

NVIDIA Corp NVDA (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★	486.58 USD	250.00 USD	1.95	0.13	0.13	300.22	Semiconductors	Exemplary
11 Sep 2020 21:37, UTC	11 Sep 2020	20 Aug 2020 01:27, UTC		11 Sep 2020	11 Sep 2020	11 Sep 2020		

Morningstar Pillars	Analyst	Quantitative
Economic Moat	Narrow	Wide
Valuation	★	Overvalued
Uncertainty	Very High	High
Financial Health	—	Moderate

Source: Morningstar Equity Research

Quantitative Valuation



Source: Morningstar

Bulls Say

- The proliferation of the artificial intelligence and deep learning phenomena that rely on Nvidia's graphics chips presents the firm with a potentially massive growth opportunity.
- The firm has a first-mover advantage in the autonomous driving market that could lead to widespread adoption of its Drive PX self-driving platform.
- The increasing complexity of graphics processors provides a barrier to entry for most potential rivals, as it would be difficult to match Nvidia's large R&D budget.

Bears Say

- The artificial intelligence opportunity remains nascent and it is not a foregone conclusion for Nvidia's GPUs to dominate.
- Nvidia's automotive endeavors face plenty of competition, as numerous chipmakers are targeting the market.
- A majority of sales come from the maturing PC industry via PC gaming.

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Nvidia to Buy ARM in \$40 Billion Deal with Eyes Set on Data Center Dominance; Maintain FVE

Business Strategy and Outlook

Abhinav Davuluri, CFA, Analyst, 19 August 2020

Nvidia is the leading designer of graphics processing units that enhance the visual experience on computing platforms. The firm's chips are used in a variety of end markets, including high-end PCs for gaming, data centers, and automotive infotainment systems. Enterprise customers use Nvidia's GPUs for professional visualization applications that require realistic rendering, including computer-aided design, video editing, and special effects. Nvidia has experienced initial success in focusing its GPUs in nascent markets such as artificial intelligence (deep learning) and self-driving vehicles. Hyperscale cloud vendors have leveraged GPUs in training neural networks for uses such as image and speech recognition.

The linchpin of Nvidia's current business is gaming. PC gaming enthusiasts generally purchase high-end discrete GPUs offered by the likes of Nvidia and AMD. Going forward, we expect the data center segment to drive most of the firm's growth, led by the explosive artificial intelligence phenomenon. This involves collecting large swaths of data followed by techniques that develop algorithms to produce conclusions in the same way as humans. As Moore's law-led CPU performance improvements have slowed, GPUs have become widespread in accelerating the training of AI models to perform a task. However, we think other solutions are more suitable for inferencing, which is the deployment of a trained model on new data. Today's basic variants of AI are consumer-oriented and include digital assistants, image recognition, and natural language processing.

The firm views the car as a "supercomputer on wheels." Although this segment currently contributes relatively little to the top line, we acknowledge the opportunity Nvidia has to grow its presence in cars beyond infotainment as drivers seek autonomous features in newer vehicles. Looking further, Nvidia's Drive PX platform is a deep learning tool for autonomous driving that is being used in research and development at more than 370 partners. Nonetheless, both the data center and automotive spaces are fraught with competition that

could limit Nvidia's future growth.

Analyst Note

Abhinav Davuluri, CFA, Analyst, 13 September 2020

On Sept. 13, Nvidia announced it would acquire ARM from the SoftBank Group in a transaction valued at \$40 billion. At first glance, the most logical rationale for this deal is to enable Nvidia to offer a comprehensive data center portfolio that includes ARM-based CPUs while leveraging Nvidia's artificial intelligence expertise into ARM's vast ecosystem spanning the data center to mobile and Internet of Things devices. Similar to SoftBank's justification when it bought ARM, Nvidia expects to bolster ARM's R&D budget to realize its data center vision. ARM was a wide-moat-rated firm when we covered the standalone entity, and we believe it is likely this cash/stock deal would enhance Nvidia's narrow moat even further, should the deal close. From a valuation perspective, Nvidia is paying a high multiple for ARM's earnings but given the GPU leader's share price is trading at a significant premium to our \$250 fair value estimate, we like that Nvidia is using its rich shares to fund a large portion of the deal. With Nvidia set to expand ARM's Cambridge, U.K. base, we don't anticipate material cost synergies, though there could be some interesting revenue synergy opportunities for the duo. Based on the regulatory risk associated with this deal (the largest in chip history if it closes), we will likely assign a 50% probability of the deal closing. Consequently, we are maintaining our \$250 fair value estimate for narrow-moat Nvidia for now, but we will reassess our valuation following Nvidia's conference call discussing the deal the morning of Sept. 14.

Nvidia is financing the deal via \$21.5 billion in its common stock (44.3 million shares) and \$12 billion in cash, which includes \$2 billion payable at signing. Also, SoftBank may receive up to \$5 billion in cash or common stock subject to ARM meeting certain performance targets, while Nvidia will issue \$1.5 billion in equity to ARM employees for retention purposes.

Economic Moat

Abhinav Davuluri, Analyst, 19 August 2020

We believe Nvidia has a narrow economic moat stemming

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Close Competitors	Currency (Mil)	Market Cap	TTM Sales	Operating Margin	TTM/PE	
Intel Corp INTC	USD	209,588	78,955	33.38	9.09	has gained share at the expense of AMD as gamers have moved from mainstream graphics cards to performance and enthusiast segments. We note these GPUs range from \$150 at the low-end to over \$1,000 for premium cards, with Nvidia's gaming gross margins in the high 50s. Although virtual reality is another trend that should benefit Nvidia's gaming GPUs, we think mobile VR applications will be more prominent relative to those on PC VR systems, at least in the near term.
Advanced Micro Devices Inc AMD	USD	89,627	7,646	11.56	147.06	

from its cost advantages and intangible assets related to the design of graphics processing units, or GPUs. The firm is the originator of and leader in discrete graphics, having captured the lion's share of the market from longtime rival AMD. We think the market has significant barriers to entry in the form of advanced intellectual property, as even chip leader Intel was unable to develop its own GPUs despite its vast resources, and ultimately needed to license IP from Nvidia to integrate GPUs into its PC chipsets. To stay at the cutting edge of GPU technology, Nvidia has a large R&D budget relative to AMD and smaller GPU suppliers that allows it to continuously innovate and fuel a virtuous cycle for its high-margin chips.

Nvidia's intangible assets originate with its popularization of GPUs in 1999, which could off-load graphics processing tasks from the CPU, thereby increasing the overall performance of the system. The firm has patents related to the hardware design of its GPUs in addition to the software and frameworks used to take advantage of GPUs in gaming, design, visualization, and other graphics-intensive applications. Additionally, the latest PC games typically require system software updates (drivers) that optimize the performance of GPUs. We note Nvidia tends to provide more reliable drivers for most games that allows gamers to take full advantage of its GPUs, while AMD is unable to match Nvidia in breadth and consistency of driver updates. Consequently, consumers have favored Nvidia's GPUs for gaming, with the firm boasting over 70% share in the discrete GPU market, with little resistance from AMD at the leading-edge. In turn, this has enabled economies of scale that allow Nvidia to invest in designing chips at the latest process node while offering regular driver updates and remain at the forefront of GPU technology.

While the market for discrete GPUs in PCs has continued to decline, as most PCs utilize integrated graphics chips from Intel, Nvidia has benefited from a resurgence for high-end GPUs driven by the growing enthusiast PC gaming space. In our view, AMD has been unable to design products capable of competing with Nvidia's GPUs at the high-end of the gaming spectrum. Consequently, Nvidia

has gained share at the expense of AMD as gamers have moved from mainstream graphics cards to performance and enthusiast segments. We note these GPUs range from \$150 at the low-end to over \$1,000 for premium cards, with Nvidia's gaming gross margins in the high 50s. Although virtual reality is another trend that should benefit Nvidia's gaming GPUs, we think mobile VR applications will be more prominent relative to those on PC VR systems, at least in the near term.

Unlike gaming GPUs, which are dependent on the secularly declining PC market, Nvidia has taken steps to leverage its GPU prowess into other markets such as automotive and data center that represent a meaningful and sustainable growth opportunity. GPUs are being used to accelerate computation workloads with the goal of training AI systems to drive cars and perform medical diagnoses. We note these are computationally intensive endeavors that are more achievable with CPUs and GPUs working in tandem versus CPUs in isolation.

Internet behemoths such as Google, Facebook, Amazon, and Microsoft have found GPUs to be adept at accelerating cloud workloads that use deep learning techniques to achieve speech recognition (Siri, Google Now, Alexa, Cortana), photo recognition (identifying faces in pictures on Facebook, videos of cats on YouTube), and recommendation engines (Netflix, Amazon). To train a computer to recognize spoken words or images, it must be exposed to massive amounts of data with the goal of educating itself. Inference involves taking what the model learned during the training process and putting it into real world applications to make decisions (that is after reviewing 10,000 cat pictures during training, is this next picture a cat?).

These examples are not very efficient to run on server CPUs (predominantly Intel's Xeons) alone, as general-purpose CPUs consist of a few cores that are good at performing a wide array of tasks in a sequential manner. The training process is ideal for GPUs that have massively parallel architecture consisting of thousands of smaller cores designed for handling multiple tasks simultaneously. Nvidia has a first-mover advantage in the accelerator market, as it looks to drive AI adoption in both the cloud and on the road.

Within automotive, Nvidia currently has a presence in the infotainment systems of millions of vehicles through its

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Tegra processors. While increasingly complex digital cockpit computers will become the norm, we note this is a highly competitive market, with Qualcomm, Intel, among others also offering competitive infotainment solutions, and we do not see any competitive advantage from Nvidia that warrants a moat just yet. However, with its Drive PX self-driving system, Nvidia hopes to carve a dominant position in the self-driving space. Should the firm's autonomous platform win the lion's share of self-driving business, we think Nvidia would strengthen its moat via superior intangible assets and switching costs. We view this opportunity as in the early innings, and while more than 370 OEMs have tested Drive PX in R&D settings, Intel (with the 2017 acquisition of Mobileye) represents a formidable opponent that will challenge Nvidia, in our view.

Fair Value & Profit Drivers

Abhinav Davuluri, Analyst, 19 August 2020

We are raising our fair value estimate to \$250 per share from \$200, as we incorporate a stronger near-term outlook and Mellanox acquisition. Our fair value estimate assumes a forward adjusted price/earnings ratio of 31 times. We do not believe the market is accounting for the competitive forces that we expect to challenge Nvidia. We project revenue will increase at a 20.5% compound annual growth rate through fiscal 2025 as the firm continues to diversify its revenue sources to areas of strong potential. Fiscal 2020 was a challenging year for the firm, as gaming revenue fell due to a cryptocurrency mining-related hangover and excess channel inventories, but we anticipate sales growth of 46% in fiscal 2021.

We think the data center segment is poised to rise at a CAGR of 41%, accounting for over half of total revenue in fiscal 2025. We expect the firm to dominate the training portion of deep learning, but we don't believe the inference market will be as lopsided in favor of Nvidia's GPUs as the current stock price suggests. Gaming should continue to be a major source of revenue, though we think recent growth rates will be difficult to replicate due to saturation and lengthening replacement cycles of gaming GPUs, greater competition, and softer cryptocurrency mining-related GPU sales.

In automotive, most of Nvidia's current sales are infotainment-related. Its Drive PX autonomous driving platform is still in the early innings. By 2025, the firm expects the AI opportunity in automotive to be \$30 billion

with roughly 40 million vehicles on the road with capabilities ranging from basic level 2 to fully autonomous level 5. Ultimately, we think Nvidia will capture a healthy portion of this opportunity, culminating in a 15% CAGR in automotive revenue through fiscal 2025 (which includes a soft fiscal 2021 due to COVID-19). Nonetheless, we also believe Intel-Mobileye will factor prominently into the self-driving equation.

Gaming currently accounts for over half of total sales and has a gross margin at the corporate average. The Tegra chip, used in automotive infotainment systems, is relatively lower. In contrast, the data center unit has high gross margins, ranging from 65% to 70%. However, we also foresee margin pressure due to competition leading to long-term gross margins of 60%. Nvidia must invest heavily in R&D to maintain its competitive edge in GPUs. Thus, we model long-term R&D as a percentage of sales at 22%, implying operating margins in the high 20s.

Risk & Uncertainty

Abhinav Davuluri, Analyst, 19 August 2020

Consumer spending in the PC space has undergone a significant structural shift over the past decade with the proliferation of mobile devices that serve as many users' de facto computers. This has pressured sales in desktops and laptops. Nvidia's discrete GPUs are also challenged by Intel's chips that feature both the CPU and GPU. These combo chips are more cost-efficient but still lack high-end graphics capability. We note there is still strong demand from gaming enthusiasts, who are willing to purchase high-end GPUs from the likes of Nvidia.

We remain concerned Nvidia generates the majority of its sales from gaming. The firm has benefited from strong PC gaming momentum in recent years, as gamers shift from consoles to PC gaming. However, many of the most popular games are competitive multiplayer online games (esports) that require low-end discrete GPUs for latency reasons versus high-end GPUs for cutting-edge graphics. The firm is also expected to benefit from Virtual Reality, however, a shift to mobile gaming VR over PC VR could curb these opportunities, as Nvidia's GPUs aren't formidable in smartphones (similar to Intel's CPUs in smartphones).

Adjacent markets (AI, automotive) are still in the early innings, and though Nvidia has a first-mover advantage in both, its lead may not last if superior alternatives arise (other forms of acceleration for AI or other self-driving

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platforms). Also, the rate of disruption tends to be quicker in these markets that are very performance-sensitive. We note GPUs were designed to do one thing very well: render graphics for realistic images, games, videos, and so on. Leveraging GPUs in deep learning applications among other areas mostly occurred due to lack of better alternatives. As alternatives arise (via current competition or startups), Nvidia's recent explosive growth will be difficult to sustain, in our view. Ultimately, the risky nature of Nvidia's nongaming GPU segments leads to our very high uncertainty rating.

Stewardship

Abhinav Davuluri, Analyst, 19 August 2020

We believe management has demonstrated Exemplary stewardship of shareholder capital. CEO Jen-Hsun Huang cofounded Nvidia in 1993 after stints at LSI Logic and AMD. Colette Kress became CFO in September 2013, having previously worked with Cisco. Management compensation appears reasonable compared with industry peers.

Nvidia's management team has shown a willingness to invest in new opportunities in the past several years outside the firm's core PC graphics processor business. As a result, Nvidia has become a key player in the artificial intelligence accelerator market with its GPUs for AI training and inference workloads. The firm has also sought to drive the push toward autonomous driving with its Drive PX platform.

The firm has periodically made acquisitions in the past, though the deals tend to be smaller relative to ones made by competitors such as Intel. One notable acquisition was the \$367 million purchase of Icera in 2011, a baseband processor firm, to complement Nvidia's foray into mobile devices. In May 2015, Nvidia wound down its Icera modem operations primarily because of its shift in strategy to focus on high-growth opportunities such as gaming, automotive, and AI acceleration instead of the cutthroat integrated application processor and modem markets for smartphones. We view this move as shrewd because it shows that management is willing to adapt when a particular venture isn't performing as intended.

In March 2019, Nvidia announced it will acquire Israeli-based Mellanox Technologies for \$6.9 billion or \$125 per share in cash. Mellanox sells networking products that focus on efficient data transfer in data

centers via its InfiniBand and Ethernet technologies for interconnects. We note there will be no initial revenue or cost synergies as the GPU titan intends to maintain all of Mellanox's existing investments. We think this makes sense, as the deal rationale is initially to bolster Nvidia's share of data center spend to potentially increase its switching costs. Nvidia's DGX integrated system for Artificial Intelligence, or AI, utilizes InfiniBand technology while the two firms collectively power over half of the world's Top 500 supercomputers with Nvidia GPUs and Mellanox interconnects. The deal closed in early 2020.

Management initiated a quarterly dividend in the fourth quarter of fiscal 2013 to return excess cash to shareholders, and it currently has a stock-buyback program. The firm returns cash to shareholders through ongoing quarterly cash dividends (\$0.16 per share) and share repurchases.

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Analyst Notes Archive

New Product Launches and Mellanox Acquisition Bode Well for Nvidia in 2020; Raising FVE to \$200

Abhinav Davuluri, Analyst, 21 May 2020

Nvidia reported impressive first-quarter results with revenue exceeding the midpoint of management's guidance. Although it faced supply and demand headwinds related to coronavirus, Nvidia was able to outperform thanks to increased work from home, learn from home, and gaming trends. This dynamic more than offset weaker automotive sales, which is expected to persist over the next few quarters. The firm launched its latest A100 data center GPU on May 14, Nvidia's first GPU made on TSMC's 7-nanometer process and part of its new Ampere architecture. The A100 boasts impressive performance enhancements from its predecessor (V100) and contributed to first-quarter sales. We anticipate continued momentum for Nvidia's data center business, particularly with the inclusion of recently acquired Mellanox in second-quarter results, as customers leverage both Nvidia's training and inference GPUs in key AI applications such as natural language understanding, conversational AI, and deep recommendation engines. After incorporating Mellanox into our valuation model and the solid near-term outlook, we are raising our fair value estimate to \$200 per share from \$160. Nevertheless, we view shares as overvalued as we think current levels imply narrow-moat Nvidia is the sole beneficiary of the burgeoning AI and self-driving trends.

First-quarter sales grew 39% year over year to \$3.1 billion. The sharp year-over-year spike can be attributed to an artificially deflated first quarter fiscal 2020 (calendar 2019) due to the massive decline in gaming GPU sales during that period stemming from a decline in demand in GPUs for cryptocurrency mining. Gaming sales were up 27% year over year due to strength across all major products including desktop GPUs and Nintendo Switch chips. Management highlighted a 50% increase in hours played on its GeForce platform during the quarter, as more gamers were forced to quarantine. Data center sales were \$1.1 billion, up 80% year over year and 18% sequentially.

Nvidia's Gaming and Data Center Leadership Boosts Q2 Results; Raising FVE to \$250

Abhinav Davuluri, Analyst, 19 August 2020

Nvidia reported stellar second-quarter results with

revenue exceeding the midpoint of management's guidance. The firm benefited from strong showings in both gaming and data center segments, with gaming enjoying an easy year-over-year compare and the latter bolstered by the inclusion of recently acquired Mellanox as well as Nvidia's latest A100 data center GPU. Management anticipates more muted sequential growth for the data center segment in the third quarter, but gaming sales are expected to be up over 25% sequentially (firm will be launching a new 7-nanometer gaming GPU).

We are raising our fair value estimate to \$250 per share from \$200, as we incorporate a stronger near-term outlook. However, we continue to view shares as overvalued as we think current levels imply narrow-moat Nvidia is the sole beneficiary of the burgeoning AI and self-driving trends.

Concerning ARM (which Nvidia is reportedly in talks to acquire from SoftBank), CEO Jen-Hsun Huang praised the architecture as the most energy efficient. The most logical rationale for a potential deal is to enable Nvidia to offer a comprehensive data center portfolio that includes ARM-based CPUs. While there is nothing stopping the firm from developing its own ARM-based server CPU (Nvidia's Project Denver in 2014 sought to accomplish just that), we assume an outright purchase may help Nvidia accelerate any server CPU ambitions it may have. Nonetheless, SoftBank purchased ARM for \$32 billion, and we surmise Nvidia could have to pay upwards of \$40 billion. Regulatory risk (particularly from escalating U.S.-China tensions) and potential pushback from major ARM licensees (including Apple, Qualcomm, and Huawei) are formidable hurdles to the consummation of a deal, in our view.

Second-quarter sales grew 50% year over year to \$3.9 billion. Gaming sales were up 26% year over year. Data center sales were up 167% year over year thanks to Mellanox (14% of total revenue) and the A100 launch.

Nvidia to Buy ARM in \$40 Billion Deal with Eyes Set on Data Center Dominance; Maintain FVE

Abhinav Davuluri, Analyst, 13 September 2020

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NVIDIA Corp NVDA ★^Q 13 Sep 2020 02:00 UTC

Last Close

11 Sep 2020

Fair Value^Q

13 Sep 2020 02:00 UTC

486.58

292.11

There is no one analyst in which a Quantitative Fair Value Estimate and Quantitative Star Rating are attributed to; however, Mr. Lee Davidson, Head of Quantitative Research for Morningstar, Inc., is responsible for overseeing the methodology that supports the quantitative fair value. As an employee of Morningstar, Inc., Mr. Davidson is guided by Morningstar, Inc.'s Code of Ethics and Personal Securities Trading Policy in carrying out his responsibilities. For information regarding Conflicts of Interests, visit <http://global.morningstar.com/equitydisclosures>

Company Profile

Nvidia is a leading designer of graphics processing units that enhance the experience on computing platforms. The firm's chips are used in a variety of end markets, including high-end PCs for gaming, data centers, and automotive infotainment systems. In recent years, the firm has broadened its focus from traditional PC graphics applications such as gaming to more complex and favorable opportunities, including artificial intelligence and autonomous driving, which leverage the high-performance capabilities of the firm's graphics processing

Quantitative Scores

		Scores		
		All	Rel Sector	Rel Country
Quantitative Moat	Wide	100	100	99
Valuation	Overvalued	1	1	1
Quantitative Uncertainty	High	99	99	97
Financial Health	Moderate	79	47	79



Source: Morningstar Equity Research

Valuation

	Current	5-Yr Avg	Sector Median	Country Median
Price/Quant Fair Value	1.67	1.43	0.77	0.83
Price/Earnings	89.3	37.0	21.4	20.1
Forward P/E	55.6	—	15.9	13.9
Price/Cash Flow	54.2	31.8	15.6	13.1
Price/Free Cash Flow	61.0	36.4	23.0	19.5
Trailing Dividend Yield %	0.13	0.53	1.89	2.35
Price/Book	21.6	10.5	2.3	2.4
Price/Sales	23.2	9.0	1.7	2.4

Profitability

	Current	5-Yr Avg	Sector Median	Country Median
Return on Equity %	27.9	33.5	12.5	12.9
Return on Assets %	17.0	21.7	6.4	5.2
Revenue/Employee (K)	948.5	746.3	442.6	325.9

Financial Health

	Current	5-Yr Avg	Sector Median	Country Median
Distance to Default	0.6	0.7	0.6	0.5
Solvency Score	205.1	—	449.9	552.4
Assets/Equity	1.4	1.6	1.6	1.7
Long-Term Debt/Equity	0.2	0.3	0.1	0.4

Growth Per Share

	1-Year	3-Year	5-Year	10-Year
Revenue %	-6.8	16.5	18.5	12.6
Operating Income %	-25.2	13.7	30.3	—
Earnings %	-31.8	20.7	32.2	—
Dividends %	4.9	9.7	13.5	—
Book Value %	29.3	26.5	19.7	15.4
Stock Total Return %	164.3	42.4	84.9	47.5

Market Cap

11 Sep 2020

300.2 Bil

Sector

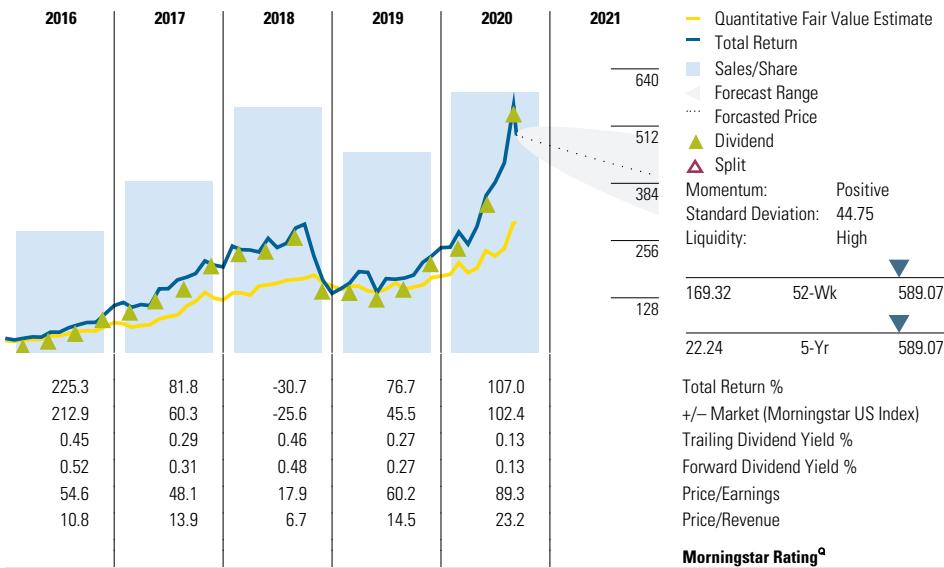
Technology

Industry

Semiconductors

Country of Domicile

United States

Price vs. Quantitative Fair Value

Quantitative Fair Value Estimate

Total Return

Sales/Share

Forecast Range

Forecasted Price

Dividend

Split

Momentum: Positive

Standard Deviation: 44.75

Liquidity: High

Total Return %

+/- Market (Morningstar US Index)

Trailing Dividend Yield %

Forward Dividend Yield %

Price/Earnings

Price/Revenue

Morningstar Rating^a

★★★★★

★★★★

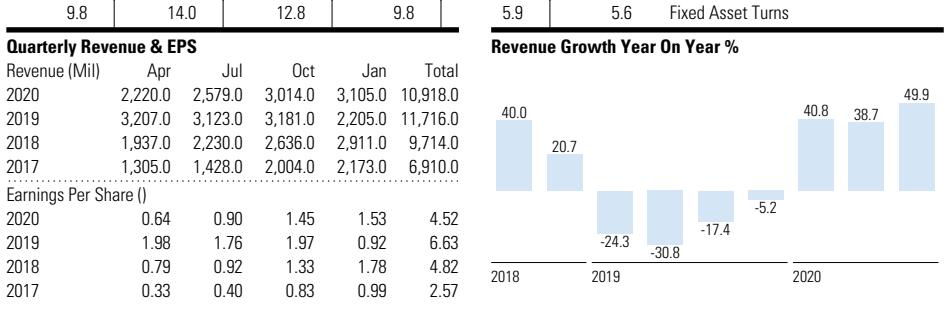
★★★

★★

★

2016	2017	2018	2019	2020	TTM	Financials (Fiscal Year in Mil)
5,010	6,910	9,714	11,716	10,918	13,065	Revenue
7.0	37.9	40.6	20.6	-6.8	19.7	% Change
878	1,937	3,210	3,804	2,846	3,544	Operating Income
15.7	120.6	65.7	18.5	-25.2	24.5	% Change
614	1,666	3,047	4,141	2,796	3,388	Net Income
1,175	1,672	3,502	3,743	4,761	5,581	Operating Cash Flow
—	-176	-593	-600	-489	-620	Capital Spending
1,089	1,496	2,909	3,143	4,272	4,961	Free Cash Flow
21.7	21.6	29.9	26.8	39.1	38.0	% Sales
1.08	2.57	4.82	6.63	4.52	5.45	EPS
—	138.0	87.5	37.6	-31.8	20.6	% Change
1.79	2.12	4.08	5.41	5.90	7.98	Free Cash Flow/Share
0.39	0.49	0.57	0.61	0.64	0.64	Dividends/Share
8.30	9.10	10.48	15.64	18.31	22.55	Book Value/Share
538,000	539,000	606,000	610,000	612,000	617,000	Shares Outstanding (K)

	13.8	32.6	46.1	49.3	26.0	27.9	Profitability
Return on Equity %	32.6	46.1	49.3	26.0	27.9	27.0	Return on Equity %
Return on Assets %	19.4	28.9	33.8	18.3	17.0	17.0	Return on Assets %
Net Margin %	24.1	31.4	35.3	25.6	25.9	25.9	Net Margin %
Asset Turnover	0.80	0.92	0.96	0.71	0.65	0.65	Asset Turnover
Financial Leverage	1.7	1.5	1.4	1.4	1.8	1.8	Financial Leverage
Gross Margin %	58.8	59.9	61.2	62.0	62.8	62.8	Gross Margin %
Operating Margin %	28.0	33.1	32.5	26.1	27.1	27.1	Operating Margin %
Long-Term Debt	1,983	1,985	1,988	1,991	6,960	6,960	Long-Term Debt
Total Equity	5,762	7,471	9,342	12,204	13,914	13,914	Total Equity
Fixed Asset Turns	14.0	12.8	9.8	5.9	5.6	5.6	Fixed Asset Turns



Research Methodology for Valuing Companies

Qualitative Equity Research 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. We believe this bottom-up, long-term, fundamentally based approach allows our analysts to focus on long-term business drivers, which have the greatest valuation impact, rather than short-term market noise.

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 an uncertainty-adjusted 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 excess 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.

To assess the direction of the underlying competitive advantages, analysts perform ongoing assessments of the moat trend. A firm's moat trend is positive in cases where we think its sources of competitive advantage are growing stronger; stable where we don't anticipate changes to competitive advantages over the next several years; or negative when we see signs of deterioration.

All the moat and moat trend ratings undergo periodic review and any changes must be approved by the Morningstar Economic Moat Committee, comprised of senior members of Morningstar's equity research department.

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, or EBI, and the net new investment, or NNI, to derive our annual free cash flow forecast.

Stage II: Fade

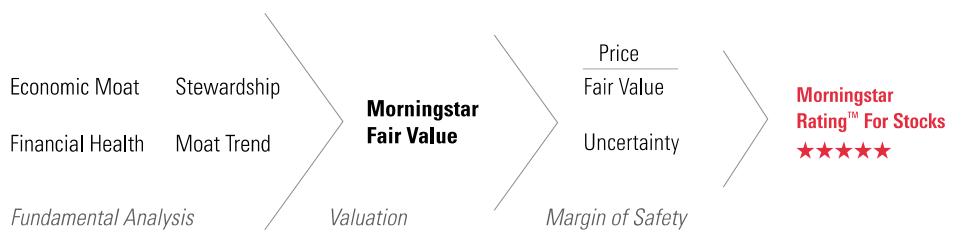
The second stage of our model is the period it will take the company's return on new invested capital—the return on capital of the next dollar invested ("RONIC")—to decline (or rise) to its cost of capital. During the Stage II period, we use a formula to approximate cash flows in lieu of explicitly modeling 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, or RONIC, and the number of years until perpetuity, when excess returns cease. The investment rate and return on new invested capital decline until the perpetuity stage is reached. 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.

Morningstar Research Methodology for Valuing Companies



Research Methodology for Valuing Companies

3. Uncertainty Around That Fair Value Estimate

Morningstar's Uncertainty Rating captures a range of likely potential intrinsic values for a company and uses it to assign the margin of safety required before investing, which in turn explicitly drives our stock star rating system. The Uncertainty Rating represents the analysts' ability to bound the estimated value of the shares in a company around the fair value estimate, based on the characteristics of the business underlying the stock, including operating and financial leverage, sales sensitivity to the overall economy, product concentration, pricing power, and other company-specific factors.

Analysts consider at least two scenarios in addition to their base case: a bull case and a bear case. Assumptions are chosen such that the analyst believes there is a 25% probability that the company will perform better than the bull case, and a 25% probability that the company will perform worse than the bear case. The distance between the bull and bear cases is an important indicator of the uncertainty underlying the fair value estimate.

Our recommended margin of safety widens as our uncertainty of the estimated value of the equity increases. The more uncertain we are about the estimated value of the equity, 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 for our qualitative analysis are low, medium, high, very high, and extreme.

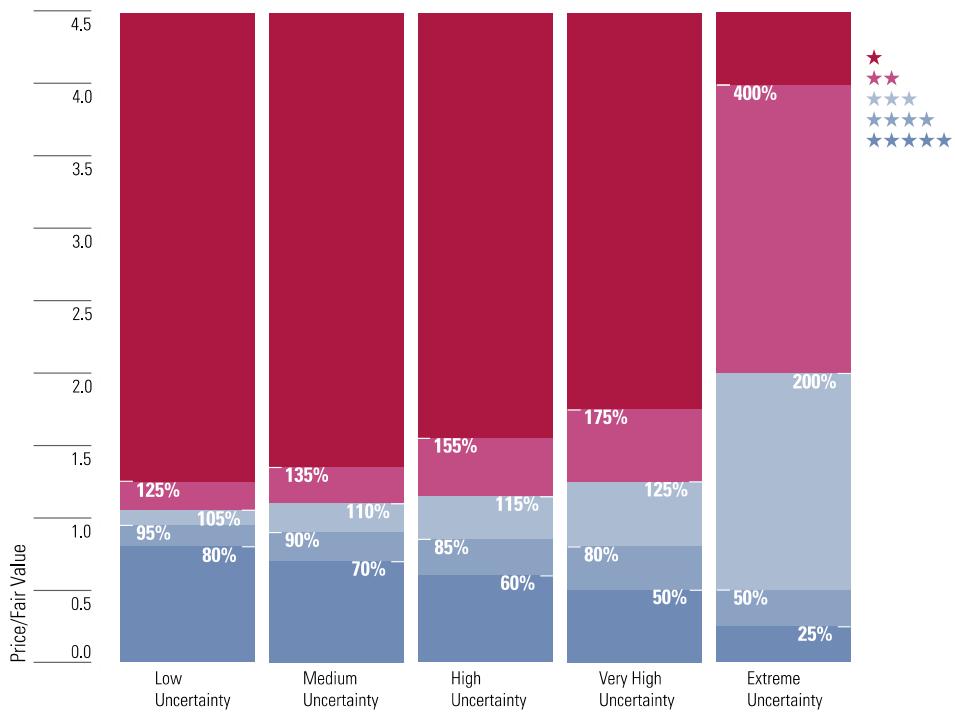
- Low-margin of safety for 5-star rating is a 20% discount and for 1-star rating is 25% premium.
- Medium-margin of safety for 5-star rating is a 30% discount and for 1-star rating is 35% premium.
- High-margin of safety for 5-star rating is a 40% discount and for 1-star rating is 55% premium.
- Very High-margin of safety for 5-star rating is a 50% discount and for 1-star rating is 75% premium.
- Extreme-margin of safety for 5-star rating is a 75% discount and for 1-star rating is 300% premium.

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.

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. 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. The market is pricing in an excessively optimistic outlook, limiting upside potential and leaving the investor exposed to Capital loss.

Research Methodology for Valuing Companies

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.

Stewardship Rating: Represents our assessment of management's stewardship of shareholder capital, with particular emphasis on capital allocation decisions. Analysts consider companies' investment strategy and valuation, financial leverage, dividend and share buyback policies, execution, compensation, related party transactions, and accounting practices. Corporate governance practices are only considered if they've had a demonstrated impact on shareholder value. Analysts assign one of three ratings: "Exemplary," "Standard," and "Poor." Analysts judge stewardship from an equity holder's perspective. Ratings are determined on an absolute basis. Most companies will receive a Standard rating, and this is the default rating in the absence of evidence that managers have made exceptionally strong or poor capital allocation decisions.

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

- Undervalued: Last Price is below Morningstar's quantitative fair value estimate.
- Fairly Valued: Last Price is in line with Morningstar's quantitative fair value estimate.
- Overvalued: Last Price is above Morningstar's quantitative fair value estimate.

Risk Warning

Please note that investments in securities are subject to market and other risks and there is no assurance or guarantee that the intended investment objectives will be achieved. Past performance of a security may or may not be sustained in future and is no indication of future performance. A security investment return and an investor's principal value will fluctuate so that, when redeemed, an investor's shares may be worth more or less than their original cost. A security's current investment performance may be lower or higher than the investment performance noted within the report. Morningstar's Uncertainty Rating serves as a useful data point with respect to sensitivity analysis of the assumptions used in our determining a fair value price.

Quantitative Equity Reports Overview

The quantitative report on equities consists of data, statistics and quantitative equity ratings on equity securities. Morningstar, Inc.'s quantitative equity ratings are forward looking and are generated by a statistical model that is based on Morningstar Inc.'s analyst-driven equity ratings and quantitative statistics. Given the nature of the

quantitative report and the quantitative ratings, there is no one analyst in which a given report is attributed to; however, Mr. Lee Davidson, Head of Quantitative Research for Morningstar, Inc., is responsible for overseeing the methodology that supports the quantitative equity ratings used in this report. As an employee of Morningstar, Inc., Mr. Davidson is guided by Morningstar, Inc.'s Code of Ethics and Personal Securities Trading Policy in carrying out his responsibilities.

Quantitative Equity Ratings

Morningstar's quantitative equity ratings consist of:

- (i) Quantitative Fair Value Estimate
 - (ii) Quantitative Star Rating
 - (iii) Quantitative Uncertainty
 - (iv) Quantitative Economic Moat
 - (v) Quantitative Financial Health
- (collectively the "Quantitative Ratings").

The Quantitative Ratings are calculated daily and derived from the analyst-driven ratings of a company's peers as determined by statistical algorithms. Morningstar, Inc. ("Morningstar," "we," "our") calculates Quantitative Ratings for companies whether it already provides analyst ratings and qualitative coverage. In some cases, the Quantitative Ratings may differ from the analyst ratings because a company's analyst-driven ratings can significantly differ from other companies in its peer group.

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

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

- Narrow: assigned when the probability of a stock receiving a "Wide Moat" rating by an analyst is greater than 70% but less than 99%.
- Wide: assigned when the probability of a stock receiving a "Wide Moat" rating by an analyst is greater than 99%.
- None: assigned when the probability of an analyst receiving a "Wide Moat" rating by an analyst is less than 70%.

Quantitative Star Rating: Intended to be the summary rating based on the combination of our Quantitative Fair

Value Estimate, current market price, and the Quantitative Uncertainty Rating. The rating is expressed as 1-Star, 2-Star, 3-Star, 4-Star, and 5-Star.

★: the stock is overvalued with a reasonable margin of safety.
 $\text{Log}(\text{Quant FVE}/\text{Price}) < -1^*\text{Quantitative Uncertainty}$

★★: the stock is somewhat overvalued.
 $\text{Log}(\text{Quant FVE}/\text{Price}) \text{ between } (-1^*\text{Quantitative Uncertainty}, -0.5^*\text{Quantitative Uncertainty})$

★★★: the stock is approximately fairly valued.
 $\text{Log}(\text{Quant FVE}/\text{Price}) \text{ between } (-0.5^*\text{Quantitative Uncertainty}, 0.5^*\text{Quantitative Uncertainty})$

★★★★: the stock is somewhat undervalued.
 $\text{Log}(\text{Quant FVE}/\text{Price}) \text{ between } (0.5^*\text{Quantitative Uncertainty}, 1^*\text{Quantitative Uncertainty})$

★★★★★: the stock is undervalued with a reasonable margin of safety. $\text{Log}(\text{Quant FVE}/\text{Price}) > 1^*\text{Quantitative Uncertainty}$

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

- Low: the interquartile range for possible fair values is less than 10%.
- Medium: the interquartile range for possible fair values is less than 15% but greater than 10%.
- High: the interquartile range for possible fair values is less than 35% but greater than 15%.
- Very High: the interquartile range for possible fair values is less than 80% but greater than 35%.
- Extreme: the interquartile range for possible fair values is greater than 80%.

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

- Weak: assigned when Quantitative Financial Health < 0.2
- Moderate: assigned when Quantitative Financial Health is between 0.2 and 0.7
- Strong: assigned when Quantitative Financial Health > 0.7

Research Methodology for Valuing Companies

Other Definitions

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

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

- ▶ Undervalued: Last Price is below Morningstar's quantitative fair value estimate.
- ▶ Fairly Valued: Last Price is in line with Morningstar's quantitative fair value estimate.
- ▶ Overvalued: Last Price is above Morningstar's quantitative fair value estimate.

This Report has not been made available to the issuer of the security prior to publication.

Risk Warning

Please note that investments in securities are subject to market and other risks and there is no assurance or guarantee that the intended investment objectives will be achieved. Past performance of a security may or may not be sustained in future and is no indication of future performance. A security investment return and an investor's principal value will fluctuate so that, when redeemed, an investor's shares may be worth more or less than their original cost. A security's current investment performance may be lower or higher than the investment performance noted within the report.

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A change in the fundamental factors underlying the quantitative equity ratings can mean that the valuation is subsequently no longer accurate.

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NVIDIA Corp NVDA (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★	486.58 USD	250.00 USD	1.95	0.13	0.13	300.22	Semiconductors	Exemplary
11 Sep 2020 21:37, UTC	11 Sep 2020	20 Aug 2020 01:27, UTC				11 Sep 2020		

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NVIDIA Corp NVDA (XNAS)

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NVIDIA Corp NVDA (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
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