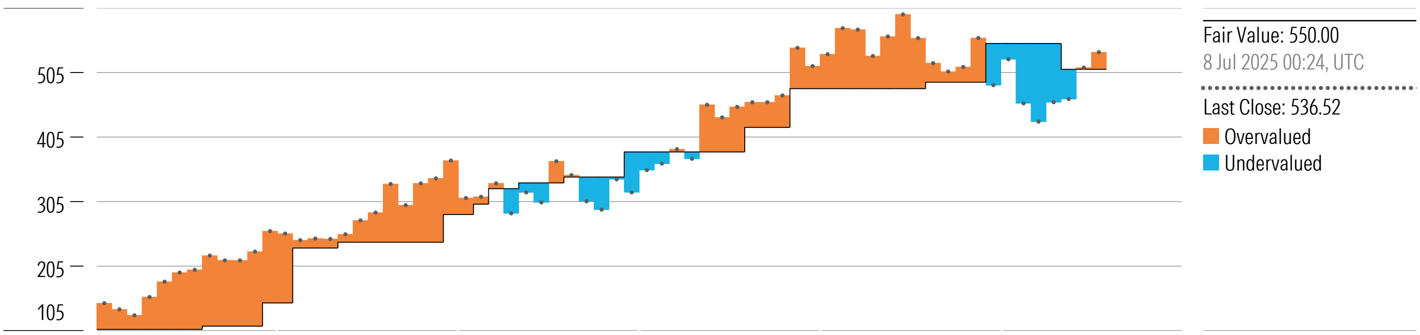
Morningstar Equity Analyst Report | Report as of 8 Jul 2025 00:31, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 1 of 23

Synopsys Inc SNPS ★★★ 8 Jul 2025 00:26, UTC

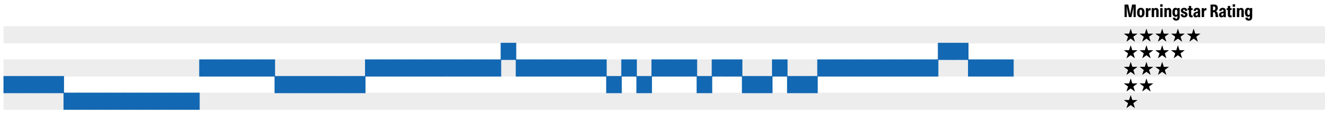
Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
536.52 USD 7 Jul 2025	550.00 USD 8 Jul 2025 00:24, UTC	0.98	83.25 USD Bil 7 Jul 2025	Wide	Large Blend	High	Exemplary	4 Jun 2025 05:00, UTC

Price vs. Fair Value



	2020	2021	2022	2023	2024	YTD	
	1.75	1.29	0.84	1.07	0.88	0.98	Price/Fair Value
	86.24	42.15	-13.35	61.27	-5.74	10.54	Total Return %

Morningstar Rating



Total Return % as of 07 Jul 2025. Last Close as of 07 Jul 2025. Fair Value as of 8 Jul 2025 00:24, 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.

Synopsys and Cadence Design: EDA Firms Resume China Operations Following Trade Progress

Analyst Note Eric Compton, CFA, Director, 8 Jul 2025

Leading electronic design automation companies Synopsys and Cadence Design have received approval from the US Department of Commerce to recommence their operations in China.

Why it matters: China accounts for nearly 11% of revenue for each company. A month ago, the EDA companies were ordered to halt China operations indefinitely, which meant a substantial corporate revenue cut as business from China would have effectively been cut to $0.

- The news that both firms can now resume operations essentially brings them back on their original trajectory of flat year-on-year China growth for Cadence, and below corporate average growth for the China business for Synopsys.
- We believe this reversal comes on the back of the broader trade deal that the US and China are working toward.

The bottom line: Based on this development, we update our fair value estimate for Synopsys to $550, up from $510; and $297 for Cadence, up from $275. We incorporates Cadence and Synopsys' original guidance for the coming quarter and fiscal year, as we no longer assume business from China drops to zero.

- We also take into account the loss of revenue for both the EDA firms during the China export restriction, specifically from the time both companies received letters to halt China operations (May

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Sector	Industry
Technology	Software - Infrastructure

Business Description

Synopsys is a provider of electronic design automation software and intellectual property products. EDA software automates and aids in the chip design process, enhancing design accuracy, productivity, and complexity in a full-flow end-to-end solution. Synopsys' comprehensive portfolio is benefiting from a convergence of semiconductor companies moving up the stack of technologies toward systems-like companies, and systems companies moving down-stack toward in-house chip design. The resulting expansion in EDA customers alongside secular digitalization of various end markets benefits EDA vendors like Synopsys.

29) till the time they were able to restart business in China (July 2).

- We believe that the one-month interruption shaves a few basis points off this year's run-rate, but it does not alter our fundamental view on the companies or the EDA industry.

Coming up: For Synopsys, the retraction of the China export restriction improves the prospects of Chinese regulatory approval for the merger with Ansys.

- Comparing our updated fair value estimate with the market price, Synopsys is slightly undervalued, as we believe the market has yet to fully price in a successful Ansys merger approval.

Business Strategy & Outlook Eric Compton, CFA, Director, 29 May 2025

Synopsys is a leading provider of software tools that engineers use to solve a fundamental industry challenge—designing complex semiconductor chips. It offers products that streamline chip building, enhance the efficiency of chip structure, automate processes, and minimize errors. Its solutions have become indispensable to virtually every major semiconductor company and a growing number of electronic systems companies globally. We believe the primary growth driver is when clients initiate new chip designs—also called design starts—which we expect to accelerate due to the recent surge in artificial intelligence-related chip development across the industry.

Synopsys has two segments. The electronic design automation, or EDA, business contributes more than half of the company's revenue. Synopsys is the market leader among peers like Cadence Design Systems and Siemens EDA (formerly Mentor Graphics). We foresee demand for EDA tools growing significantly as chip intricacy increases and the industry shifts toward multi-die or chiplet architectures, thus requiring more sophisticated design solutions, which Synopsys is well positioned to supply.

The intellectual property segment sells predesigned chip components. We observe IP complementing the EDA business and anticipate the industry's growing need for prebuilt IP blocks for standardized components to support IP demand.

In our view, Synopsys benefits from a strong moat and high retention rates, as its products are deeply integrated into client workflows, and replacing the software could lead to productivity loss and implementation risks in an industry where reliability, speed, and precision are paramount. Additionally, Synopsys' ability to provide an end-to-end set of solutions and its heavy research and development investments create high barriers to entry that solidify its competitive advantage over smaller players.

From a business strategy perspective, we like the strategic merger with Ansys. It positions Synopsys to expand its total addressable market to about $70 billion by 2030 while unlocking valuable synergies in simulation and verification.

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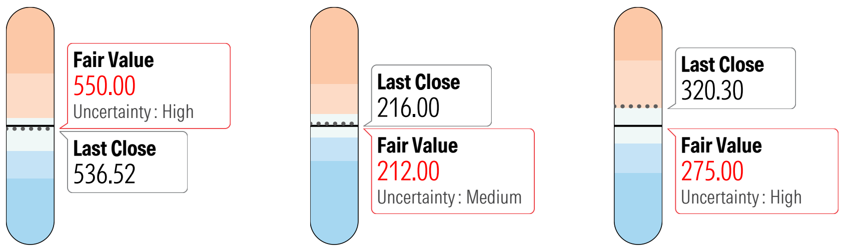
Competitors

	Synopsys Inc SNPS	Siemens AG SIE	Cadence Design Systems Inc CDNS



	Synopsys Inc SNPS	Siemens AG SIE	Cadence Design Systems Inc CDNS
Economic Moat	Wide	Wide	Wide
Currency	USD	EUR	USD
Fair Value	550.00 8 Jul 2025 00:24, UTC	212.00 18 Mar 2025 13:35, UTC	275.00 29 May 2025 16:38, UTC
1-Star Price	852.50	286.20	426.25
5-Star Price	330.00	148.40	165.00
Assessment	Fairly Valued 7 Jul 2025	Fairly Valued 7 Jul 2025	Overvalued 7 Jul 2025
Morningstar Rating	★★★8 Jul 2025 00:26, UTC	★★★5 Jul 2025 00:21, UTC	★★7 Jul 2025 21:36, UTC
Analyst	Eric Compton, Director	Matthew Donen, Director	Eric Compton, Director
Capital Allocation	Exemplary	Exemplary	Exemplary
Price/Fair Value	0.98	1.02	1.16
Price/Sales	13.78	2.21	18.36
Price/Book	8.59	2.94	18.68
Price/Earning	65.84	23.80	81.48
Dividend Yield	0.00%	2.41%	0.00%
Market Cap	83.25 Bil	171.02 Bil	87.46 Bil
52-Week Range	365.74—624.80	150.68—244.85	221.56—330.09
Investment Style	Large Blend	Large Blend	Large Growth

Bulls Say Eric Compton, CFA, Director, 8 Jul 2025

- Synopsys' wide moat stems from high customer switching costs and intangible assets that virtually no other software vendor or startup can match.
- Secular tailwinds will drive new chip design starts, raise R&D intensity, and open up new markets for semiconductor-focused EDA tools, leading to excess revenue growth for 10 or more years.
- Synopsys' margins should only improve, supported by improving IP margins, greater AI-driven wallet share, and internal AI/ML optimizations that enhance operational efficiency.

Bears Say Eric Compton, CFA, Director, 8 Jul 2025

- The market appears to be already giving Synopsys full credit for the upcoming growth cycle. Any hiccups along the way will lead to declines in valuation.
- High customer concentration could pose risks by amplifying revenue dependency on a few clients and

increasing exposure to client-specific disruptions

- Geopolitical tensions with China and China's focus on supporting domestic companies could affect Synopsys' ability to do business in the region and lead to slower revenue growth.

Economic Moat Eric Compton, CFA, Director, 29 May 2025

We believe Synopsys warrants a wide moat rating as a result of switching costs and intangible assets associated with the firm's vast product suite. Synopsys provides leading-edge electronic design automation tools and intellectual property that are critical to the semiconductor chip design process. We believe that Synopsys enjoys high customer switching costs and intangible assets in its sticky EDA segment, as well as intangible assets associated with its IP offerings. In our opinion, this customer stickiness and profitable IP portfolio will drive excess returns on capital for Synopsys over the next 10-20 years. Fundamentally, we believe that as long as the semiconductor industry exists and is innovating, Synopsys will be a necessary part of that innovation, earning excess returns on invested capital.

Engineers use electronic design automation software to design and build semiconductor chips. This software is indispensable, functioning as the backbone for developing advanced microchips. Without EDA software, there would be no modern semiconductor industry. If a company is designing semiconductor chips, or its overall systems are heavily reliant on semiconductors (think modern automobiles), it is using EDA software.

The EDA industry is dominated by three key players that control over 90% of the market: Synopsys, Cadence, and Siemens EDA. Synopsys and Cadence are the most dominant market leaders, with 38% and 36% share, respectively, collectively capturing over two thirds of the industry. This dominance is reinforced by near 100% retention rates and an 80%-85% recurring revenue model, reflecting both the critical role that EDA tools play in chip development and the loyalty the top EDA firms have from their clients. These are essentially the strongest retention rates a software company can have, implying customer lifetimes well over 20 years. The primary reasons clients stop using the services of Synopsys is that they go out of business or are acquired. We believe the top EDA firms' market dominance (essentially a stable oligopoly), evidence of extremely high switching costs (retention rates near 100%), and position as indispensable tools for processes where firms cannot afford failure—where a bad chip design could put a younger firm out of business, or at the very least have a severely negative impact on a more mature firm—all support a wide moat rating based on switching costs and intangible assets.

Switching costs represent the primary moat source for Synopsys. Chip design is an intricate process involving thousands of hours dedicated to fine-tuning workflows, integrating tools, and aligning processes. Synopsys' tools are tightly integrated within its clients' workflows, and transitioning to an alternative could lead to significant implementation risks such as a drop in productivity and complex data migration challenges. In a rapidly moving technological industry, we believe that the costs of switching vendors far outweigh the small technological benefit the client would get in switching vendors. In addition, engineers invest considerable time in becoming proficient with specific tools, and changing vendors would mean more training, additional ramp-up time, disruption to ongoing projects, and delayed time to market.

Further, firms cannot afford mistakes in the design process, as they put future revenue and the future of the business at risk. Minor design flaws can result in significant disruptions and exacerbated losses down the line, making it necessary for these tools to be reliable and trustworthy. Clients would find it impractical to change providers without jeopardizing project deadlines and the quality of the final product.

In support of intangible assets, we point to the overall reputation of top EDA firms, like Synopsys. When a company is considering which EDA tools to use, there are only three reliable choices. We find it highly unlikely that a company would entrust its design processes to an unknown, unproven upstart. It is simply not worth the risk. This hesitancy toward new vendors, along with gradual industry consolidation over time, has led to minimal investment in new alternatives. This is in stark contrast to other parts of the semiconductor industry, such as chip design (the clients of EDA firms), where new capital and companies jumped at the opportunity presented by new waves of demand, such as designing AI-optimized chips.

The barriers to entry in the EDA business are substantial, involving massive upfront capital, deep technical knowledge, and cumulative industry expertise that cannot be easily replicated. Synopsys and Cadence's continuous acquisitions to build their software portfolios have led to market consolidation and a robust pace of innovation, which has put them leagues ahead of smaller competitors. We observe that if either lacks a feature or process, they have both the resources and technical know-how to catch up and maintain their competitive advantage. A major advantage that Synopsys has over smaller competitors is its ability to offer end-to-end design flow—a full suite of tools needed to design a chip from start to finish—thus reducing the appeal of small competitors that have fragmented solutions.

Another industry feature that gives us confidence in the wide moat rating is the fact that EDA is not cyclical. During uncertain times and economic downcycles in the semiconductor market, firms can cut budgets, but one area where firms are loath to cut spending is their core R&D budget. Innovation is essential to maintaining a competitive edge in the semiconductor industry. If a company starts cutting its EDA budget significantly, it means it is essentially firing its engineers, which also likely means that it is facing serious financial difficulty—likely even on the verge of going out of business.

Over the long term, we expect demand for EDA to only increase. As chips get smaller and more complex, and therefore more expensive to design, customers are willing to pay a premium for the latest tools that Synopsys has to offer. Increasing complexity and increasing difficulties in chasing improved performance also increase the value of the solutions EDA firms offer. To meet this demand, Synopsys has some of the highest R&D spending in the software space, to ensure it remains at the cutting edge.

Another factor increasing our confidence in the long-term demand outlook is the increasing diversity of Synopsys' client base, extending beyond semiconductor-focused companies to include what are called system-level customers. Fifteen years ago, nearly all of Synopsys' clients were semiconductor companies, whereas today, close to 45% are companies that produce the end products rather than the chips alone. For example, an automotive firm that has to design a car that uses many different semiconductor components will design the car with the overall system, including the semiconductors, in mind. It can use EDA software for this system-level design process. With products only becoming more complex and more electronic over time, we expect this demand trend will remain in place for decades to come. With the EDA industry consolidated around a few players, Synopsys' brand and unique technological advantage position it to capture pricing uplifts, as well as volume increase, from a broadening customer base, along with industry-leading margins, all of which ultimately flow into better returns on capital.

Synopsys' other primary business is its IP segment. This is becoming an increasingly important part of Synopsys. As of fiscal 2023, IP growth has outpaced Synopsys' core EDA growth, representing around 30% of the company's revenue.

Synopsys' IP solutions can be compared with LEGO building blocks. When designing a chip, it is helpful for engineers to use prebuilt blocks for parts of the chip that are common and undifferentiated, allowing designers to focus on customizing the differentiated aspects of their creation. For example, part of the chip may have to deal with interacting with a USB connection. Building out this part of the chip each time a new chip is designed is not an efficient use of engineering resources. Companies like Synopsys will prebuild this part of the chip, and then sell that part of the design as IP. This allows clients to purchase these modular, undifferentiated parts of a chip's design for a fraction of what they would cost to develop in-house with their own engineering team. Synopsys can sell this IP at an attractive price because it is able to depreciate its cost of development over a large base of clients.

We believe this business benefits from an intangible asset moat source, driven by the breadth of its IP library and Synopsys' unique position at the center of the semiconductor design workflow.

Synopsys has steadily expanded its IP library (through acquisitions and internal development), building a robust repository of standardized and custom solutions that differentiate it from smaller competitors. The extensive library, combined with continuous innovation in sectors like automotive and AI-focused applications, keeps Synopsys at the forefront of client demands and the pace of technological developments. Nearly half of Synopsys' workforce is dedicated to building and maintaining this library, a testament to the company's commitment to quality and breadth. This breadth makes Synopsys a natural first place to look for IP solutions as a designer.

The second key ingredient to Synopsys' moat in IP is its unique position at the center of semiconductor design. In theory, anyone could create many of these IP blocks. However, it is fundamentally more efficient at the industry level to have one or two firms do it and then sell those standardized design blocks to the rest of the industry, as opposed to having each design firm rebuild what are functionally the same design blocks for every project. This allows a firm like Synopsys—which is naturally already at the center of the design process for the industry with its software—to have a natural distribution advantage. This further allows Synopsys to depreciate the cost of development for each IP block across a wider base of customers. We hesitate to award the firm a cost advantage for this because, in theory, it does not cost Synopsys any less to develop these IP blocks, but the ability to sell them across a wider base of customers does allow Synopsys to sell them at a price that would be unpractical for a firm with too few customers, and at a price which is cheaper than what it would cost any of its customers to develop these IP blocks in house.

Synopsys has increased its market share in the IP business to 23% (from 13% in 2016) by taking market share from Arm, the leader with 41% share (49% share in 2016), while also outpacing Cadence, which holds a distant 6%. The consistent quality of Synopsys' IP fosters long-term partnerships and deepens client loyalty. Furthermore, client-specific customized solutions developed with Synopsys make switching to other providers challenging, as it risks compromising design integrity and reliability.

Lastly, the type of IP portfolio matters. Arm has the most dominant market share, but it is focused only on processor IP. Meanwhile, Synopsys and Cadence concentrate on non-processor IP, which is growing fast; we forecast it will soon account for more than half of the IP market. With a fast-growing IP margin profile, we believe Synopsys' IP business will be a significant contributor to strong and improving ROICs and future growth.

Fair Value and Profit Drivers Eric Compton, CFA, Director, 8 Jul 2025

Our fair value estimate of $550 per share implies a fiscal 2025 adjusted price/earnings multiple of 36 times, an enterprise value/adjusted EBITDA multiple of 26 times and a 1.8 % free cash flow yield.

Over the next five (10) years, we forecast Synopsys' EDA segment revenue to grow at a 11% (11%) CAGR and the IP segment at an 13% (13%) CAGR. Overall, we believe Synopsys will grow at a 12% (11%) CAGR through 2029 (2034). This is above the expected semiconductor industry growth rate of high single digits. We believe this above-average growth is warranted by several key trends, including AI demand, increasing chip complexity, and the increasing proliferation of EDA tools to "systems" companies.

We are seeing generative AI demand leading to more chip design starts and R&D investment, fueling growth in EDA tools. Growing chip design complexity and the slowdown of Moore's Law have led to a shift to multi-die architectures, necessitating more sophisticated EDA solutions and increased use of EDA tools. We also expect rapid adoption of silicon content, that is, more chip demand from systems companies across various industries like automotive, high-tech, industrial, and aerospace, thus increasing adoption of Synopsys' EDA products. We view the strategic acquisition of Ansys as expanding the total addressable market in these same systems companies. We also see growth opportunities in IP, as companies need the reusable design blocks—not only for prioritizing differentiated design elements while outsourcing the basic design work through IP—but also for accelerating design cycles and go-to-market strategies.

We expect operating margins to continually increase, from 22% in 2024 to 31% by 2034. We see no reason to expect margin expansion to stop by 2034 either. This would be driven by strong growth in the IP business (where we expect margins to improve as the business scales), AI-driven efficiencies, pricing opportunities through selling higher-value-added products (value-add increases driven by increased demand along with product innovation, like AI enhancements), and more typical scale-based efficiencies (software companies do not need to double the salesforce or general and administrative expenses to double sales, for example).

A stable business model and low cyclicality in revenue thanks to resilient demand during economic downturns gives us confidence in assigning a 7.5% cost of equity, the lowest discount rate we use when analyzing companies.

Risk and Uncertainty Eric Compton, CFA, Director, 29 May 2025

We assign Synopsys a High Morningstar Uncertainty Rating. This is primarily based on the uncertainty of future revenue growth. While EDA firms have historically grown closer to the overall semiconductor market, they are entering a period where we expect above-industry growth for the next two decades. The degree of uncertainty around this revenue upside and its implications for our fair value estimate lead to the High Uncertainty Rating.

We also assign the firm a cost of equity of 7.5%, the lowest discount rate we use. We do this because we see low risk to the overall business given its entrenched position, immunity to cyclicality, and strong financial position and margins. We see the business as low-risk and high-quality, while we see high uncertainty related to our fair value based on future revenue growth compared with the overall semiconductor market.

Key risks for Synopsys include headwinds in China, customer concentration, and operational execution risks related to the Ansys deal and future innovation.

Approximately 15% of total revenue comes from China. New regulations on exports to China, along with increasing competition in the domestic semiconductor industry (China's long-term vision is for the Chinese market to consist of Chinese firms), could all pose headwinds to revenue growth.

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Synopsys depends on a relatively small number of customers for large chunks of its revenue base. However, although it derives most of its sales from chip designers, it has been diversifying into systems companies. Synopsys garners approximately 10% of revenue from Intel alone, so losing a major client could affect the company.

Synopsys also faces execution and integration risks from its pending acquisition of Ansys, as well as future innovation risks in general, including the need to innovate to stay competitive with key rival Cadence and to take share in new addressable markets.

We believe Synopsys faces low levels of environmental, social, and governance risk.

Capital Allocation Eric Compton, CFA, Director, 29 May 2025

We assign Synopsys an Exemplary Capital Allocation Rating based on a sound balance sheet, exemplary investments regarding strategic priorities and execution, and appropriate shareholder distribution policies.

With solid profitability, low debt, and reasonable cash balances, we view the balance sheet as sound. With regards to shareholder distributions, Synopsys prioritizes capabilities-focused mergers and acquisitions to further its overall competitive positioning and growth first, and then uses excess capital for reinvesting into the business and share repurchases. Share repurchases primarily offset existing share issuance. The company does not pay a dividend, although perhaps at some point in the future it might. We view all of this as reasonable.

Regarding investments, we view the company's moves as exemplary. Synopsys was founded by Aart de Geus in 1986 to provide EDA solutions in a rapidly burgeoning chip design market. In January 2024, COO Sassine Ghazi took over the CEO role from de Geus, who moved to the executive chair role.

Over the years, Synopsys has engaged in numerous small tuck-in acquisitions and has made some sizable investments to emerge as a leader in the industry. We view these investments as exemplary because they have enabled Synopsys to keep up with industry changes, build out a complete product portfolio, and also add on additional business lines such as IP. All of these have increased shareholder value, and we think the company will continue to make such moves.

Iin January 2024, Synopsys announced its intention to acquire Ansys for approximately $35 billion in enterprise value. We think the Ansys acquisition is a sound deal for Synopsys, and once again we think Synopsys is making the right strategic move, building out the simulation portion of its product portfolio, aiding its existing customers in "silicon to systems" solutions, and playing on the increasingly important theme of "systems" companies. The deal expands Synopsys' addressable market and provides diversification outside of semis into companies doing systems-level design.

One area that has not worked out as well has been Synopsys' venture into security testing and software integrity through acquisitions like Coverity in 2014 and Black Duck in 2017. These businesses remained low-margin, and Synopsys' decision to sell aligns with a focused capital-allocation strategy, enabling the firm to concentrate resources on high-margin and high-growth areas.

Analyst Notes Archive

Synopsys Earnings: Strong Second Quarter Overshadowed by Escalating China Sanctions Eric Compton, CFA,Director,29 May 2025

Wide-moat Synopsys reported a solid second quarter, but results were clouded by reports that the Trump administration has instructed all the major electronic design automation providers—Synopsys, Cadence, and Siemens EDA—to halt sales to Chinese entities. Synopsys responded on the earnings call that it has not received any formal notification from the US Bureau of Industry and Security regarding new export controls, and declined to speculate on the potential impacts. At the same time, the company reiterated the full-year guidance which factors in declining revenue from China, but does not account for any restrictions like those that were reportedly introduced today.We have seen mixed reporting on a potential ban on EDA sales to China. Because there are multiple reports about notices received, including previous reporting on Siemens, we think that EDA firms have likely received some sort of notice, although descriptions of the details vary. Some describe the notice as a ban, while others suggest the notice simply requires approval for sales to China on a case-by-case basis.Based on our previous analysis that a main goal of the current tariffs is to target supply chains related to China, as well as pending section 232 reviews related to semiconductors specifically, and the latest reporting, we believe it is likely that regulation banning EDA sales to China in some form or another is coming. As such, we are incorporating a more conservative stance in our forecasts.China represented approximately 10% of total revenue in the current quarter (down from 15% last year), and we forecast a full curtailment of business with China by the end of the year as a more realistic base case. Management did not want to comment on the margin profile of business in China, but our guess is it would likely be similar to overall company margins or slightly lower.After updating our model, we arrive at a lowered fair value estimate of $510 from $550 previously. Shares are fairly valued.

Synopsys Earnings: Good Start to 2025, With China Headwinds Still in Sight Eric Compton, CFA,Director,27 Feb 2025

We maintain our $550 fair value estimate for wide-moat Synopsys after the firm reported top-line results within our expectations and a solid beat on the bottom line. This quarter we saw China form a lower proportion of revenue (approximately 12% compared with 16% in the previous quarter), as US restrictions on China take effect. Furthermore, China's domestic economy is facing a weak macroeconomic environment that led to slower sales growth for Synopsys for the region. While we expect US firms to very gradually lose share in China over the long term, China's macro trend downward has been a bit harsher than we originally anticipated. Management now expects revenue from China to grow more slowly than the corporate average, which is slightly more bearish than the commentary last quarter. Even so, the full-year revenue outlook was maintained as other regions and product strength still supported the initial full-year guide. Shares are trading at a 13% discount to our fair value, which we view as slightly undervalued, but still 3-star-rated on a risk-adjusted basis.Synopsys' artificial intelligence portfolio continues to garner demand, which is shown to boost productivity, improve design efficiencies, and bring about faster product innovation. AI and high-performance computing demand for electronic design automation tools remained robust in the first quarter, but this was offset by a challenging industrial, automotive, and consumer electronics demand environment, and weaker China revenue. Design IP revenue is lumpy and can fluctuate from quarter to quarter, which was one of the reasons the IP segment's revenue was down 17% year on year, along with the added burden of a tough prior-year comparison. Nonetheless, we believe the rising complexity of chip designs, along with increasing pressure to reduce time-to-market will continue to propel IP demand, which we continue to expect will grow at a midteens pace for the years ahead.

Synopsys Earnings: Slower 2025 Revenue Outlook, but Margins Should Strengthen; Raising Fair Value Eric Compton, CFA,Director,5 Dec 2024

Wide-moat Synopsys delivered decent fiscal fourth-quarter results. However, the 2025 revenue outlook was a bit weak compared with FactSet consensus expectations—$6.78 billion at the midpoint versus a consensus median expectation of $6.90 billion)—which is what likely drove the 8% selloff after hours.We raise our fair value estimate to $550 per share, up from $490, as we transfer coverage, upgrade our moat rating to Wide from Narrow, and lower our cost of equity to 7.5% from 9%. We also reiterate our belief in key tailwinds driving double-digit percentage revenue growth for years to come, including increasing silicon proliferation, robust demand from systems companies, and increasing demand from artificial intelligence chip design starts. With shares now trading closer to $543 after the selloff, we view shares as fairly valued.Management attributed the more conservative 2025 outlook to a pragmatic approach to revenue in China, eight fewer days in the 2025 fiscal year compared with 2024, and the integration timing of the Ansys acquisition. We would not read too much into it, and we were pleased with the margin outlook of 40%, a healthy improvement over last year's level of 38.5%, and well on the way to the long-term target of the mid-40s. We believe Synopsys remains well-positioned to navigate any short-term headwinds. Additionally, advancements in the company's AI toolkit are expected to boost demand and volumes while enhancing margins through operational efficiency, and we maintain our confidence that double-digit percentage revenue growth coupled with margin expansion is maintainable for the time being.

Synopsys Earnings: Another Solid Period of Double-Digit Revenue Growth; Raising Fair Value Slightly Eric Compton, CFA,Director,22 Aug 2024

Narrow-moat-rated Synopsys reported solid third-quarter 2024 results, and we are increasing our fair value estimate slightly to $490 from $480. The firm posted revenue in line with our expectations, while margins came in slightly better than our estimate, leading to a 5% beat compared with our non-GAAP earnings per share estimates.We continue to see positive tailwinds for Synopsys, driven by increasing chip complexity and increased integration value across chip systems. This leads to good opportunities for the company to meet demand for more value-added tools. This supports our double-digit percentage revenue growth outlook over the next several years (excluding the drag from the soon-to-be-sold Integrity business), which remains unchanged. We view artificial intelligence as both a demand driver and an efficiency driver for the company. We continue to view shares, which were slightly up after-hours, as overvalued, trading at roughly a 16% premium to our updated fair value estimate.Revenue was up a healthy 13% year over year, while profitability also improved, with non-GAAP operating margin increasing to 40.0% from 36.4% year over year. This low to mid-double-digit percentage revenue growth fits squarely within the company's long-term goals, as does its 40% operating margin. Management highlighted a number of product wins during the quarter, and work on the leading edge nodes with key foundries such as TSMC. We also like the progress the company is making on multi-die design capabilities and its participation in the latest high bandwidth memory developments. Driven by artificial intelligence-led demand, we see demand for HBM design solutions only increasing as the years progress.Aside from solid revenue generation, Synopsys also had solid cost control, highlighting AI as an efficiency generator.

Synopsys Earnings: The Firm Focuses on AI-Fueled Growth and Sells Its Software Integrity Business

Brian Colello, CPA,Senior Equity Analyst,23 May 2024

We maintained our $480 fair value estimate for narrow-moat Synopsys after the firm posted fiscal second-quarter results with revenue below our expectations, while the non-GAAP operating margin was above our estimate. In the quarter, Synopsys entered into a definitive agreement to sell its software integrity business to Clearlake Capital for over $2.1 billion, which we view as strategically sound. With this, management adjusted its full-year guidance for removing the segment and still expects strong performance throughout the year. In our view, Synopsys is executing well on deploying its artificial intelligence applications across customer workflows, which we think will be the key ingredient in propelling chip design productivity. We continue to view shares, which were flat after-hours, as overvalued.On the call, Synopsys announced it had received stockholder approval to acquire Ansys. The $35.0 billion deal is expected to close in the first half of 2025, and we view the transaction as more likely than not to go through. Ansys is an industry leader in simulation, and Synopsys' management believes that Ansys tools will aid its existing semiconductor customers in "silicon to systems" solutions, as more chipmakers are expanding into systems (such as Nvidia), while other systems providers are expanding into semis (Microsoft, Tesla, and others).Second-quarter revenue increased 15% year over year to $1.455 billion, excluding the software integrity business. Growth was led by the design intellectual property segment, which increased 19% year over year to $400 million, thanks to strength in the automotive end-market. Design automation rose 14% year over year to $1.055 billion, driven by the increasing deployment of Synopsys.ai and strong hardware sales.The quarter's non-GAAP operating margin was 37.3%, up from 33.3% in the year-ago period. We expect the firm's focus on higher-value segments to drive margin expansion.

Synopsys Earnings: Promising Signs of Success as the Firm Doubles Down on AI-Based Solutions

Brian Colello, CPA,Senior Equity Analyst,22 Feb 2024

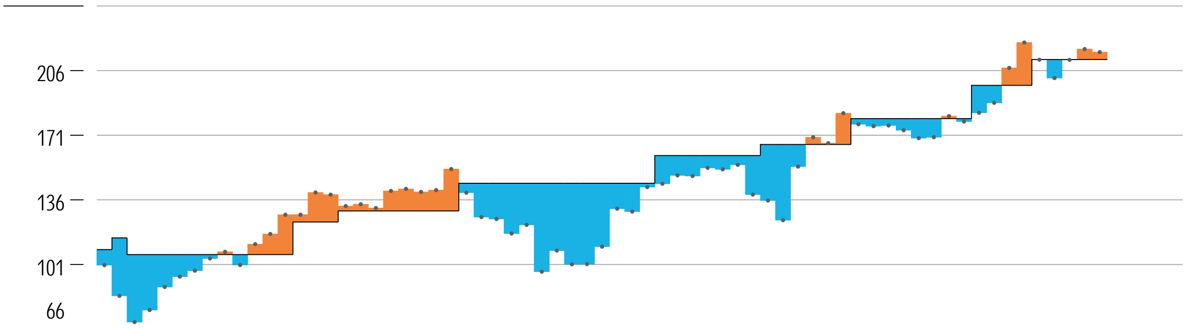
We maintain our $480 fair value estimate for narrow-moat Synopsys after the firm reported fiscal first-quarter results, which were largely in line with our revenue estimates while exceeding our expectations for non-GAAP operating margin. We are impressed by Synopsys' deployment of its artificial intelligence toolkit across customer workflows, which we think will propel chip design productivity as Moore's law slows. Management maintained its fiscal 2024 outlook for revenue and margins while increasing its non-GAAP EPS guidance. We remain confident in Synopsys' long-term demand as the firm capitalizes on secular trends toward hyperscale computing, AI, and 5G communications. We believe its pending acquisition of Ansys will deliver ample growth opportunities. We view the shares, which were up around 4% after hours, as overvalued.Synopsys' AI prowess continues to be a focus as the firm works toward deploying Synopsys.ai across its entire electronic design automation stack. We think Synopsys.ai is of value to the firm's semiconductor customers, as the software focuses on optimization, data analytics, and generative AI to enable increasingly complex chip design. We foresee AI becoming progressively infused into customers' workflows and expect a similar trend across many software firms.First-quarter revenue increased 21% year over year to $1.65 billion, which was at the high end of guidance. Growth was led by design IP strength, up 53% from the prior-year period to $526 million. Design automation also performed well in the quarter, up 11% year over year, thanks to higher-than-expected hardware sales and increasing deployment of Synopsys.ai. The software integrity business was up 8% year over year to $138 million, where results were dampened by ongoing headwinds against enterprise software. Management is searching for strategic alternatives for its software integrity business, to better align its portfolio to higher-growth opportunities.

Morningstar Equity Analyst Report | Report as of 8 Jul 2025 00:31, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS

Synopsys Inc SNPS ★★★ 8 Jul 2025 00:26, UTC

Competitors Price vs. Fair Value

Siemens AG SIE



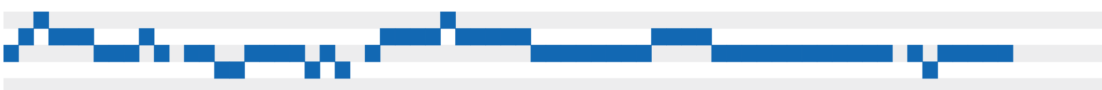
Last Close: 216.00

Fair Value: 212.00
18 Mar 2025 13:35, UTC

Overvalued
Undervalued

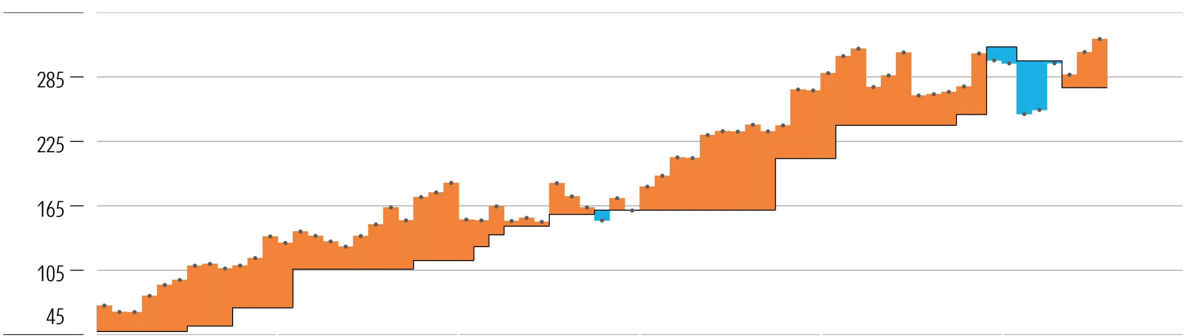
2020	2021	2022	2023	2024	YTD	
1.10	1.17	0.89	1.02	0.96	1.02	Price/Fair Value
5.66	32.90	-12.47	34.35	13.74	17.31	Total Return %

Morningstar Rating



Total Return % as of 04 Jul 2025. Last Close as of 04 Jul 2025. Fair Value as of 18 Mar 2025 13:35, UTC.

Cadence Design Systems Inc CDNS



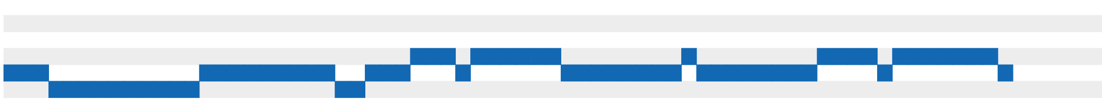
Last Close: 320.30

Fair Value: 275.00
29 May 2025 16:38, UTC

Overvalued
Undervalued

2020	2021	2022	2023	2024	YTD	
1.95	1.63	1.00	1.30	0.96	1.16	Price/Fair Value
96.70	36.59	-13.80	69.55	10.31	6.60	Total Return %

Morningstar Rating



Total Return % as of 07 Jul 2025. Last Close as of 07 Jul 2025. Fair Value as of 29 May 2025 16:38, UTC.

Morningstar Equity Analyst Report | Report as of 8 Jul 2025 00:31, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 15 of 23

Synopsys Inc SNPS ★★★ 8 Jul 2025 00:26, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
536.52 USD 7 Jul 2025	550.00 USD 8 Jul 2025 00:24, UTC	0.98	83.25 USD Bil 7 Jul 2025	Wide	Large Blend	High	Exemplary	4 Jun 2025 05:00, UTC

Morningstar Valuation Model Summary

Financials as of 28 May 2025	Actual			Forecast				
Fiscal Year, ends 31 Oct	2022	2023	2024	2025	2026	2027	2028	2029
Revenue (USD Mil)	5,082	5,843	6,127	6,397	6,977	7,897	8,915	10,023
Operating Income (USD Mil)	1,174	1,346	1,356	1,524	1,898	2,266	2,591	2,951
EBITDA (USD Mil)	1,390	1,516	1,651	1,760	2,144	2,526	2,875	3,268
Adjusted EBITDA (USD Mil)	1,966	2,293	2,584	2,760	2,991	3,485	3,890	4,336
Net Income (USD Mil)	985	1,230	2,263	1,428	1,617	1,930	2,206	2,512
Adjusted Net Income (USD Mil)	1,393	1,737	2,879	2,192	2,337	2,713	3,033	3,379
Free Cash Flow To The Firm (USD Mil)	898	793	1,229	1,425	1,215	1,518	1,707	2,096
Weighted Average Diluted Shares Outstanding (Mil)	156	155	156	158	161	160	159	159
Earnings Per Share (Diluted) (USD)	6.29	7.92	14.51	9.05	10.06	12.06	13.85	15.85
Adjusted Earnings Per Share (Diluted) (USD)	8.90	11.19	18.46	13.89	14.53	16.94	19.03	21.32
Dividends Per Share (USD)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Margins & Returns as of 28 May 2025		Actual			Forecast					
	3 Year Avg	2022	2023	2024	2025	2026	2027	2028	2029	5 Year Avg
Operating Margin %	22.2	23.1	23.0	22.1	23.8	27.2	28.7	29.1	29.4	27.5
EBITDA Margin %	—	27.4	26.0	26.9	27.5	30.7	32.0	32.3	32.6	—
Adjusted EBITDA Margin %	—	38.7	39.3	42.2	43.2	42.9	44.1	43.6	43.3	43.4
Net Margin %	25.8	19.4	21.1	36.9	22.3	23.2	24.4	24.8	25.1	24.0
Adjusted Net Margin %	34.7	27.4	29.7	47.0	34.3	33.5	34.4	34.0	33.7	34.0
Free Cash Flow To The Firm Margin %	17.1	17.7	13.6	20.1	22.3	17.4	19.2	19.2	20.9	19.8

Growth & Ratios as of 28 May 2025		Actual			Forecast					
	3 Year CAGR	2022	2023	2024	2025	2026	2027	2028	2029	5 Year CAGR
Revenue Growth %	13.4	20.9	15.0	4.9	4.4	9.1	13.2	12.9	12.4	10.3
Operating Income Growth %	20.8	52.8	14.7	0.7	12.4	24.6	19.4	14.3	13.9	16.8
EBITDA Growth %	22.1	48.2	9.1	8.9	6.7	21.8	17.8	13.8	13.7	14.8
Adjusted EBITDA Growth %	22.2	38.8	16.6	12.7	6.8	8.4	16.5	11.6	11.5	10.9
Earnings Per Share Growth %	44.5	30.7	26.0	83.2	-37.7	11.2	19.9	14.9	14.4	1.8
Adjusted Earnings Per Share Growth %	44.5	30.1	25.7	65.0	-24.8	4.7	16.6	12.3	12.0	1.8

Valuation as of 28 May 2025	Actual			Forecast				
	2022	2023	2024	2025	2026	2027	2028	2029
Price/Earning	32.9	42.0	27.8	38.6	36.9	31.7	28.2	25.2
Price/Sales	8.8	12.2	12.9	13.0	11.9	10.5	9.3	8.3
Price/Book	8.3	11.9	8.9	6.7	6.0	5.4	4.8	4.3
Price/Cash Flow	—	—	—	—	—	—	—	—
EV/EBITDA	22.2	30.6	30.1	28.9	26.7	22.9	20.5	18.4
EV/EBIT	37.2	52.2	57.4	52.3	42.0	35.2	30.8	27.0
Dividend Yield %	—	—	—	—	—	—	—	—
Dividend Payout %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Free Cash Flow Yield %	—	—	—	—	—	—	—	—

Operating Performance / Profitability as of 28 May 2025	Actual			Forecast				
Fiscal Year, ends 31 Oct	2022	2023	2024	2025	2026	2027	2028	2029
ROA %	10.5	11.9	17.3	5.4	5.9	6.8	7.3	7.8
ROE %	17.7	19.9	25.1	11.2	11.2	12.1	12.4	12.7
ROIC %	17.2	18.5	2.5	21.7	22.3	23.7	24.4	23.1

Morningstar Equity Analyst Report | Report as of 8 Jul 2025 00:31, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS

Synopsys Inc SNPS ★★★ 8 Jul 2025 00:26, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
536.52 USD 7 Jul 2025	550.00 USD 8 Jul 2025 00:24, UTC	0.98	83.25 USD Bil 7 Jul 2025	Wide	Large Blend	High	Exemplary	4 Jun 2025 05:00, UTC

Financial Leverage (Reporting Currency)	Actual			Forecast				
Fiscal Year, ends 31 Oct	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Debt/Capital %	1.5	0.9	0.9	10.4	8.6	7.2	6.4	5.5
Assets/Equity	1.7	1.7	1.4	2.1	1.9	1.8	1.7	1.6
Net Debt/EBITDA	-0.7	-0.6	-2.0	-4.4	-4.2	-4.0	-4.0	-4.0
Total Debt/EBITDA	0.3	0.3	0.3	3.5	2.9	2.2	1.8	1.5
EBITDA/ Net Interest Expense	42.3	-70.5	-16.3	-32.5	-213.6	-248.9	-277.8	-309.7

Forecast Revisions as of 29 May 2025	2025		2026		2027	
Prior data as of 26 Feb 2025	**Current**	**Prior**	**Current**	**Prior**	**Current**	**Prior**
Fair Value Estimate Change (Trading Currency)	550.00	549.95	—	—	—	—
Revenue (USD Mil)	6,397	6,772	6,977	7,672	7,897	8,683
Operating Income (USD Mil)	1,524	1,775	1,898	2,306	2,266	2,492
EBITDA (USD Mil)	2,760	2,991	2,991	3,468	3,485	3,828
Net Income (USD Mil)	2,192	2,362	2,337	2,718	2,713	2,974
Earnings Per Share (Diluted) (USD)	9.05	10.29	10.06	12.23	12.06	13.34
Adjusted Earnings Per Share (Diluted) (USD)	13.89	14.92	14.53	16.92	16.94	18.69
Dividends Per Share (USD)	0.00	0.00	0.00	0.00	0.00	0.00

Key Valuation Drivers as of 28 May 2025	
Cost of Equity %	7.5
Pre-Tax Cost of Debt %	5.5
Weighted Average Cost of Capital %	7.5
Long-Run Tax Rate %	21.0
Stage II EBI Growth Rate %	9.7
Stage II Investment Rate %	30.0
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	17,285
Present Value Stage II	17,405
Present Value Stage III	39,772
Total Firm Value	**74,462**
Cash and Equivalents	3,897
Debt	16
Other Adjustments	0
Equity Value	**78,343**
Projected Diluted Shares	159
Fair Value per Share (USD)	**550.00**

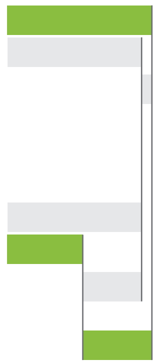
Morningstar Equity Analyst Report | Report as of 8 Jul 2025 00:31, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS

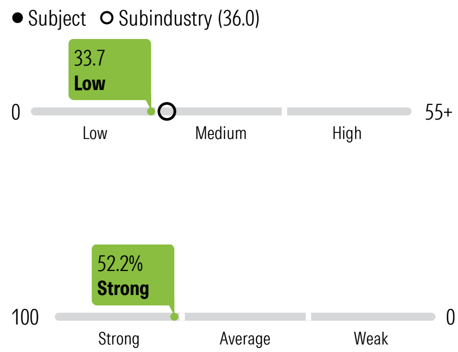
Synopsys Inc SNPS ★★★ 8 Jul 2025 00:26, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
536.52 USD 7 Jul 2025	550.00 USD 8 Jul 2025 00:24, UTC	0.98	83.25 USD Bil 7 Jul 2025	Wide	Large Blend	High	Exemplary	4 Jun 2025 05:00, UTC

ESG Risk Rating Breakdown

Exposure	
Company Exposure[1]	33.7
– Manageable Risk	31.3
Unmanageable Risk[2]	**2.4**
Management	
Manageable Risk	31.3
– Managed Risk[3]	16.3
Management Gap[4]	**15.0**
Overall Unmanaged Risk	**17.4**





- 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 52.2% 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 Jun 04, 2025. Highest Controversy Level is as of Jun 08, 2025. Sustainalytics Subindustry: Enterprise and Infrastructure Software. 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 04 Jun 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		
Synopsys Inc	33.7 | Low	0	55+	52.2 | Strong	100	0	17.4 | Low	0	40+
Cadence Design Systems Inc	33.3 | Low	0	55+	60.8 | Strong	100	0	14.5 | Low	0	40+
Siemens AG	60.7 | High	0	55+	63.3 | Strong	100	0	25.8 | Medium	0	40+
–	– | –	0	55+	– | –	100	0	– | –	0	40+
–	– | –	0	55+	– | –	100	0	– | –	0	40+

Morningstar Equity Analyst Report | Report as of 8 Jul 2025 00:31, UTC | Reporting Currency: USD | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 18 of 23

Appendix
Historical Morningstar Rating

Synopsys Inc SNPS 7 Jul 2025 21:33, 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
★	★	★	★	★	★	★	★	★★	★★	★★	★★

Siemens AG SIE 5 Jul 2025 00:21, 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
—	★★★	★★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★	★★★★★	★★★★	★★★

Cadence Design Systems Inc CDNS 7 Jul 2025 21:36, UTC

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

Research Methodology for Valuing Companies

Overview

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

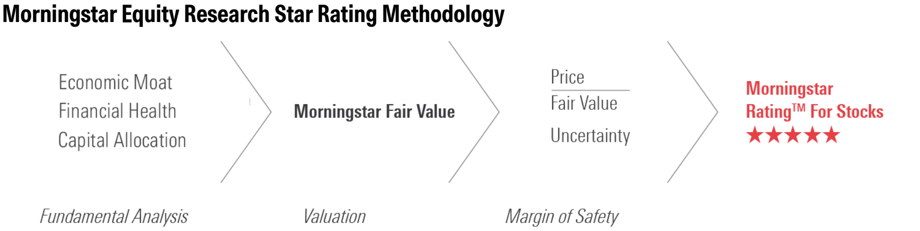
Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows. Because we are modeling free cash flow to the firm—representing cash available to provide a return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

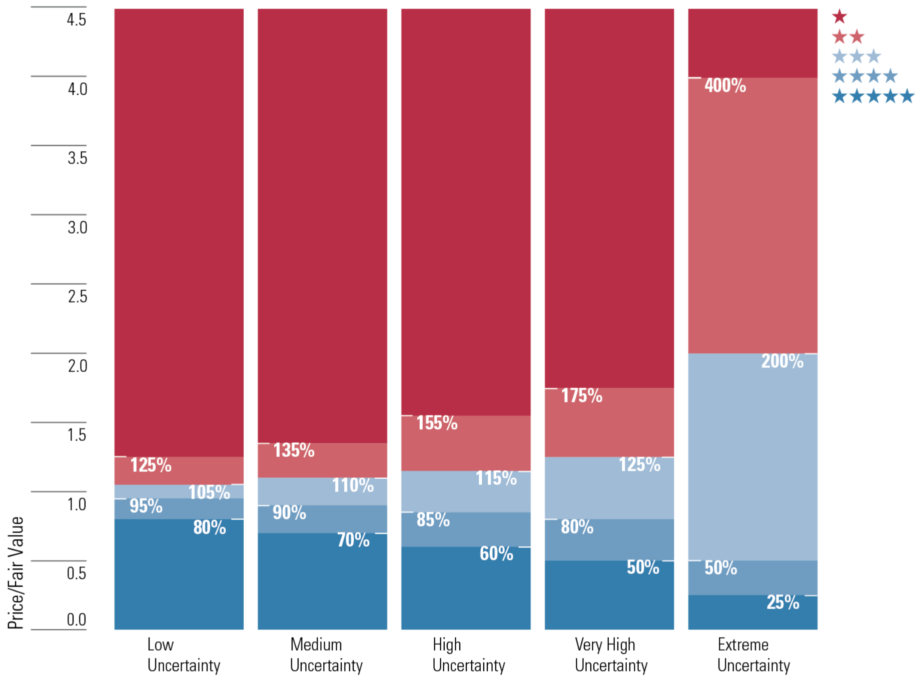
Our uncertainty rating is based on the interquartile range, or the middle 50% of potential outcomes, covering the 25th percentile–75th percentile. This means that when a stock hits 5 stars, we expect there is a 75% chance that the intrinsic value of that stock lies above the current market price. Similarly,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