and have some flexibility, there are few places to hide under the current tariff regime, aside from bringing manufacturing back to the US. We find reshoring highly unlikely in the near term, and even if it did occur, it would be extremely costly and inflationary. Under the current executive order, semiconductors are exempt, and only hard goods are being tariffed, which means services are implicitly exempt. Services would cover large swaths of the technology sector, including software, consulting, and IT services. The bottom line: We are maintaining our fair value estimates and Uncertainty Ratings across most of tech for now but see heightened uncertainty and risks to the downside, depending on how long tariffs remain, if they are watered down, and what retaliations other countries choose. Tariffs will hurt hardware supply chains, as such, we see hardware names as the most exposed. Hardware names with cyclical end market exposure are in the worst position, such as autos or industrials. While services are exempt currently, we see an increased risk of retaliations from other countries that could specifically try to target services given the US is a net exporter of services, therefore giving this vector more leverage.

Nvidia: GTC Shows Off Nvidia's March Toward an AI Empire Brian Colello, CPA,Strategist,19 Mar 2025

We attended Nvidia's GTC events in San Jose this week and remain impressed with the company's march toward artificial intelligence supremacy in hardware, software, and networking, all with physical AI via robotics and autonomous driving on the horizon. We maintain our $130 fair value estimate for wide-moat Nvidia and view shares as fairly valued.Not surprisingly, we heard little pessimism around the AI data center (DC) environment, as management touted the massive AI factories to be built by governments and tech and consumer internet leaders. CEO Jensen Huang stated that the "vast majority" of AI inference runs on Nvidia today, and even with a rising threat of custom ASICs being designed by hyperscalers, we still foresee tremendous demand for Nvidia's solutions in the years ahead.We're impressed with the details into Nvidia's three-year AI GPU roadmap, with Blackwell Ultra (GB300 series) arriving later this year, Vera Rubin in the second half of 2026, and Rubin Ultra in the second half of 2027. Rubin Ultra is expected to have 576 GPU die within a single NVLink data center rack and should emerge as a workhorse with significant AI inference processing advantages versus prior generations. Nvidia's medium-term revenue will rely upon an ongoing increase in AI capital expenditures among tech leaders, but Nvidia's impressive roadmap should give these customers the incentive to keep spending on AI and replace its legacy GPUs.Robotics and physical AI remains on the horizon for Nvidia, and a key takeaway from the event is that Nvidia foresees it as a DC opportunity. Nvidia "needs to build the AI to build the robots" and thinks robotics demand can support ongoing DC spending. We were modestly surprised that Nvidia announced its Issac GROOT N1 robotics foundational model as open source. However, we think Nvidia is trying to seed the robotics ecosystem and instead profit on the back end via cloud data and workloads.

Nvidia Earnings: Maintaining Our $130 Fair Value Estimate as Near-Term Revenue Remains Bright
Brian Colello, CPA,Strategist,27 Feb 2025

We maintain our $130 fair value estimate for wide-moat Nvidia as the company reported another quarter of strong results, while providing investors with guidance that exceeded FactSet consensus estimates. Shares appear fairly valued to us as we think the market is pricing in both the tremendous potential for Nvidia's artificial intelligence solutions and the risk of slower spending on such products beyond calendar 2025.Revenue in the January quarter was $39.3 billion, up 12% sequentially, up 78% year over year, and ahead of guidance of $37.5 billion and FactSet consensus estimates of $38.1 billion. Data center revenue is still the once-in-a-generation growth driver for Nvidia, up 93% year over year. Revenue from new Blackwell products was $11 billion and exceeded management's expectations. Adjusted gross margin came in at 73.5%, down 150 basis points sequentially but in line with guidance due to higher costs associated with new Blackwell products.Nvidia expects April-quarter revenue to be $43 billion, which would be up 9% sequentially, up 65% year over year, and ahead of FactSet consensus estimates of $42.1 billion. Despite the selloff in late January associated with the emergence of DeepSeek, we still see no meaningful signs that data center demand is waning in the near-term, and we've been encouraged with the capital expenditure plans of cloud computing leaders for the upcoming year. We still suspect that Nvidia will sell virtually everything it can make in calendar 2025. The only blemish we saw within these results was the forecast for first-quarter adjusted gross margin to come in at 71%, implying another sequential decline due to the Blackwell ramp, although we'd be impressed if management can achieve its target to reach the mid-70% range later this year.

AI DeepSeek Coverage Summary: Maintaining Our Fair Values; Pullback Was Healthy Eric Compton, CFA,Director,28 Jan 2025

We have consolidated our recent DeepSeek-related coverage in this note. Artificial intelligence affects companies across much of our coverage, including semiconductors, cloud infrastructure, software, utilities, and energy.Many of the firms under our coverage with an "AI premium" were already trading in 1- to 2-star territory. Our valuations were already positioned for a pullback of this nature, as we were having a hard time justifying the increases in revenue implied by these valuations. We view the current pullback as healthy, even as we remain positive on the long-term potential of AI. We have maintained our fair value estimates across the affected companies.Our thesis, after the release of DeepSeek, is that we were going to see instances of sleeker, more-efficient AI models that would not rely on massive clusters of AI GPUs and related hardware. This was the only way the ecosystem was going to successfully address large numbers of use cases in the long term. We believe that lower costs—making AI cheaper, therefore more economical—increase the number of use cases it is viable for, and as a result, should increase demand. This is the same path the PC revolution followed, with computing power becoming cheap enough that millions of individuals could use it at an affordable cost. The same happened with the cloud and SaaS revolution thereafter, where the incremental cost of adding users was close to zero. We believe a future where AI was both prohibitively expensive and also "taking over the world" was not likely. As such, we view the advancements made by DeepSeek as promising and healthy for the overall ecosystem.For more in-depth coverage on specific industries, please refer to our notes on Nvidia, the hyperscalers, semiconductor equipment companies, TSMC, Apple and networking, utilities, European utilities, HVAC, and industrials.

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NVIDIA Corp NVDA ★★★ 29 May 2025 02:21, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
134.81 USD 28 May 2025	140.00 USD 29 May 2025 02:18, UTC	0.96	3.29 USD Tril 28 May 2025	Wide	Large Growth	Very High	Exemplary	7 May 2025 05:00, UTC

Nvidia: Maintaining Our $130 Fair Value Estimate Despite AI Model Efficiencies Deployed by DeepSeek Brian Colello, CPA,Strategist,27 Jan 2025

We are maintaining our $130 per share fair value estimate for wide-moat Nvidia despite the selloff in AI stocks on Jan. 27. We believe the selloff is related to the better-than-expected performance of DeepSeek. DeepSeek is a Chinese AI large-language model believed to be on par with some of the best models released by OpenAI and others, despite not having access to leading AI accelerators, such as Nvidia's best Hopper and Blackwell products. DeepSeek raises concerns that future LLMs will be developed with fewer AI GPUs from Nvidia, lower capital expenditure from hyperscalers, and perhaps less of a need for a massive energy buildout in the US. DeepSeek may also lead to an even stronger set of US sanctions on China that could weigh on the sector even further.The selloff brings Nvidia's stock price near our fair value estimate, which we think balances the massive risks and rewards associated with AI. We reiterate our Morningstar Uncertainty Rating of Very High, as AI is changing at warp speed. We view DeepSeek as a counterbalance to the bullish news we heard last week around Stargate and Meta Platforms' robust capex plans of $60 billion-$65 billion next year.Our fair value estimate for Nvidia does not hinge on the company being able to sell into China, and if stronger US sanctions were to emerge, we're skeptical that they will be catastrophic to our fair value estimate. Further, we've long expected the arrival of new AI techniques and slimmer LLMs, although not necessarily from China given the US sanctions and AI constraints.Despite the promise of DeepSeek, we doubt the leading cloud vendors and AI builders like Stargate will pause their plans, although it's a risk that certainly bears watching. We believe that AI GPU demand still exceeds supply, so while slimmer models may enable greater development for the same number of chips, we still think tech firms will continue to buy all the GPUs they can as part of this AI "gold rush."

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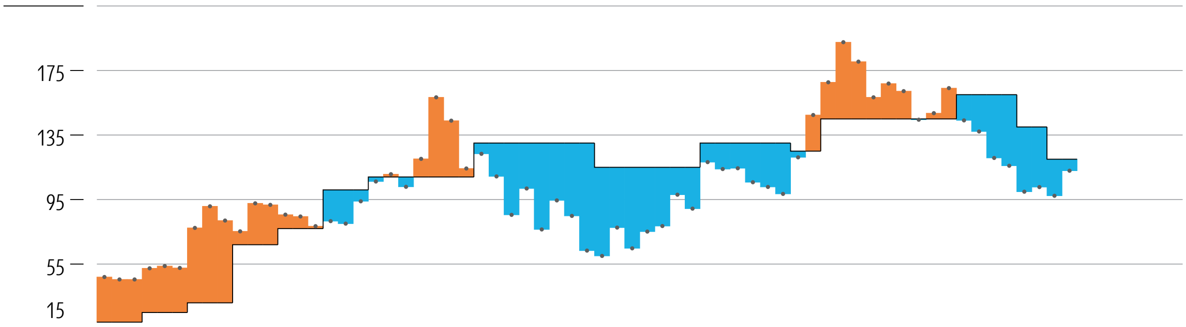
NVIDIA Corp NVDA ★★★ 29 May 2025 02:21, UTC

Competitors Price vs. Fair Value

Advanced Micro Devices Inc AMD

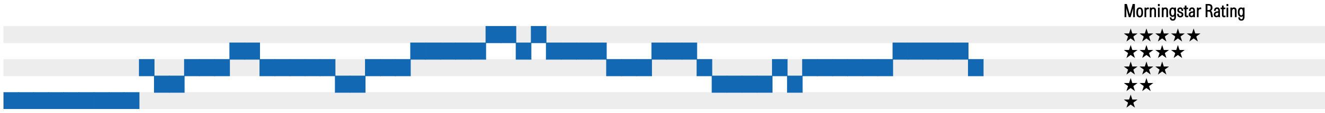


Fair Value: 120.00
16 Apr 2025 19:18, UTC

Last Close: 112.86
Overvalued
Undervalued

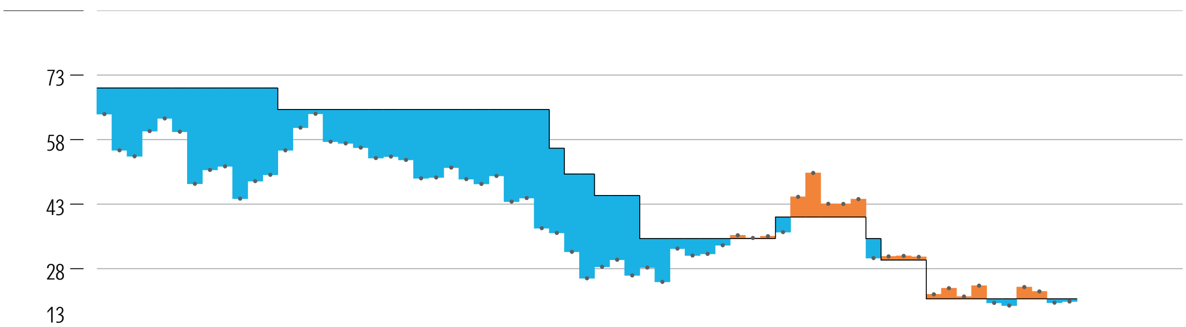
	2020	2021	2022	2023	2024	YTD
Price/Fair Value	1.37	1.32	0.56	1.18	0.75	0.94
Total Return %	99.98	56.91	-54.99	127.59	-18.06	-6.57

Morningstar Rating



Total Return % as of 28 May 2025. Last Close as of 28 May 2025. Fair Value as of 16 Apr 2025 19:18, UTC.

Intel Corp INTC

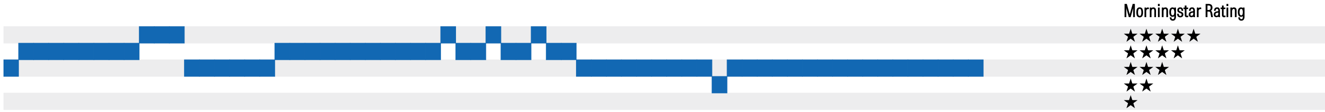


Fair Value: 21.00
2 Aug 2024 03:48, UTC

Last Close: 20.37
Overvalued
Undervalued

	2020	2021	2022	2023	2024	YTD
Price/Fair Value	0.71	0.79	0.59	1.26	0.95	0.97
Total Return %	-14.55	6.16	-45.84	92.92	-59.35	1.60

Morningstar Rating



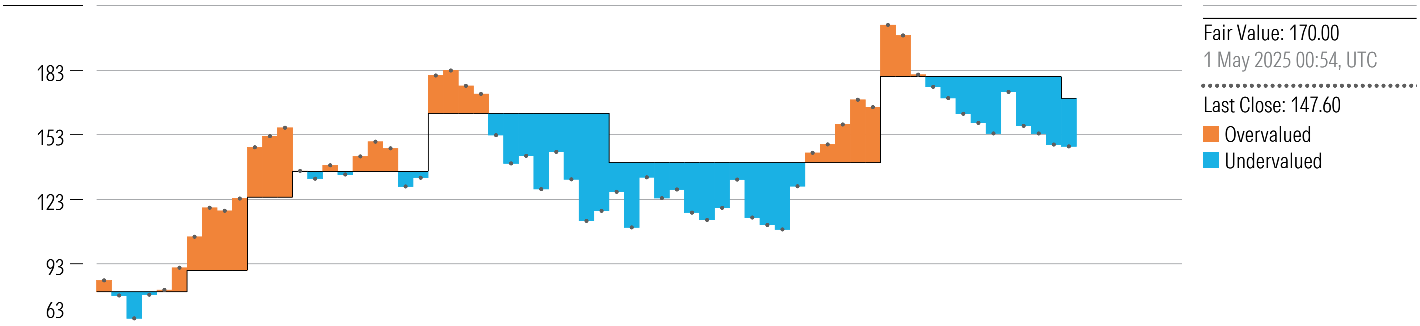
Total Return % as of 28 May 2025. Last Close as of 28 May 2025. Fair Value as of 2 Aug 2024 03:48, UTC.

Morningstar Equity Analyst Report | Report as of 29 May 2025 02:25, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 14 of 24

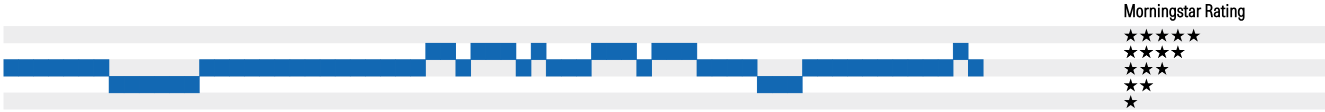
NVIDIA Corp NVDA ★★★ 29 May 2025 02:21, UTC

Competitors Price vs. Fair Value

Qualcomm Inc QCOM



	2020	2021	2022	2023	2024	YTD	
	1.23	1.12	0.79	1.03	0.85	0.87	Price/Fair Value
	75.58	21.81	-38.28	34.42	8.53	-3.37	Total Return %



Total Return % as of 28 May 2025. Last Close as of 28 May 2025. Fair Value as of 1 May 2025 00:54, UTC.

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NVIDIA Corp NVDA ★★★ 29 May 2025 02:21, UTC

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Morningstar Valuation Model Summary

Financials as of 28 May 2025	**Actual**			**Forecast**				
Fiscal Year, ends 31 Jan	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Revenue (USD Mil)	26,974	60,922	130,497	195,017	243,457	278,992	287,457	321,700
Operating Income (USD Mil)	5,577	32,972	81,454	114,593	145,793	166,237	167,755	187,137
EBITDA (USD Mil)	5,768	34,480	83,318	116,418	149,317	170,916	173,892	194,537
Adjusted EBITDA (USD Mil)	5,768	34,480	83,318	116,418	149,317	170,916	173,892	194,537
Net Income (USD Mil)	4,368	29,760	72,880	98,527	123,958	141,241	142,600	158,966
Adjusted Net Income (USD Mil)	8,365	32,313	74,266	102,938	127,905	145,878	148,161	165,621
Free Cash Flow To The Firm (USD Mil)	-564	23,023	50,605	51,560	98,181	120,906	134,844	140,448
Weighted Average Diluted Shares Outstanding (Bil)	25	25	25	25	24	24	23	23
Earnings Per Share (Diluted) (USD)	0.17	1.19	2.94	4.02	5.14	5.96	6.12	6.94
Adjusted Earnings Per Share (Diluted) (USD)	0.33	1.30	2.99	4.20	5.30	6.15	6.36	7.23
Dividends Per Share (USD)	0.02	0.02	0.03	0.04	0.04	0.04	0.04	0.04

Margins & Returns as of 28 May 2025		**Actual**			**Forecast**					
	3 Year Avg	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**5 Year Avg**
Operating Margin %	44.1	20.7	54.1	62.4	58.8	59.9	59.6	58.4	58.2	59.0
EBITDA Margin %	—	21.4	56.6	63.8	59.7	61.3	61.3	60.5	60.5	—
Adjusted EBITDA Margin %	—	21.4	56.6	63.8	59.7	61.3	61.3	60.5	60.5	60.7
Net Margin %	40.3	16.2	48.9	55.9	50.5	50.9	50.6	49.6	49.4	50.2
Adjusted Net Margin %	47.0	31.0	53.0	56.9	52.8	52.5	52.3	51.5	51.5	52.1
Free Cash Flow To The Firm Margin %	24.8	-2.1	37.8	38.8	26.4	40.3	43.3	46.9	43.7	40.1

Growth & Ratios as of 28 May 2025		**Actual**			**Forecast**					
	3 Year CAGR	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**5 Year CAGR**
Revenue Growth %	69.3	0.2	125.9	114.2	49.4	24.8	14.6	3.0	11.9	19.8
Operating Income Growth %	100.9	-44.5	491.2	147.0	40.7	27.2	14.0	0.9	11.6	18.1
EBITDA Growth %	196.9	-48.6	497.8	141.6	39.7	28.3	14.5	1.7	11.9	19.2
Adjusted EBITDA Growth %	95.1	-48.6	497.8	141.6	39.7	28.3	14.5	1.7	11.9	18.5
Earnings Per Share Growth %	96.9	-54.7	584.9	146.2	36.8	27.9	15.9	2.7	13.4	18.8
Adjusted Earnings Per Share Growth %	96.9	-24.9	288.3	131.1	40.3	26.3	16.0	3.3	13.7	18.8

Valuation as of 28 May 2025	**Actual**			**Forecast**				
	2023	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Price/Earning	59.2	47.3	40.2	32.1	25.4	21.9	21.2	18.6
Price/Sales	17.9	24.9	22.5	16.9	13.5	11.8	11.4	10.2
Price/Book	22.2	35.8	37.5	26.4	16.6	11.3	8.4	6.4
Price/Cash Flow	—	—	—	—	—	—	—	—
EV/EBITDA	83.3	43.8	34.9	28.0	21.8	19.0	18.7	16.7
EV/EBIT	86.1	45.8	35.7	28.4	22.3	19.6	19.4	17.4
Dividend Yield %	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dividend Payout %	4.8	1.2	1.1	1.0	0.8	0.7	0.6	0.5
Free Cash Flow Yield %	—	—	—	—	—	—	—	—

Operating Performance / Profitability as of 28 May 2025	**Actual**			**Forecast**				
Fiscal Year, ends 31 Jan	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
ROA %	10.6	45.3	65.3	59.8	51.6	42.6	33.9	30.0
ROE %	19.8	69.2	91.9	78.9	63.3	49.7	38.2	33.1
ROIC %	20.5	61.0	97.1	91.6	80.3	67.1	53.5	48.4

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Financial Leverage (Reporting Currency)

Fiscal Year, ends 31 Jan	Actual 2023	2024	2025	Forecast 2026	2027	2028	2029	2030
Debt/Capital %	2.4	0.7	0.4	0.2	0.2	0.2	0.1	0.1
Assets/Equity	1.9	1.5	1.4	1.3	1.2	1.2	1.1	1.1
Net Debt/EBITDA	-0.2	-0.4	-0.4	-0.5	-0.7	-1.1	-1.6	-1.9
Total Debt/EBITDA	2.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0
EBITDA/ Net Interest Expense	134.1	-40.8	-32.4	-71.8	-84.1	-89.6	-86.6	-92.3

Forecast Revisions as of 28 May 2025

Prior data as of 15 Apr 2025	2026 Current	2026 Prior	2027 Current	2027 Prior	2028 Current	2028 Prior
Fair Value Estimate Change (Trading Currency)	140.00	125.00	—	—	—	—
Revenue (USD Mil)	195,017	181,600	243,457	220,666	278,992	250,519
Operating Income (USD Mil)	114,593	103,640	145,793	133,375	166,237	150,452
EBITDA (USD Mil)	116,418	105,465	149,317	136,762	170,916	154,824
Net Income (USD Mil)	102,938	97,069	127,905	115,817	145,878	130,731
Earnings Per Share (Diluted) (USD)	4.02	3.56	5.14	4.65	5.96	5.33
Adjusted Earnings Per Share (Diluted) (USD)	4.20	3.96	5.30	4.80	6.15	5.51
Dividends Per Share (USD)	0.04	0.04	0.04	0.04	0.04	0.04

Key Valuation Drivers as of 28 May 2025

Cost of Equity %	9.0
Pre-Tax Cost of Debt %	5.5
Weighted Average Cost of Capital %	9.0
Long-Run Tax Rate %	15.0
Stage II EBI Growth Rate %	11.0
Stage II Investment Rate %	34.3
Perpetuity Year	20

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

Discounted Cash Flow Valuation as of 28 May 2025

	USD Mil
Present Value Stage I	840,819
Present Value Stage II	799,169
Present Value Stage III	1,635,677
Total Firm Value	**3,275,665**
Cash and Equivalents	43,210
Debt	8,463
Other Adjustments	0
Equity Value	**3,310,412**
Projected Diluted Shares	24
Fair Value per Share (USD)	**140.00**

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ESG Risk Rating Breakdown

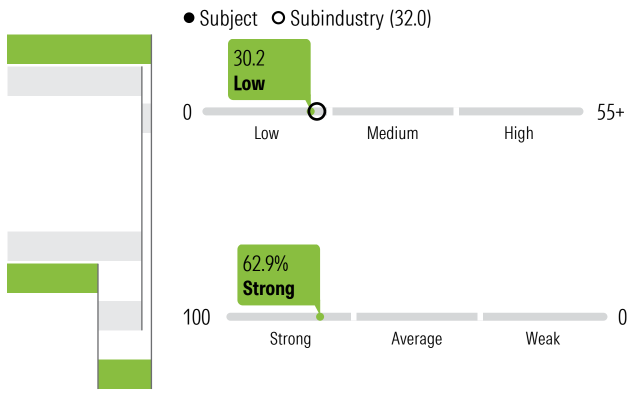
Exposure

Company Exposure[1]	30.2
– Manageable Risk	28.2
Unmanageable Risk[2]	**2.0**

Management

Manageable Risk	28.2
– Managed Risk[3]	17.7
Management Gap[4]	**10.5**

Overall Unmanaged Risk	**12.5**



- 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 62.9% 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 Assessment[5]

ESG Risk Rating is of May 07, 2025. Highest Controversy Level is as of May 08, 2025. Sustainalytics Subindustry: Semiconductor Design and Manufacturing. 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 07 May 2025

Peers are selected from the company's Sustainalytics-defined Subindustry and are displayed based on the closest market cap values

Company Name	Exposure			Management			ESG Risk Rating		
NVIDIA Corp	30.2 | Low	0	55+	62.9 | Strong	100	0	12.5 | Low	0	40+
Qualcomm Inc	38.1 | Medium	0	55+	69.3 | Strong	100	0	13.6 | Low	0	40+
Advanced Micro Devices Inc	31.4 | Low	0	55+	64.4 | Strong	100	0	12.5 | Low	0	40+
Intel Corp	48.9 | Medium	0	55+	65.9 | Strong	100	0	19.2 | Low	0	40+
Montage Technology Co Ltd	29.9 | Low	0	55+	34.1 | Average	100	0	20.4 | Medium	0	40+

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Appendix
Historical Morningstar Rating

NVIDIA Corp NVDA 28 May 2025 21:32, 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
★★	★★	★★	★	★	★	★	★★	★	★★	★★	★★

Advanced Micro Devices Inc AMD 28 May 2025 21:32, 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
★★	★★	★★★	★	★	★	★	★	★	★	★	★

Intel Corp INTC 28 May 2025 21:34, 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
★★★★★	★★★★★	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★

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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, indepth 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 shortterm market-price movements), but we believe these negatives are mitigated by deep analysis and our longterm 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 singlepoint 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 returns 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 workingcapital accounts, and capital spending. Based on these projections, we calculate earnings before interest, after taxes (EBI) and the net new investment (NNI) to derive 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 EBI 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.

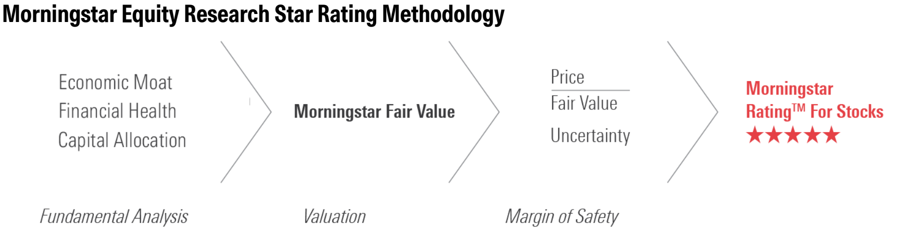
Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows. Because we are modeling free cash flow to the firm—representing cash available to provide a return 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

Morningstar Equity Research Star Rating Methodology



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outcomes for the intrinsic value of a company, and anything 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 Uncertainty Ratings	★★★★★Rating	★Rating
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

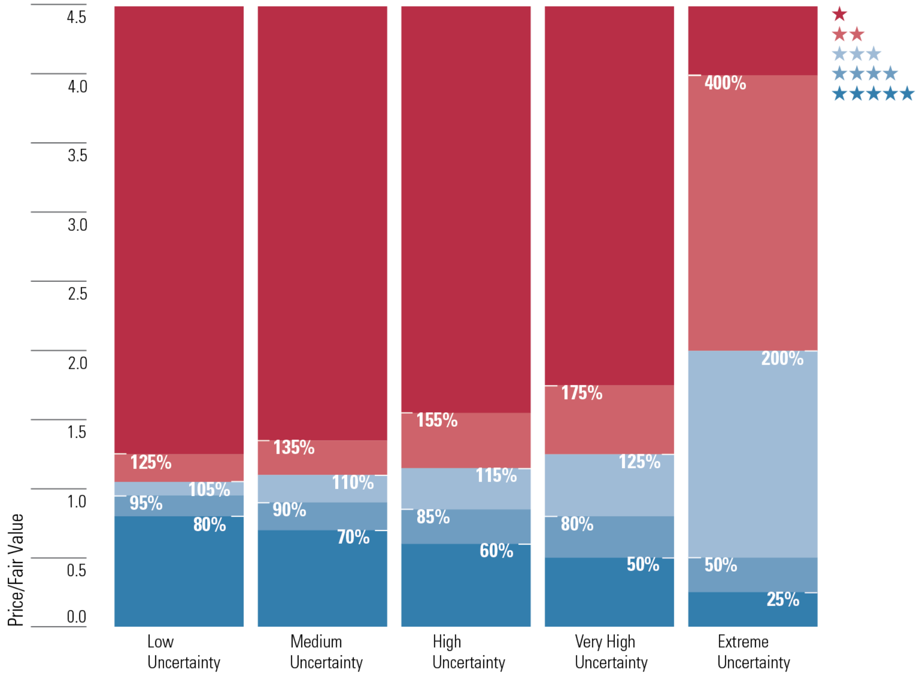
Our uncertainty rating is based on the interquartile range, or the middle 50% of potential outcomes, covering the 25th percentile–75th percentile. This means that when a stock hits 5 stars, we expect there is a 75% chance that the intrinsic value of that stock lies above the current market price. Similarly,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



Morningstar Star Rating for Stocks

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 adjusted 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,

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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.

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/

Ratings should not be used as the sole basis in evaluating a company or security. Ratings involve unknown risks and uncertainties which may cause our expectations not to occur or to differ significantly from what was expected and should not be considered an offer or solicitation to buy or sell a security.

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